Section 6

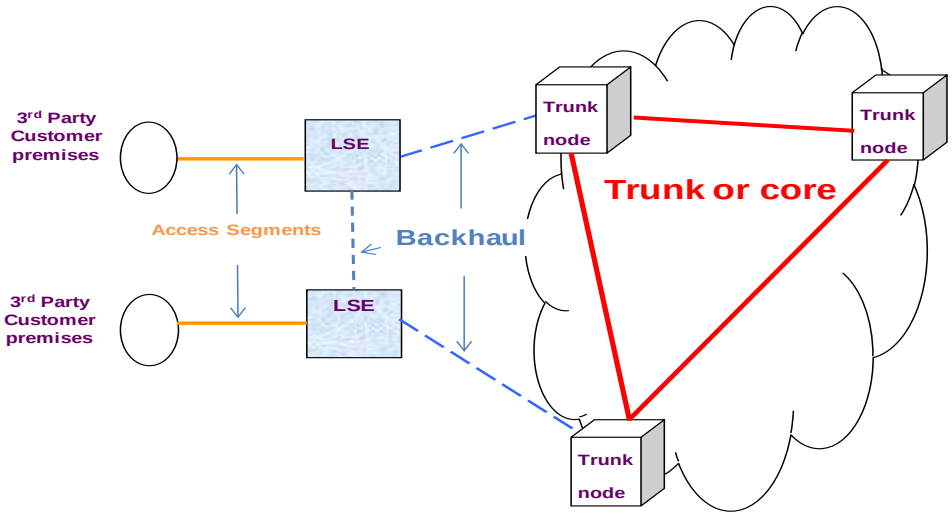
Product and geographic market definition for wholesale trunk

Introduction

6.1 In Sections 4 and 5, we have defined the scope of the relevant wholesale product and geographic markets for terminating segment markets. In this Section, we consider product and geographic market definition for wholesale trunk services.

6.2 Trunk or core networks are used to transfer data over long distance national routes and between the major urban centres where businesses are concentrated. Data transported over trunk (or core) networks is combined with other traffic streams (using multiplexors), which allows CPs to transport traffic on their networks more efficiently. By contrast, terminating segments (such as AISBO or TISBO circuits) are often used to provide the connectivity from end-user sites into core networks.

Figure 6.1: Trunk versus terminating segments



Source: Ofcom 2012

Summary of our conclusions

6.3 Our conclusions on wholesale trunk market definition are very similar to our proposals in the June BCMR Consultation, and are summarised in Figure 6.2 below. In light of comments to the June BCMR Consultation, we continue to define regional and national trunk markets at all bandwidths.

Figure 6.2: Summary of wholesale market definitions for trunk / core connectivity services

	Product market
Trunk / core connectivity	TI regional trunk at all bandwidths
	TI national trunk at all bandwidths
	National core conveyance at all bandwidths

Source: Ofcom 2013

Structure

6.4 In light of the extent of stakeholder comments related to topics falling under our TI and AI trunk definition, we have sub-divided this Section into six main parts as set out in Figure 6.3 below.[521]

Figure 6.3: Structure of product and geographic market definition assessment for wholesale trunk

Issue	Summary of issue being considered
Issue 1: Separate TI trunk and terminating segments	We consider the case for separate trunk and terminating segments market(s).
Issue 2: Defining TI trunk markets for “regional” and “national” trunk	We explain our rationale and the evidence to support the break between TI trunk and terminating segments based on Trunk Aggregation Nodes and the definition of separate regional and national trunk markets.
Issue 3: Stakeholders’ alternative trunk market definition proposals	In light of Stakeholders’ concerns regarding our market definition (discussed under Issue 2), we set out our assessment of stakeholders’ alternative trunk market definition proposals.
Issue 4: AI trunk	In light of our definition of TI trunk markets (based on TANs and regional and national trunk), we discuss our approach to defining trunk for AI services (AI trunk).
Issue 5**:** trunk versus core conveyance	We consider whether we can identify separate markets for different ‘types’ of trunk/core networks that are used to support leased lines services (e.g. core conveyance or trunk services used to support retail AI and TI services).
Issue 6: Bandwidth breaks	We discuss whether we should identify separate markets for trunk or core conveyance based on the bandwidth of the service delivered.

6.5 For each Issue:

[521] Issues 1 to 4 in this Section were all covered under Issue 1 in the June BCMR Consultation. Issues 4 and 5 in this Section are equivalent to the discussion of Issues 2 and 3 in the June BCMR Consultation.

- we set out the proposals we made in the June BCMR Consultation, with the reasoning that underpinned them;
- we then summarise stakeholders' comments on our proposals; and
- we present our conclusions in light of those comments and our further analysis.

6.6 Under Issue 1, we consider whether demand and supply-side substitution analysis points to separate markets for trunk and terminating segments. We also consider whether differences in the competitive conditions for the trunk part of the network relative to terminating segments support the finding of separate markets. Consistent with our view in the June BCMR Consultation, we conclude that both demand and supply-side substitution and respective differences in competitive conditions support defining separate markets for trunk and terminating segments.

6.7 Under Issue 2, we discuss how best to define the precise boundaries between trunk and terminating segments. Consistent with our view in the June BCMR Consultation, we conclude that it is appropriate to base our market definition of TI trunk on the trunk aggregation node (TAN) approach. Consistent with our proposals in the June BCMR Consultation, we have also concluded it is appropriate to define a national and regional TI trunk respectively.

6.8 Under Issue 3, we discuss stakeholders' alternative TI trunk market definition proposals and why we have rejected their proposals.

6.9 Under Issue 4, we explain that we use a similar approach to identify AI trunk market based on TANs. We also consider some of the differences related to AI trunk and why we consider it unnecessary to define regional and national trunk markets for AI services.

6.10 Under Issue 5, we look at the alternative technologies that can be used in trunk or core networks and we assess whether a distinction can be made between the trunk networks used to support TI retail markets (often based on TDM-technologies) and other forms of 'core' conveyance[522] used to support, among other things, AI services. Consistent with our proposals in the June BCMR Consultation, we conclude that there are separate markets for trunk and core conveyance respectively.

6.11 Finally, under Issue 6, we look at whether we should identify separate markets for trunk or core conveyance services based on the bandwidth of the service delivered. Consistent with our proposal in the June BCMR Consultation, we conclude there is a single core conveyance market at all bandwidths. With regard to our TI trunk markets, we conclude that we should identify regional and national TI trunk markets at all relevant bandwidths.

Issue 1: Is there a break between trunk and terminating segments

Our proposals in the June BCMR Consultation

6.12 In the June BCMR Consultation, we assessed whether there was a separate trunk market in the UK and, finding that there was, we considered the appropriate boundary between trunk and terminating segments. We explained why we thought

[522] An example of a core conveyance service used for leased lines would be MPLS technologies used in IP networks.

that the competitive conditions for the provision of trunk services would, in general, remain sufficiently distinct from those for the provision of terminating segments.

6.13 In considering whether there were separate markets for trunk and terminating segments, we first considered possible demand and supply-side substitution. We said that trunk and terminating segments typically had a complementary relationship.[523] This complementary nature suggested that a terminating segment would not be an effective substitute for a trunk segment or vice versa.

6.14 We said that the lack of demand-side substitution reflected the differences in aggregation opportunities at different levels in the network. We considered that the general distinction between terminating segments and trunk related to the greater aggregation opportunities for trunk. Where sufficient aggregation opportunities existed, then trunk circuits (taking advantage of economies of scale and scope) would be preferred[524]. By definition, it was unlikely that a terminating segment that might go to an individual end-user (or a link shared across fewer end-users) would be an efficient alternative and would therefore not provide an effective competitive constraint on a long-distance trunk link.[525]

6.15 In considering the case for separate trunk and terminating segments, we considered that it was also relevant to highlight the distinction made between trunk and terminating segments in the EC's Explanatory Note:

> "At the wholesale level, it is possible to distinguish separate markets, in particular between the terminating segments of a leased circuit (sometimes called local tails or local segments) and the trunk segments. What constitutes a terminating segment will depend on the network topology specific to particular Member States and will be decided upon by the relevant NRA."[526]

6.16 We noted that the EC's main justification for a separate trunk market was that (in many Member States) multiple CPs were likely and able to provide competing infrastructure for trunk or core networks. In the EC's Explanatory Note, the EC considered that in general the extent of competition for trunk in most Member States justified removing trunk segments from the list of markets susceptible to ex-ante regulation. Nevertheless, it recognised that the scope for competition in trunk was likely to vary both between and within Member States:

> "While many trunk segments on major routes are likely to be effectively competitive in certain geographic areas in Member States, other trunk segments may not support alternative suppliers. Depending on the proportion of such routes in a given Member State, one may see a tendency towards effective competition where alternative operators have made sufficient investments in alternative infrastructures and are in competition with the incumbent on the

[523] This complementary relationship can be seen in Figure 6.5 below.

[524] Leased line demand is location-specific and terminating segments and trunk segments tend to be provided in different locations: a terminating segment between a customer site and a network node will not be a good substitute for a trunk segment between that network node and another network node in a different location.

[525] In the context of a hypothetical monopolist test (HMT), a SSNIP on trunk segments would not prompt sufficient levels switching to terminating segments to make that price increase unprofitable. Similarly, it would not be efficient for a CP to rely on a trunk link where there are limited aggregation opportunities (as is the case for terminating segments to the end-user).

[526] See Section 4.2.3.

> merchant market. The trunk segment leased line market has so far been found not to meet the second criterion in one Member State and hence not to be susceptible to ex ante regulation. In a number of other Member States, the NRA has found the market for trunk segments of leased lines to be effectively competitive as a number of parallel networks have been established. This trend is likely to continue. Therefore the market for wholesale trunk segments of leased lines is withdrawn from the recommended list on the basis that there is a clear trend towards effective competition through parallel infrastructures, which also indicates that entry barriers are insufficiently high to warrant satisfaction of the first criterion.
>
> Nevertheless a significant number of routes may continue to be served only by a single operator in particular where the route is thin. This will vary within and between Member States but often new entrants cannot be expected to compete with the established operator across the whole of the territory, individual NRAs may be in a position to demonstrate that trunk segments of leased lines continue to fulfil the three criteria and are susceptible to ex ante regulation. Whilst it might be considered that competition law can address the failure on such thin routes, it is unrealistic to rely solely on competition law for as long as the number of unduplicated trunk routes in a country remains high, considering the general costing and pricing principles that would have to be applied throughout the network."[527]

6.17 Therefore, the EC's view was that the presence of competing infrastructure – which was likely to be more extensive for the largest trunk routes – was the main driver for identifying separate markets for trunk and terminating segments.

6.18 In the June BCMR Consultation, we analysed data on retail TI circuits sold by OCPs that would 'notionally' require a trunk segment.[528] We compared these 'retail requirements' to BT's overall sales of wholesale TI circuits to third parties (Partial Private Circuits (PPCs))[529] that also contained both a terminating segment and trunk segments. This comparison of retail requirements for trunk to BT's wholesale sales of PPCs was used to provide a view of the extent to which OCPs that were reliant on BT for a terminating segment were able to self-supply the trunk element of a retail circuit themselves.

[527] See Section 4.2.3.

[528] We calculated whether a retail circuit requires a trunk segment based on whether the circuit crosses the boundaries of one catchment area and another. Where the circuit serves customers in different TAN catchment areas, we assumed it has a trunk component (for a further description of catchment areas see discussion under Issue 2 below. If the retail circuit requirement falls within the same TAN catchment area then there is no trunk segment. We referred to this as a 'notional' requirement because the trunk requirement is inferred from the TAN routing rules rather than data as to how each OCP retail circuit is actually physically routed (which is data that we do not have).

[529] BT always sells a PPC from the end-user site to an OCP's point of handover to its core network. However, a PPC is not available on an end-to-end basis between two end-user sites (so it is always a partial circuit). A PPC sold always contains at least a terminating segment (from an end-user site to an OCP's POH). Depending on the scope of an OCP's own network an OCP may also rely on BT to provide PPC including a trunk segment as well as a terminating segment.

6.19 The data[530] suggested that, on average, more than one third of OCPs' retail TI circuit sales would 'notionally' have required a trunk segment. This was marginally higher than the proportion (around 26%) of TI circuits sold to OCPs by BT that included a trunk segment. This suggested that where a CP required a terminating segment (from BT) it often also bought a trunk segment from BT rather than self-supplying. However, within this average there were a number of larger suppliers such as [✂] whose reliance on BT was less significant. Across all CPs there appeared to be a significant number of instances where OCPs could self-supply the trunk segment.[531]

6.20 Therefore, we considered that the analysis supported the definition of separate TI trunk and terminating segments markets. We noted that a similar analysis could be applied to AI services, because a significant number of CPs had their own core network capacity capable of supporting a long-distance AI conveyance service analogous to TI trunk services. In particular, a CP with its own core network infrastructure capable of supporting AI services should be in a better position to self-provide AI trunk than they would be for AI terminating segments. We considered that the reasons for identifying a break between TISBO and trunk segments were likely to be equally valid for AISBO and AI core/trunk segments.[532]

Consultation responses in relation to Issue 1

6.21 Out of the seven respondents that commented on our trunk proposals, only BT provided specific comments on separate trunk and terminating segments. BT seemed to accept that there is a distinction between what it termed the access and the core network, but it provided a number of objections to the way we sought to differentiate trunk and terminating segments, as:

- our observation that trunk and terminating segments are complements was largely a result of (and endogenous to) our starting definitions;[533]
- the reference we made to the EC's Explanatory Note[534] could be interpreted differently to the way Ofcom had set out;[535] and

[530] Data based on CPs responses to our s135 information request on retail and wholesale circuit sales and purchases.

[531] There are some caveats that we must apply to this analysis. This is because some of the inferences over the extent of sales of wholesale trunk circuits may be overstated to some extent. However, if anything, any bias in this analysis is likely to overstate the extent to which OCPs rely on BT for all of their trunk requirements. Therefore, to the extent that the market data suggests that some OCPs are able to self-supply trunk segments (to a greater degree than terminating) then this evidence is still supportive of a separate market to terminating segments.

[532] We note that it would not be possible for us to calculate the volume of AI trunk circuit sales in the same manner. BT's sales of such services are often under the umbrella of its Managed Ethernet Access Services contracts. The nature of these services and the technology used to deliver trunk services (on BT's 21CN) is such that it is difficult to replicate the above analysis on a per circuit basis.

[533] Similar to wholesale market definition for access and backhaul (discussed in Section 4, under Issue 3), BT considered that the fact we considered trunk and terminating segments as complements was endogenous to our definition, as we defined a break-point with reference to BT's network topology. Hence, if terminating segments are defined as always ending at a particular node type (e.g. Tier 1 or trunk aggregation nodes) and trunk always starting at the same nodes then the two segments will never overlap.

BT's argument may be that at the network planning stage there is some substitutability at the margin. In particular, its argument may be that it is possible to substitute between trunk and terminating segments by changing the location of nodes. For example, one network design might feature a relatively small core and long terminating segments whilst another could feature a larger core and shorter terminating segments. This may have been behind the BT view that "trunk and termination are emphatically substitutes". Paragraphs 40-42, p234, S4.8. On the other hand, SPC, in the report submitted by BT, seem to regard trunk and terminating segments as complements: see Issue 3 below.

- Ofcom's analysis of the purchasing patterns of CPs used to justify separate terminating and trunk markets was based entirely on the existing regulated products (which assume traffic is routed via Tier 1 nodes).[536]

Ofcom's considerations of consultation responses

6.22 BT accepted that there were separate trunk and terminating segments markets but it criticised our justification for separate markets[537] and our interpretation of the EC's Explanatory Note.

6.23 Our view remains that trunk and terminating segments are most appropriately viewed as complementary network components. Even if there could be some substitution at the margin (when planning the design of a network) between trunk and terminating segments, from the point of view of a CP considering how to supply an end-to-end retail circuit, both trunk and terminating segments may be needed and they may then have a complementary relationship (even if there is scope to change at the margin the relative proportion of trunk and terminating segments).

6.24 We note that in the report BT Commissioned from SPC, it seemed to accept segmentation between terminating and trunk. SPC's report identifies *"Trunk and Local Access (i.e. the connection between the customer premises and the point of interconnection) to be complementary, separate, upstream inputs to retail leased lines. The distinction between them may be considered arbitrary in that they are not physically distinguishable and both exist only as a result of regulation. We therefore propose that the distinction should be based on replicability."* This quotation accepts that definition of separate markets reflects the complementary nature of the two services. It also seems to accept that differences in the ability of rivals to replicate different parts of the network, and hence differences in competitive conditions, are a driver for distinguishing between the two network elements. This is the focus of our trunk assessment (albeit with different views to some stakeholders on how best to draw the dividing line between trunk and terminating segments).

6.25 As noted in the EC's Explanatory Note, there is generally considered to be greater scope for competition in trunk markets than in terminating segment markets (largely reflecting the existence of parallel infrastructure i.e. operators with their own competing trunk network). We consider that a key reason for this *a priori* expectation that the relevant trunk market(s) will contain competing parallel infrastructure, reflects

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[534] See paragraph 6.69 of the June BCMR Consultation.

[535] BT did not consider that the reference to the EC's Explanatory Note, which distinguished between 'thick' and 'thin' routes, supported our case for trunk based around Tier 1 nodes and TANs. It saw the quotation as highlighting that 'thin' routes were ones that are supported only by a single operator and by deduction where there is more than one operator the route might be deemed not to be 'thin'.

[536] BT argued that the assumption of routing via Tier 1 nodes creates a 'notional' requirement for trunk built entirely around BT's topology. CPs would not be able to identify a 'trunk' utilisation in any other sense than they utilise their own networks to the maximum extent possible. BT considered that it was not clear what we meant in the document where we assert that 'where a CP buys a terminating segment from BT it often also buys a trunk rather than self-supplying it.' BT noted that if this observation were based on the notional routing then it is not useful finding. BT further noted, in any case, that we had found in a sufficient number of instances OCPs can self-supply the trunk segment – which it saw as *prima facie* evidence that BT does not have SMP in this activity.

BT also expressed concerns that we had not undertaken sensitivity analysis to take into account the use of PPCs to feed into other downstream markets such as PSTN and VPNs (as was done in the 2007/8 Review).

[537] For example, BT was critical of our analysis of the purchasing behaviour of CPs. However, the information that we presented in the June BCMR Consultation was aimed at showing that there was a case for defining these two parts of the network separately as the evidence indicated sufficiently heterogeneous conditions of competition (this is further explained below under Issue 2).

the nature of trunk services. Trunk networks connect the main centres, collecting traffic from the surrounding area (delivered over multiple access links or terminating segments) and aggregating it for onward transmission. Given high fixed and sunk costs of investment in network infrastructure, (construction costs do not vary significantly with the capacity installed), average unit costs fall as capacity and traffic increase. The larger volumes of traffic on trunk routes allow a greater number of operators to enter without suffering a significant cost disadvantage relative to a large incumbent. Hence, OCPs have targeted their network build to the main population centres as it is in the main centres that they can generate sufficient economies of scale to justify that network presence. We expect competitive conditions for the provision of trunk to be sufficiently distinct from those for the provision of terminating segments, reflecting the greater aggregation opportunities for trunk (and hence greater opportunities to realise economies of scale and scope). This is reflected in a number of CPs owning and operating core networks to varying degrees.

6.26 With regard to BT's criticism of our interpretation of the reference made to the EC's Explanatory Note, our view is that the competitive conditions for the supply of trunk services and terminating segments respectively are sufficiently heterogeneous (due, as noted above, to the former's greater aggregation opportunities which in turn provides OCPs with the financial incentive to invest in the necessary infrastructure), such that separate markets are warranted. We consider that this view is consistent with the EC's Explanatory Note, as set out in the following passage:

> "In relation to terminating segments, the existence of high and non-transitory entry barriers and the absence of a tendency towards effective competition across the EU are more obvious. Often the terminating segments of leased lines rely in one form or another on the former incumbent's ubiquitous access network. The control over that ubiquitous access network continues to provide the incumbent with a legacy advantage on the terminating segments of the leased line market that new entrants, across the EU, have not yet overcome. Even more than with trunk segments, there is little dynamic towards effective competition and competition law cannot alone address the failures on the [terminating] segments market."[538]

Issue 2: TI trunk definition for "regional" and "national" trunk

6.27 In light of the conclusion under Issue 1 that there are separate terminating and trunk markets, we discuss under Issue 2 our approach to defining the break point between TI trunk and terminating segments market.

6.28 Prior to discussing our proposals in the June BCMR Consultation, we have provided further background in relation to the key market definition concepts associated with our trunk market definition. With these descriptions in mind we set out our June BCMR Consultation proposals, stakeholders' views and our conclusions on the definition of TI trunk markets.

[538] See Section 4.2.3.

Background to TI trunk market definition

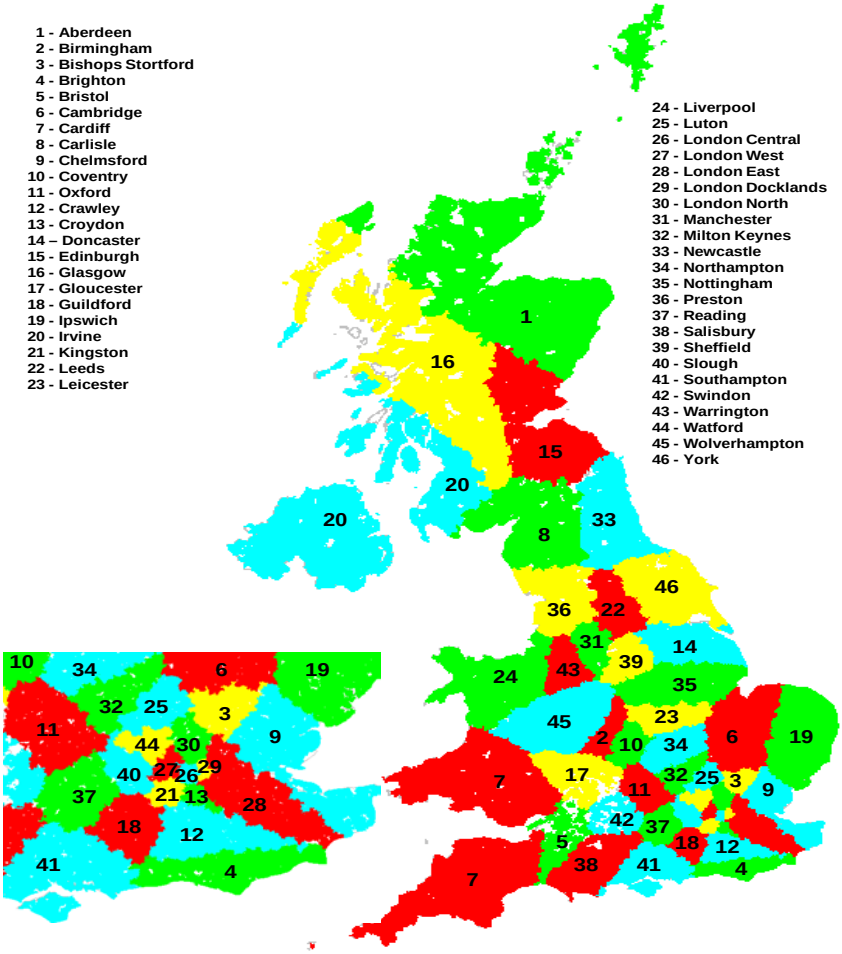
Identification of the break point based on catchment areas

6.29 In the following paragraphs, we provide a description of the key market definition concepts associated with the trunk market. In particular, we describe below how we use the concept of "catchment areas" to identify circuits containing trunk. We explain how these "catchment areas" have been applied in previous market reviews, where we have regarded a circuit that connects two different catchment areas as including a trunk segment, whilst a terminating segment is a circuit entirely within a single catchment area.

6.30 In previous market reviews of wholesale leased lines, we have progressively adapted our approach to defining trunk markets as we aimed to draw a more accurate boundary between trunk and terminating segments. What is common to each iteration of our trunk market definition is that it has relied on splitting the UK into a patchwork of regions known as "catchment areas". These catchment areas have been used to classify circuits either as trunk or terminating segments and hence they have been used, historically, to identify the boundary between trunk and terminating segment markets (and also in the subsequent application of regulatory remedies).

6.31 The "catchment areas" are based on the areas served by (groups of) BT's main network nodes. Hence, any location in the UK is associated (or parented) to a particular node or set of nodes serving a particular catchment area. The catchment areas relied upon in our June BCMR Consultation are shown in Figure 6.4 below.

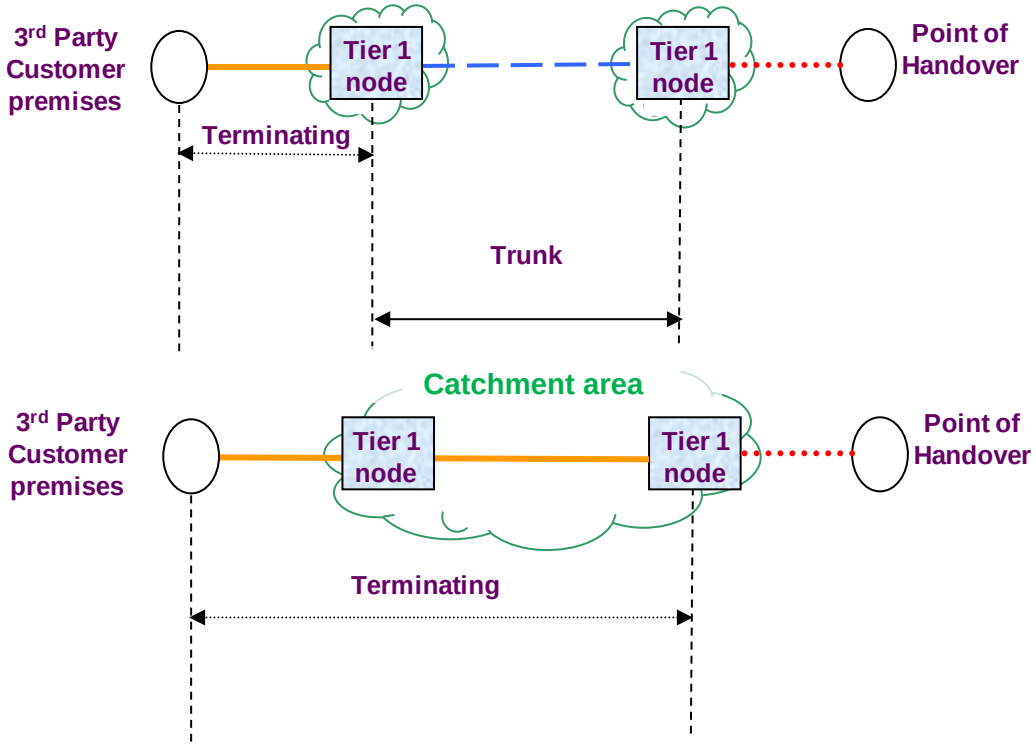
Figure 6.4: Catchment areas for TI trunk markets



Source: Ofcom 2012, BT s.135 data

6.32 These catchment areas are important to our market definition since, as noted above, a "trunk" service is used where a circuit connects two points that fall within different geographic catchment areas, while a terminating segment is a connection where both circuit ends are within a single geographic catchment area. This is set out in Figure 6.5 below.

Figure 6.5: Definition of trunk between aggregation nodes in the 2007/8 Review



Source: Ofcom 2007/8 Review

6.33 In the first schematic in Figure 6.5, we show a circuit linking BT nodes situated in different catchment areas. In these circumstances, the circuit between those Tier 1 nodes would be treated as trunk as it links different TAN catchment areas. In the second scenario, the Tier 1 nodes are part of the same TAN catchment area. In this scenario a circuit linking those Tier 1 nodes would be classified as a terminating segment.

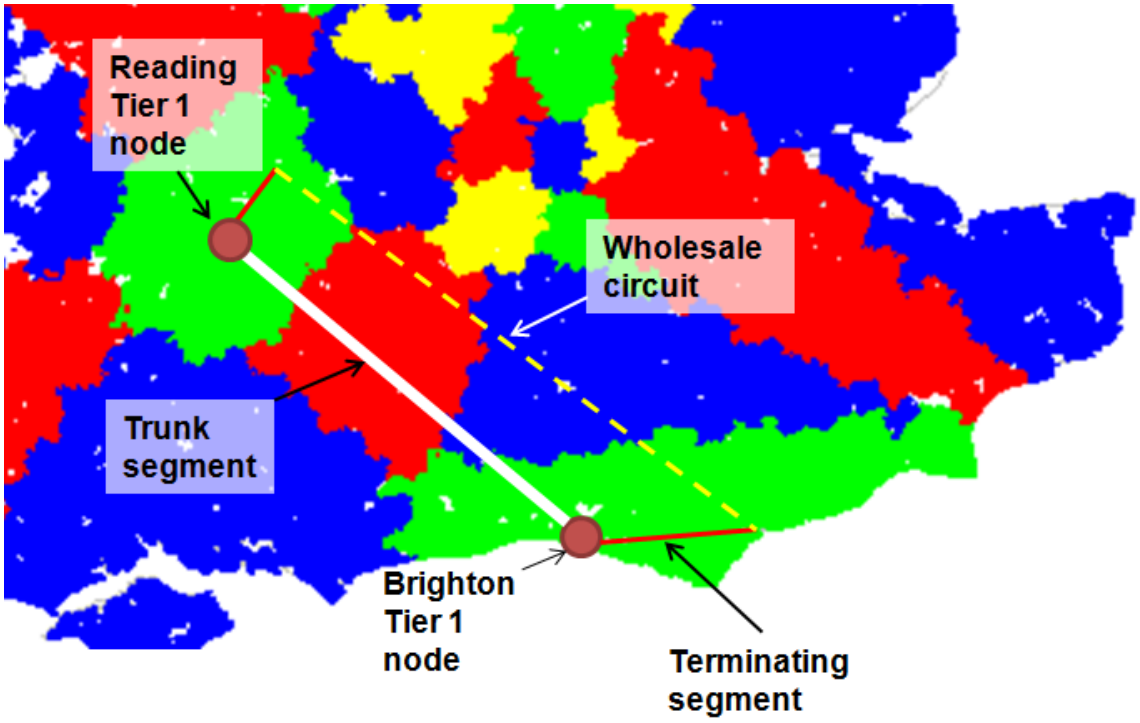
6.34 Hence, if we refer back to the UK map of catchment areas in Figure 6.4 above a circuit linking Edinburgh (represented by catchment area 15) and Birmingham (represented by catchment area 2) would be classified as containing a trunk segment. A circuit with both ends wholly within the Edinburgh catchment area (area 15) would be a terminating segment.

Routing assumptions

6.35 To provide more precision over the break-point between trunk and terminating segments (i.e. where a terminating segment ends and where a trunk segment starts), we assume:

- that the notional routing of the circuit between TANs is via relevant BT Tier 1 nodes (or the equivalent on OCPs' networks);
- this 'notional' routing applies even if the 'actual' routing of the wholesale circuit in question is over a more direct route.

Figure 6.6: Example of 'notional' circuit routing



6.36 In Figure 6.6 above, if an OCP purchased a wholesale circuit from BT between the Brighton catchment area and the Reading catchment area (the circuit is represented by the yellow dotted line) then we would assume that the circuit provided contains a trunk segment. Under BT's PPC routing rules, the circuit is assumed to go via the Tier 1 nodes nearest to the circuit end points in each of the catchment areas. [539]

6.37 The resulting 'notional' route is used for charging of the wholesale service a CP requires (the yellow dotted line) by segmenting that circuit into trunk and terminating segments. This segmentation is based on the total distances for the trunk and terminating segments on the 'notional' route via relevant Tier 1 nodes. Hence, an OCP purchasing a circuit from BT would be charged as if part of that circuit were provided using a trunk segment between the Brighton and Reading Tier 1 nodes (even if in practice the circuit were routed via an alternative path on BT's network).

6.38 These routing assumptions have been an important feature of regulated leased lines markets. As noted in the January Consultation for the 2007/8 Review:

> "… In the existing model for TI circuits, BT is obliged to provide PPCs, which run from a customer site to a point of presence (POP) in the purchasing CP's network, but does not provide end-to-end wholesale services between customer sites. In this existing model, a CP wishing to provide a short retail circuit, which crosses a catchment area boundary, has to purchase terminating segments from each customer site to the respective Tier 1 nodes, and then link the Tier 1 nodes using at least some of their own network.

[539] BT uses circuit routing rules to determine the proportions of the length of a circuit that are respectively trunk and terminating segments. They are independent of the actual routing of the circuit. These proportions are then used to calculate the charges BT makes for wholesale TI circuits (PPCs) sold to third parties and to its own retail arm.

> In order to provide competitive parity, when BT provides a similar circuit, it is required to charge its retail business as if the circuit had been routed via the same Tier 1 nodes, even if the physical routing was in fact much more direct. This is a key feature of the PPC charging model. It is essentially an Equivalence of Outcome (EOO) approach rather than one based on Equivalence of Inputs (EOI). BT is not actually providing the same services to its own downstream business as to its competitors, but it uses its internal transfer charging framework in an attempt to achieve an equivalent outcome."[540]

6.39 Hence, for wholesale circuits that BT sells to OCPs (PPCs),[541] the PPC charging model assumes that circuits are routed via Tier 1 nodes. Under the regulatory regime, BT's downstream retail arm does not have to consume PPCs available to third parties but instead uses regulated wholesale inputs sold by its upstream arm on an end-to-end basis. However, in order to achieve parity, the same routing assumptions are applied to BT (i.e. it is also assumed that BT's wholesale end-to-end circuits are routed via Tier 1 nodes). If BT were able to charge its own downstream operations based on preferential routing (relative to OCPs) then it could result in a competitive outcome that was not equivalent. Hence, the PPC charging model has been applied to help deliver effective competition in downstream retail markets.

6.40 However, it is important to emphasise the distinction between, first, the assumed routing rules under the PPC charging model – which, as noted above, is an EOO remedy to address SMP – and secondly, the routing we have assumed for the purposes of defining separate markets for national and regional trunk segments, both of which assume that the routing of a circuit between TANs is via relevant BT Tier 1 nodes (or the equivalent on OCPs' networks).

6.41 Use of routing rules featuring catchment areas around network aggregation points is natural and logical, and consistent with the objective of minimising costs. Cost minimisation in the provision of leased lines is generally served by minimising the length of terminating segments and hence by maximising the advantage taken of opportunities to aggregate traffic on high capacity links. A rule by which terminating segments generally connect end-user sites to the nearest network node where aggregation takes place is therefore reasonable, and use of a rule of thumb rather than case-by-case optimisation may also be reasonable from the point of view of reducing costs overall. The use of rules of some kind to ensure that terminating segments connect end user sites to core networks appropriately is therefore to be expected even in unregulated markets. In BT's case, the precise rules have also to operate in a non-discriminatory way in order to ensure competitive parity between BT and other CPs, which might not be the case in the absence of regulation where BT has SMP, although even-handed treatment of purchasers might also be regarded as consistent with a competitive market.

6.42 Our analysis in each subsequent market review including this one, as explained below, has focused on identifying where traffic was concentrated and where BT and OCPs could therefore be expected to have their core network or points of interconnection in order to aggregate that traffic for onward transmission over their own trunk networks. This is an important clarificatory point since it shows our

[540] Paragraphs 6.136 to 6.137 of the January 2008 Consultation.

[541] PPCs are circuits that link customer sites back to relevant points on their networks (POPs). OCPs then provide circuits over their own core networks.

approach to trunk market definition is based on evidence revealed by our market analysis as to where BT's and OCPs' trunk network is physically located, as opposed to relying on an assumption arising from a regulatory remedy.[542]

We have adapted our trunk market definition through time

6.43 As stated above, in each review of wholesale leased lines markets, we have refined our trunk market definition to better capture the boundary between trunk and terminating segments:

6.44 In the LLMR 2003/4, we defined the break-point between trunk and terminating segments on the basis of BT SDH Tier 1 nodes and the equivalent in operator networks. In practice, we relied on 67 Tier 1 catchment areas to classify trunk and terminating segments. Hence, the resulting market definition assumed that any circuit between areas served by different Tier 1 nodes includes a trunk segment, whereas circuits serving ends falling entirely within the same Tier 1 node are terminating segments.[543]

6.45 In the 2007/8 Review, we noted the difficulties which could arise if the trunk market were defined solely with reference to a particular level in BT's network. In particular, we were concerned that defining the trunk market as consisting of circuits between any of BT's 67 Tier 1 nodes could mean that the market definition may not adequately capture where traffic is aggregated on rival OCP networks and hence could fail to capture the scope for competitive provision.

6.46 Our approach in the 2007/8 Review was to identify the key locations in the UK where traffic was concentrated (mainly urban centres) where CPs were likely to aggregate traffic for onward transmission over their own trunk networks. We defined these aggregation points as Trunk Aggregation Nodes (TANs). This approach still took the 'catchment areas' associated with Tier 1 nodes as the building block. We considered that, as a general rule, CPs' decision to interconnect at a particular node would depend on two key factors:

- **the aggregation opportunities available:** based for example on the volume of end-users/circuits potentially served by that node; and
- **the relative distances involved:** if CPs were already located at another interconnection point (i.e. a BT Tier 1 node), what distances would be involved in the backhaul of traffic to that existing interconnection point (relative to interconnecting at the new node).

[542] In this respect we regard our approach as consistent with the application of the modified Greenfield approach.

[543] In the LLMR 2004 Statement we explained that: *"The choice of Tier 1 as the breakpoint is based on evidence supplied to Ofcom by BT regarding the extent of other communications providers' networks. This evidence shows that a significant number of other communications providers have built their networks up to the proximity of many of BT's Tier 1 nodes on BT's SDH network [....], whereas only a very small number reach other nodes. Handover therefore takes place, in the main, at Tier 1 nodes. Given the high sunk costs involved in extending a network to get closer to customer sites, Ofcom does not expect this situation to alter in the foreseeable future. This has led Ofcom to consider that BT's Tier 1 nodes provide the appropriate cut-off point. These nodes tend to be located at differing distances from customer sites, meaning that a market definition based on an average length of circuits would demonstrably fail to reflect actual market conditions."* (paragraph 2.174)

We went on to explain that:

"Ofcom will keep market conditions under review, in particular the continued relevance of the Tier 1 breakpoint as the most appropriate proxy available for the breakpoint between trunk and symmetric broadband origination."

6.47 Therefore, based on information on CP interconnection and the proximity of network nodes, we identified a smaller set of 46 TI TANs (whereas the 2004 LLMR identified 67 catchment areas). The TI TANs were essentially groupings of one or more Tier 1 node catchment areas. For example, in the 2004 LLMR review there were two Tier 1 nodes (with associated catchment areas) for Cardiff and Newport, which we combined in the 2007/8 Review to form the Cardiff/Newport TAN. The resulting TAN catchment areas are shown in Figure 6.4 above. We conducted a similar exercise for the AI market to identify trunk services albeit based on 56 AI TANs.[544]

6.48 In our Call for Inputs (CFI) for the current market review, we explained that we were minded to identify the TI trunk market on the basis of the 46 TI TANs used in the 2007/8 Review. We explained that this set of 46 TI TANs was based on key locations in urban centres where CPs were likely to locate (at least) one of their key interconnect points to pick up termination traffic. We did not consider that these key locations would have changed significantly since the last review. We invited stakeholders' views on the proposal to continue to rely on TANs to define the trunk market.

6.49 Most stakeholders responding to the CFI did not object to our proposed approach. However, in December 2011, BT submitted a paper (BT's December 2011 paper) setting out concerns over our TI trunk product market definition (and market power assessment) based on the TAN concept.

6.50 It identified two main issues with Ofcom's existing methodology:

- Ofcom's definition of 46 "aggregation nodes" failed to capture the full scope of CPs' own networks which extend much closer to end-users than BT's Tier 1 nodes. BT argued that there is significant presence at a significant number of local exchanges such that there will therefore be alternatives to using BT's network to provide connectivity beyond those nodes.

- Second, our assessment of competition between its defined "aggregation nodes" was – in its design – bound to overstate BT's service share and hence result in the finding of SMP at that "trunk" level. BT highlighted two main issues:

  - Indirect routing and measurement errors: BT noted that the TAN concept does not take into account indirect routing possibilities and results in errors in the measurement of the extent of BT's sales of trunk and underestimates the extent of OCP self-supply; and

  - TAN boundary issues: BT argued that the routing of circuits is often not via Tier 1 nodes (as the TI trunk definition assumes) and therefore incorrectly classifies some circuits as trunk that are more like terminating segments.

Our proposals in the June BCMR Consultation

6.51 In the June BCMR Consultation, we explained:

- why our overall approach to defining markets on the basis of TAN catchment areas remained appropriate;

[544] This analysis was based around the relevant network nodes for the AI market, BT's 106 metro nodes, which are now referred to as Openreach Handover Points ("OHPs").

- our views on the overall significance of BT's Tier 1 nodes to the definition of trunk using TAN approach; and

- why there could be issues over the treatment of 'short-distance' circuits as trunk when connections were between adjacent catchment areas.

6.52 We summarise below our comments in the June BCMR Consultation on each of these points and why this led us to propose an alternative trunk market definition that was still reliant on the TAN approach but that was also used to identify "regional" and "national" trunk.

Overall validity of the TAN approach

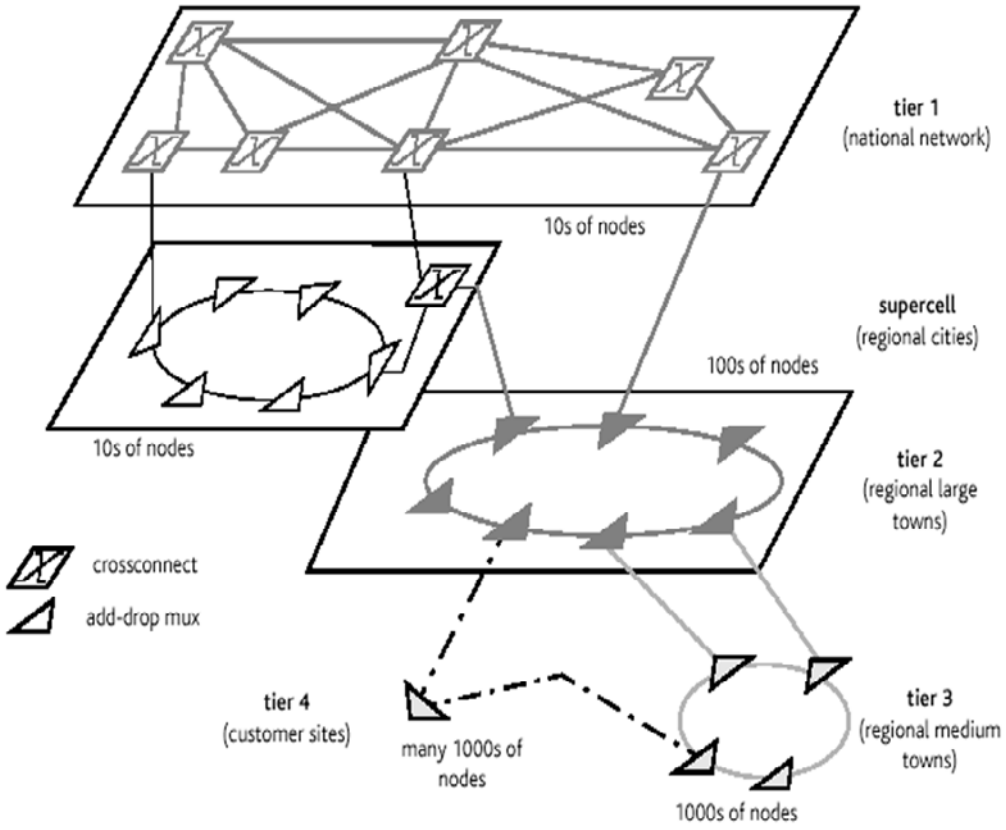
6.53 In the June BCMR Consultation, we explained why we considered that the overall TAN concept remained the most valid basis for defining the trunk market. In essence, this was because it was consistent with the way CPs competed in leased line markets. Demand for leased lines from retail business connectivity markets often required businesses to connect their sites across the UK. CPs building competing networks were likely to locate their trunk nodes first in the most concentrated population centres where their customer (end-user) base was largest. Progressively, as they gained more customers they might wish to locate more than one PoP in a particular area thereby reducing further their reliance on BT.

6.54 The need for aggregation meant that a CP's build decision was not centred on the location of a single end-user. Clearly, if it were efficient to do so, a CP would want to pick-up traffic from its retail customers close to the customer. However, building out network would entail significant sunk costs and this often meant that a CP would need to generate economies of scale (and/or scope) to make investment in trunk (or backhaul) at a PoP closer to its customers worthwhile.

6.55 The optimal decision was likely to be to locate at those exchanges where the most traffic could be served and which would minimise the circuit distances of all end-users served from that location. OCPs would also consider the opportunity to interconnect with third parties (either to purchase or sell circuits from others). Therefore, OCPs were likely to be driven towards the major network nodes where a number of other CPs had decided to locate. We considered that Tier 1 nodes were likely to be important to OCPs for this reason.

6.56 Indeed, we noted that, as part of its response to our formal information request, BT had submitted a schematic diagram of its SDH network depicting Tier 1 nodes as providing the national backbone with lower Tiers used for regional/intra-city connectivity. This diagram was included in the June BCMR Consultation and is shown again below.

Figure 6.7: Schematic view of BT's SDH network



Source: BT 2011, response to S135 information request

6.57 With this network, BT could supply regional or intra-city circuits without needing to route a service back to a parent Tier 1 node in all cases. However, this would not necessarily be true of OCPs with smaller networks. We were not only concerned about how BT might route a circuit on its network. We were also concerned that our market definition should capture the scope for OCPs to compete, which would depend on their likely network topology rather than BT's. BT as the incumbent operator with the largest customer base had naturally designed its network with a greater level of connectivity between lower layers on its network than would be the case than for its competitors (with lower overall scale).

6.58 We considered that a smaller scale operator than BT was unlikely to be able to build out a fully meshed network at anywhere near the scale of BT. Therefore, the starting point for a rival entering the market was likely to be a core network located at key points where it could pick-up the most traffic most efficiently. This network was likely to have a more hierarchical structure as a CP with more limited scale could only justify aggregation nodes at major urban centres. Through time, CPs might be able to build capacity and locate at points closer to the end-user for particular backhaul routes (e.g. in the London area). But we considered that the TAN concept of identifying a core network around key demand concentrations remained valid.

The significance of Tier 1 nodes as part of the TAN concept

6.59 We considered that there was significant CPs interconnection at Tier 1 node locations than elsewhere.

6.60 Figure 6.8 below (reproduces analysis first presented in Table 3 of the June BCMR Consultation), in which we showed that there was significant presence of OCPs in at least one Tier 1 node within each of the TAN catchment areas. We compared this to the average 'presence' of OCPs at all other SDH-enabled BT exchanges.

Figure 6.8: Count of OCPs with Point of Handover within proximity to Tier 1 nodes with TAN areas

Trunk aggregation node exchanges	Distance (km)				
	<250m	<500m	<1km	<2km	<5km
ABERDEEN	3	4	4	4	4
BIRMINGHAM	5	7	8	9	9
BISHOPS STORTFORD	1	1	2	2	3
BRIGHTON	4	4	4	4	7
BRISTOL	4	4	4	8	9
CAMBRIDGE	4	4	4	4	6
CARDIFF/NEWPORT	4	4	4	4	4
CARLISLE	2	3	3	3	3
CHELMSFORD	3	3	3	3	3
COVENTRY	3	3	4	4	4
CRAWLEY	2	2	3	3	4
CROYDON	2	2	4	6	6
DONCASTER	2	2	3	3	4
EDINBURGH	1	1	3	4	7
GLASGOW/CLYDE VALLEY	1	3	6	7	7
GLOUCESTER	2	2	2	2	4
GUILDFORD	3	3	4	4	4
IPSWICH	3	3	5	5	6
IRVINE	1	1	1	1	1
KINGSTON	2	2	2	2	2
LEEDS	0	4	6	6	7
LEICESTER	5	5	7	7	8
LIVERPOOL	3	3	3	4	5
LONDON CENTRAL	5	6	7	9	11
LONDON DOCKLANDS	3	3	3	9	10
LONDON EAST	3	3	3	3	3
LONDON NORTH	1	1	2	2	3
LONDON WEST	1	2	3	4	4
LUTON	4	4	4	4	4
MANCHESTER	5	5	5	6	11
MILTON KEYNES	2	2	3	4	5
NEWCASTLE	0	4	4	5	8
NORTHAMPTON	3	4	4	4	5
NOTTINGHAM	4	5	5	6	6
OXFORD	5	5	6	6	6
PRESTON	3	3	3	3	3
READING	3	4	4	7	7
SALISBURY	2	2	3	3	3
SHEFFIELD	4	4	4	4	6
SLOUGH	0	0	3	3	6
SOUTHAMPTON/PORTSMOUTH	5	5	7	8	8
SWINDON	3	4	5	6	6
WARRINGTON	3	3	3	4	5
WATFORD	4	4	4	4	4
WOLVERHAMPTON	4	4	4	4	4
YORK	3	3	3	3	4
Average number of CPs with proximity to TAN exchanges	2.8	3.3	3.9	4.6	5.4
Average number of CPs with proximity to other exchanges*	0.1	0.1	0.2	0.3	0.8

Source: Ofcom 2012 based on BT's S135 data on PPC Point of Handover circuit sales.
*National average includes all other exchanges.[545]

6.61 The table showed, for example, that in the Birmingham TAN there were seven unique CPs with a point of handover within what we termed a 500-metre "proximity" to one of

[545] In the June BCMR Consultation we reported the last row as showing the average number of CPs with proximity to other SDH-enabled exchanges. However, on inspection it appears that the average reported in the June BCMR Consultation was an average across all exchanges. The correct average number of CPs in the last row should be 0.1, 0.2, 0.3, and 1.8 for the respective proximity assumptions.

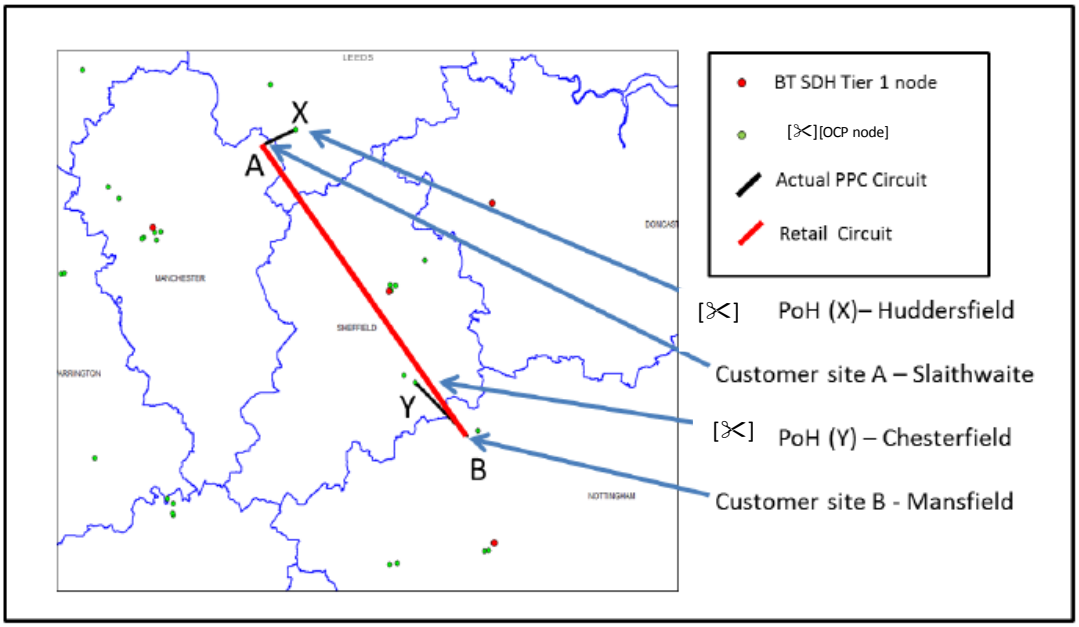
the main Tier 1 nodes.[546] On average there were more than three CPs with proximity to the Tier 1 nodes for each TAN. This contrasted with BT's other SDH-enabled exchanges, where there were far fewer CPs with this degree of proximity on average.

6.62 Therefore, in our view our proposed market definitions based around the concept of trunk networks (based on circuits between major nodes linking major urban centres) were appropriate.

Issues associated with the TAN approach: TAN boundary issues

6.63 In the June BCMR Consultation, we noted a number of comments BT had made regarding market definition issues when circuits crossed adjacent TAN catchment area boundaries. We acknowledged that there was a valid concern about the impact on BT's market share of treating circuits that cross TAN boundaries as trunk. We illustrated this point with the following example (Figure 58 in the June BCMR Consultation).

Figure 6.9: TAN boundary issues



Source: BT December 2011, Ofcom confidentiality redactions

6.64 In the example, an OCP purchased a short-distance circuit that crossed the boundary of the Manchester to Leeds TAN catchment areas. We considered that it might not be appropriate to treat a short-distance circuit as trunk simply because it crossed a 'notional boundary' between the Manchester and Leeds TAN "catchment areas". BT might be selling a number of such short-distance circuits that shared the characteristics of terminating segments (e.g. more limited opportunities for economies of scale and scope). Therefore, in market definition terms, it would appear that treating circuits linking different TAN areas as trunk circuits was not always appropriate.

6.65 We explained that the overall TAN concept remained valid for the purpose of defining trunk when considering circuits over longer distances (for instance a longer distance

[546] Given that the average distance of a PPC point of handover interconnection link is more than 1km, we considered that CPs within 500m will have proximity to major Tier 1 nodes.

circuit between major centres such as London and Birmingham should unequivocally contain a trunk segment). However, we also recognised that there were some issues with our definition when the methodology was applied to circuits that crossed the boundaries of defined TAN "catchment areas". Therefore, we explained some possible adaptations to our existing trunk market definition that we considered could resolve those issues.

6.66 We compared two market definition alternatives to address this concern:

- A definition based on the existing TAN definitions but with modifications to split the trunk between "national" trunk circuits (between non-adjacent catchment areas) and "regional" trunk circuits that cross TAN boundary of adjacent catchment areas; or

- BT's alternative proposal (from BT's December 2011 paper) to define a trunk market[547] based on the presence of CPs at BT's network nodes.

Regional and national trunk proposals in the June BCMR Consultation

6.67 As stated above, we considered that the overall approach of using TAN catchment areas to identify trunk was sound. We recognised, however, that there were issues when circuits crossed the boundaries of TANs. On this basis, we proposed to adapt our trunk market definition.

6.68 We considered that it was possible to adjust the trunk market definition to deal with the issue of circuits crossing TAN boundaries. The approach we proposed was to define two markets: a market for "regional" circuits between adjacent TANs and a separate market for "national" trunk circuits between non-adjacent TANs (e.g. circuits linking distant major UK cities).

6.69 The approach had the benefit that circuits between non-adjacent TANs were far more likely to employ trunk or core networks. For example, a longer distance circuit between, say, a town near Birmingham and a town near London was likely to be routed via London and Birmingham, in which case it would clearly include a trunk segment. However, there would inevitably be some relatively short circuits which would cross a catchment area boundary where the most efficient routing was direct, rather than via the corresponding trunk nodes for that catchment area.

6.70 A benefit of this approach was that it captured the different competitive conditions for different circuits (regional trunk segments and national trunk routes). This was because, on the one hand, routes between major urban centres would tend to be the high volume routes where the potential for competition was likely to be relatively high. On the other hand, circuits crossing boundaries may not in fact be routed across the core network; and the scope for competition for those circuits may be much more limited.

6.71 We considered that circuits between adjacent TANs should not be included within a single trunk market because many of these circuits spanning TAN boundaries shared the characteristics of terminating segments. That is, they were relatively short-distance circuits enabling a CP to serve an end-user's premises by connecting it to the nearest BT node at which it had a point of handover. In these cases, the use of a trunk circuit connecting two Tier 1 nodes was only notional, a product of the logical routing model assumed. We noted however that in other cases, it might be efficient

[547] BT, which proposed this market definition, termed it the "competitive core".

for BT or an OCP to provide a circuit spanning a TAN boundary by actually using a trunk circuit connecting two Tier 1 nodes. For example, we would expect that BT's trunk network nodes should be centred reasonably close to major cities even if they were in adjacent TAN catchment areas (e.g. Sheffield and Leeds). Therefore, in some cases, it would be efficient to route regional circuits that start and end close to the Sheffield and Leeds Tier 1 nodes over the trunk network.

6.72 However, we thought that it would not be practical to identify on a circuit-by-circuit basis which of these 'regional' circuits were:

- more like traditional, long-distance trunk carried on a high-capacity link between nodes; or
- more like termination, with only notional use of the core network.

6.73 To do so would require us to assess each circuit sold case by case, this would add significant complexity, which we considered to be disproportionate. In the June BCMR Consultation, we therefore proposed to retain the TAN concept first proposed in the 2007/8 Review in our definition of the trunk market.

Analysis to support our "regional" and "national" trunk market definition

6.74 We considered that the proposed definition of national and regional trunk markets would be consistent with demand and supply-side substitution and, given the geographic dimension to these potential markets, we also looked at common pricing constraints and homogeneity of competitive conditions.

Demand and supply-side substitution

6.75 In the June BCMR Consultation, we considered that a single national trunk market would exist because there were often multiple ways by which a national circuit could be routed (for example, a retail circuit from London to Birmingham could be delivered using a wholesale trunk service which might either be routed directly or via an intermediate London to Coventry link and then another link from Coventry to Birmingham).

6.76 Therefore, if a hypothetical monopolist sought to apply a SSNIP on a specific route (e.g. London to Birmingham) this would be constrained by CPs substituting to using alternative "indirect" trunk routes. For each trunk route, there was likely to be at least one viable alternative route. Consequently, following the standard approach to market definition,[548] we would widen the market from a starting point of an individual route to include an alternate route. If we were to repeat this exercise for every route combination in the UK then – through a chain of substitution – this could result in all national routes being included in a single national trunk market.

6.77 However, we considered that a distinction could be made between a national trunk market and regional trunk markets. For example, if a hypothetical monopolist were to apply a SSNIP to national trunk routes, it would be difficult for a CP to replicate the economies of scale and scope on national trunk routes by using a combination of multiple regional trunk or terminating segments. Therefore, demand-side substitution would not provide an effective constraint. On the other hand, for short-distance regional trunk circuits we did not consider it would be efficient to route the circuit back to a major aggregation node to make use of national trunk because this could result

[548] See, in this respect, paragraphs 40 to 43 of the SMP Guidelines.

in the circuit being much longer than is necessary. Therefore, demand-side substitution suggested separate national and regional trunk markets.[549]

Common pricing constraints

6.78 We also considered that, even if demand or supply-side substitution pointed to separate markets, it might be that a common pricing constraint applied across the two services such that they should be included in the same product market.

6.79 However, it was difficult to infer much from BT's pricing practices (and we did not have available pricing evidence from other operators).[550] BT's pricing of TI trunk segments were subject to the PPC charging rules and requirements to offer these services on a non-discriminatory basis.

6.80 Moreover, BT had scope to set different charges for different trunk segment types or in different geographic areas. Indeed, we observed that to the extent that BT had applied discounts for trunk services, it had applied them to two significant national routes for 2Mbit/s trunk segments (London to Manchester and London to Birmingham).[551] We considered that, if anything, this pricing evidence tended to suggest that there was not likely to be a common pricing constraint between regional and national trunk (at least in relation to the most important national trunk routes).

Homogeneity of competitive conditions

6.81 As noted above, we considered that the competitive conditions for national and regional trunk were likely to be sufficiently distinct for us to identify separate markets. Routes between major urban centres were likely to be the high volume routes where the potential for competition was likely to be relatively high.

6.82 By contrast, many of the regional trunk circuits spanning TAN boundaries shared the characteristics of terminating segments i.e. they were relatively short-distance circuits enabling a CP to serve an end-user premise by connecting it to the nearest BT node. In these cases, the use of a trunk circuit connecting two Tier 1 nodes was only notional, a product of the logical routing model assumed. In other cases, it might be efficient for BT or an OCP to provide a circuit spanning a TAN boundary by actually using a trunk circuit connecting two Tier 1 nodes. However, we did not believe that it would be practical to identify which circuits were more like termination and trunk without assessing each circuit sold on a case by case. This would have added significant complexity and thus be disproportionate in the context of this market definition exercise.

[549] We did not consider supply-side substitution would point to a single trunk market. This is because any providers of regional trunk are also likely to be present in the supply of national trunk. Supply-side substitution is also unlikely to be relevant in relation to providers of 'national' trunk entering the market for 'regional' trunk circuits. If we considered a HMT applied to regional trunk, it is unlikely that a provider of national trunk routes could easily enter the market and begin supplying regional circuits without incurring significant sunk costs associated with digging and ducting and further investment. Therefore, supply-side substitution would not be relevant either to national or regional trunk markets.

[550] We did not ask operators for their pricing of trunk segments because wholesale contracts may not explicitly identify trunk segments. In addition, any contracts negotiated between OCPs for third party supply may vary significantly in terms of the coverage of routes, service management such that it would be difficult to collect trunk prices comparable to BT's.

[551] BT applies a discounted charge of £22.64 per annum per km on these routes compared to an undiscounted charge of £45.28 per km for a 2Mbit/s trunk segment.

6.83 We undertook an initial assessment of likely service shares for trunk circuits using the TAN catchment areas. This analysis identified which circuits were regional trunk segments between adjacent TAN catchment areas and which were national trunk segments between non-adjacent TANs. The analysis suggested that there was more effective competition on national trunk routes between non-adjacent TANs. For example, on a national average basis, we estimated BT's share of the wholesale national trunk market to be up to 49% (and potentially less) across these large inter-city routes.[552] For the 'regional' trunk market, we estimated that BT's share would be much higher at up to 89%, which was very similar to its overall shares of the low bandwidth TISBO market. Our analysis also suggested that the service shares were persistently higher for regional trunk routes connecting adjacent TAN areas in different parts of the country.

Summary of proposed market definition in the June BCMR Consultation

6.84 In summary, we proposed to identify separate trunk and terminating segment markets. We also made a distinction between regional circuits crossing adjacent TANs (more similar to terminating segments) and national trunk circuits on the basis of variations in competitive conditions and other market definition criteria. We did not consider that a market definition based on the number of interconnecting operators alone would be an adequate basis for defining a trunk market. We considered that competitive conditions within a trunk market defined in this way would not be homogeneous. Hence, defining the market in this way would lead to the deregulation of parts of this market which were not competitive including, for example, circuits in the "regional" trunk circuits market and some circuits in TISBO markets.

6.85 Therefore, we proposed to retain the TAN concept to determine whether a wholesale TI circuit was either:

- within a TAN "catchment area" (a terminating segment);
- a regional trunk circuit between adjacent TANs (more like a terminating segment);
- a national trunk circuit between non-adjacent TANs.

6.86 In defining trunk markets in this manner we did not rule out the possibility that competition might have emerged in certain locations beyond the national trunk routes. We noted that this could be reflected in our geographic assessment for the TISBO markets. In this respect, we noted that we had proposed to identify a separate geographic market in the WECLA for a number of terminating segment services.

Consultation responses

6.87 Given the extent of comments, particularly BT's submissions on trunk, we have separated stakeholders' comments into an overall summary of key points, before going on to discuss the more detailed comments.

[552] Our method of calculating BT's share of the long-distance trunk market is not distorted by 'part circuits' that span TAN catchment areas. Therefore it would not overstate BT's shares (or understate OCPs self-supply) on national trunk routes. For a further discussion of our approach to estimating market shares see Annex 5.

Overall summary of comments

6.88 There were seven responses relating to our proposals for TI trunk (BT, CWW, Colt, Everything Everywhere/MBNL, UKCTA, Virgin and Zen Internet.) Only Zen provided unqualified support for our trunk proposals. Colt broadly agreed with the split between national and regional trunk but had comments on the boundary between the two markets. BT disagreed with our proposals for national and regional trunk definition and considered there was a far more extensive competitive national trunk market than reflected in our proposals. Other CPs that commented did not support our proposals for a split in the trunk market, preferring the existing national trunk market definition.

Comments from stakeholders

6.89 CWW disagreed with our proposals to identify a national trunk market. It argued that there is no prospect of greater competition in the national trunk market over the coming period. It noted the legacy nature of the TI market meant that the priority for CPs will be to migrate customers to new solutions rather than invest in old technologies. Given this context, CWW argued that CPs are not actively investing today to build the capability to bypass BT's TI trunk network.

6.90 CWW commented on there being limited evidence that competition had increased significantly since the 2007/8 Review. It noted that we had not compared the competitive position of national trunk in 2007/8 against the current position. CWW argued that even if BT's share has declined in trunk markets this may not be due to CPs switching national trunk usage between suppliers. It may be that they have prioritised moving the longest distance trunk routes to alternative services. CWW considered that a more in-depth analysis looking at customer's planned behaviour would demonstrate that treating part of the trunk market as having greater prospects for competition is a false premise.[553]

6.91 CWW submitted that we should consider wider evidence of a competitive wholesale trunk market. In particular, it argued that we should consider the extent to which:

- there was a merchant market for national trunk; and
- the prospect that additional national trunk sales would prove an attractive option for potential merchant providers to supply trunk in competition to BT.

6.92 CWW noted that even it, as the largest competitor to BT, continues to have a material annual spend with BT for national trunk. CWW highlighted that it needs a wide range of routes reflecting historical constraints, resilience requirements and diversity and the specific locations of platforms such as the DPCN (where routing is constrained by a limited number of DPCN nodes). Hence, even where it apparently has a point of handover there may be limited scope to provide additional trunk routes.

6.93 CWW considered that if we were to maintain our view that there are two trunk markets (i.e. regional and national), then it believed that we should change the market definition so that certain routes currently identified as national trunk should instead be treated as regional trunk. To support this view, CWW noted that there is no reason to expect that the potential for competition would be different on Liverpool to Manchester relative to Manchester to Sheffield (under the proposals the former is

[553] UKCTA made a similar point in its response.

national trunk but the latter is regional). CWW argued that both should be regional trunk routes. Similarly, it considered that:

- Edinburgh to Irvine should be treated as regional trunk; and
- the Greater London area has a number of routes that cannot really be considered to be national.[554]

6.94 Colt stated that it broadly agreed with the distinction between regional and national trunk, and the treatment of regional trunk in a similar manner to terminating segments. But it noted possible anomalies remain uncorrected e.g. a circuit from London to Reading may remain more expensive than a circuit from London to Edinburgh because the latter is not in an adjacent TAN.[555]

6.95 Colt agreed with deregulating competitive trunk services but it considered that a more granular approach was needed as some non-competitive routes are captured in the broad trunk category. Several other countries have taken a route-by-route approach to de-regulating national trunk, and Colt considered that Ofcom should do the same.

6.96 MBNL and Everything Everywhere argued that the trunk definition is not relevant to mobile backhaul services as it considered that are sold as a combined "end-to-end" service and would include any access and conveyance.[556] Telefónica understood trunk to mean the equivalent of 'core' connectivity on MNOs networks with RBS backhaul being part of the TISBO market and not part of the TI trunk market.

6.97 UKCTA disagreed with our proposal to define two separate TI trunk markets as competitive conditions are such that a single national market should be defined.[557] It submitted that purchasers of TI services continue to rely upon the availability of trunk services from BT in sufficiently large proportion to consider that BT has overall SMP in the combined market (as reflected in BT's share of the national market of 49% reported in the June BCMR Consultation).

6.98 UKCTA considered that our proposals did not take into account the nature of TI trunk as a legacy service market in the later stages of its lifecycle. It did not consider that the observed market share differences between hypothetical regional and national trunk service was evidence of a competitive market or that there may be a greater prospect for competition compared to a single trunk market. UKCTA considered that we had not provided any evidence of increased competitive entry into the national trunk market since the last market review.

6.99 UKCTA posed a number of questions regarding our TI trunk analysis:

- had Ofcom attempted to analyse geographic trunk markets in the 2007/8 Review would the market shares across the possible two markets have differed?
- if BT's market share has decreased, is this due to CPs switching trunk supply?

[554] It considered any routes between London Central, West, East, North, Docklands, Kingston, Croydon, Guildford, Slough, Luton, Bishops Stortford, Chelmsford and Crawley should be regional.

[555] Pages 12-13 of confidential response.

[556] Page 23 of non-confidential response (response to Question 4).

[557] Pages 13-14

6.100 UKCTA argued that the evidence suggested weaker competitive pressure for trunk than at the time of the 2007/8 Review. It referred to Ofcom's analysis during the PPC POH consultation concluded that CPs were not investing in new POH handover – which would be necessary if CPs were competing with BT for national trunk business.

6.101 Virgin did not agree with our proposals for separate national and regional trunk markets and cited the following reasons:[558]

- BT continues to have SMP in both markets (with an assessed market share of 49% in the national trunk market);
- the evidence that BT has applied pricing discounts on two trunk routes from London cannot be supportive of a distinction between national and regional trunk more generally;
- there is a more mixed level of competition between routes than can be categorised by a simplistic regional / national split; and
- if we applied a standard approach to market definition we would identify a single trunk market based on the availability of alternative routes and chain of substitution (i.e. some regional trunk routes could in principle be served by alternative national trunk routes).

Summary of BT's main points

6.102 BT did not agree with our proposals for separate products for national and regional trunk. The overarching theme of BT's response was that the trunk market, or what it calls the "competitive core", should be significantly larger than the national trunk market proposed by Ofcom. BT considered that we should define a single trunk market based on the presence of CPs at a greater number of BT nodes extending further out in its network, reflecting the ability of CPs to self-supply their own competing infrastructure from those more remote locations, which would not be regarded as parts of the trunk network under Ofcom's proposals. BT argued that even if we did not alter our market definition we should not continue to regulate services in the WECLA.

6.103 BT argued that competition for trunk is far more extensive than our analysis suggested. It noted that when Oftel first defined PPC trunk it was found to be "prospectively competitive", and the EC has since removed trunk from the list of markets susceptible to ex-ante regulation due to the assumed presence of competing infrastructure. BT argued that OCPs' networks have expanded to over 600 BT exchange buildings. This is significantly beyond the number of TANs used to define the trunk network and demonstrates the extent of competition for TI services in the UK. BT submitted that Ofcom had recognised that three CPs have the capability to self-provide almost all of their trunk segment requirements. BT calculated that CPs could compete for more than 70% of BT's retail TI circuits without having to buy trunk from BT or any other CP.[559]

6.104 BT submitted that our definition fails to reflect the reality of how OCPs' networks have expanded beyond the 46 TANs. It noted that we had gone some way to reflect

[558] Pages 21 to 22 of confidential response (response to Question 4).

[559] Paragraph 15, page 8 of BT's response.

competition for trunk with separate national and regional definitions, but our approach did not capture the full extent of competition.

6.105 BT was concerned about our proposal to segment trunk into regional and trunk components. It suggested that our finding that BT has SMP for regional trunk was based on an unreliable estimate of market shares. BT considered that these errors arose because we still applied the assumption that circuits are routed via Tier 1 nodes (BT made detailed submissions as to why Tier 1 nodes did not have particular significance in its network). BT submitted that the assumption that circuits are routed via Tier 1 nodes is important as it results in a systematic overstatement of BT's volumes and understates OCPs' volumes.

6.106 It considered that, rather than addressing the errors in the market definition from the 2007/8 Review (such as issues over how our market definition is then used to estimate market shares), creating the national/regional split meant that the errors now appeared to be concentrated in the regional segments. It then argued that this results in false signals as to BT's market power for regional trunk. BT argued that apparent differences between our market share estimates from the 2007/8 Review and those computed in the June BCMR Consultation resulted from what it saw as circuits having been moved around rather than the shares changing substantially.

6.107 BT submitted that rather than addressing the anomalies present in the 2008 model, the new market definition has now made these anomalies "endemic". BT submitted that it is easy to find numerous examples where a national trunk can be shorter than both a terminating segment and a regional trunk and a regional trunk can be shorter than a terminating segment. SPC Networks, author of a report submitted by BT, accepted that any approach that attempted to classify trunk circuits based on particular rules will be imperfect and the occasional anomaly might be an irrelevancy. SPC highlighted, however, that our classification of regional and national trunk based on the TAN catchment boundaries results in a significant number of anomalies "that fail any common sense test". BT referred, for example, to:

- Cardiff and Liverpool TAN catchment areas are 'adjacent' and hence circuits between them are regarded as regional trunk. BT noted that this means that a circuit from Plymouth (which falls in the catchment area of the Cardiff/Newport TAN (area 7 in Figure 6.4 above)) to Liverpool (a distance of 290 miles) would be treated as Regional Trunk.

- A circuit between Hastings and Dover (a distance of 46 miles) would be National Trunk.[560] A circuit of similar length between Norwich and Ipswich would be a terminating segment[561] and a circuit from Norwich to Kings Lynn (also of similar length) would be a regional trunk.[562] So a 45 mile long circuit could be classed as either terminating, regional or national trunk.

- A circuit from the south of the Outer Hebrides to the north of the Outer Hebrides would be counted as a national trunk.

6.108 BT noted that for the 'anomalous' routes identified above there were at least two CPs in each and every one of these urban areas and these CPs would be able to carry

[560] Dover falls within the catchment area of the Chelmsford TAN and Hastings falls within the Brighton TAN, which is non-adjacent to the Chelmsford TAN.

[561] Both circuit ends fall within the Ipswich TAN.

[562] This circuit would be between adjacent Ipswich and Cambridge TANs.

traffic between these areas entirely on their own networks. Hence, BT suggested that regional trunk routes could be provided competitively.

Further BT comments on the economic assessment of trunk

6.109 In addition to the above key points, BT's response on trunk analysis[563] covered a number of additional points (that we explain and discuss in turn below):

- BT considered that its Tier 1 nodes did not have particular significance to the definition of trunk and CPs were in any case present at other nodes on its network;
- it had concerns that our TAN approach based on an assumption that circuits are routed via Tier 1 nodes results in an exaggeration of BT's trunk market shares; and
- it made additional comments on Ofcom's analysis applied to regional and national trunk markets

BT's concerns over the significance of Tier 1 nodes

6.110 BT submitted that, in the June BCMR Consultation, we made the assertion that trunk services are subject to economies of scale and used this as the basis for arguing that CPs will generally have only one point of interconnection in a single TAN area. It considered that our discussion of the significance of Tier 1 nodes was based on a misunderstanding of network architecture, which did not have a hierarchical structure as we had suggested. BT argued that we had not presented any empirical evidence on circuits between Tier 1 nodes in BT's network, but we nevertheless associated 'economies of scale' with its Tier 1 network in numerous places.

6.111 BT argued that what it viewed as our presumption of economies of scale at Tier 1 nodes drives two critical features in our approach to defining trunk:

- that there are greater economies of scale and scope and efficiencies in using Tier 1 nodes; and
- there are incentives on CPs to acquire handover at Tier 1 nodes rather than other nodes on BT's networks.

6.112 With respect to the alleged presumption of economies of scale, BT did not agree that there were material economies of scale associated with Tier 1 nodes. To support this view, BT referred to the SPC Network findings that suggested that the main purpose of Tier 1 nodes was to alleviate pinch points in urban areas by providing 'cross-connects' on SDH rings, but they do not of themselves provide BT with any economy of scale. They are generally located in urban areas because that is where pinch-points tended to occur historically. In this respect, BT stated that the SPC Network report had argued that we had 'cause and effect' the wrong way around.[564]

6.113 In relation to the incentives on OCPs, BT questioned what it considered was our view that there are incentives on OCPs to interconnect predominantly at Tier 1 nodes. BT submitted that we had failed to consider actual OCP behaviour (i.e. the extent and

[563] Executive summary (paragraphs15-21), Response to Question 4 (pp29-33), Section 4.8 (pp228-249).

[564] Paragraph 23, page 231, S4.8 BT's main response.

location of interconnection points at other BT nodes other than Tier 1). It noted that CPs had built networks and POHs extensively beyond Tier 1 nodes and argued that this should be reflected in a definition of the trunk market which also extended outwards beyond Tier 1 nodes to these other points of connection.

6.114 BT was critical of the analysis in the June BCMR Consultation (shown in Figure 6.8 above)[565], in which we compared the extent of OCP presence at BT's Tier 1 nodes with the extent of OCP presence at other nodes on BT's network. This analysis showed that, on average, there were more than three CPs with POHs at or close to the Tier 1 nodes for each TAN, and this contrasted with BT's other SDH-enabled exchanges, where there were far fewer CPs on average. This was consistent with the idea that the Tier 1 nodes are at points in general proximity to where OCPs collected traffic for transmission over their own core infrastructure and so provide a reasonable basis to mark the boundary between terminating segments and the more competitive trunk segments. BT considered that the result that, on average, more CPs have 'presence' closer to Tier 1 nodes than they do to other BT local exchanges, was unexceptional given the siting of Tier 1 nodes and their proximity to major business areas. BT argued that the analysis comparing TAN clusters to presence at other nodes had the effect of distorting the differences observed. It argued that if we wished to make a comparison of CP presence we should have compared the simple average of both sets of nodes (Tier 1 versus non Tier 1 nodes). BT further noted that the difference between an enlarged set of Tier 1 plus an additional category of BT nodes (Tier 1.5 nodes) and the remaining BT nodes (BT Tier 2 and Tier 3 nodes) provided similar results to the comparison of Tier 1 versus non-Tier 1 nodes.[566]

6.115 BT argued in any case that analysis of BT's network topology and OCPs' "presence" at Tier 1 nodes says nothing about:

- CPs' incentives on where to acquire handover, which it suggested was at many other BT nodes;
- the logical routing of circuits, which are often not routed via Tier 1 nodes (we discuss this point further below); and
- the extent to which traffic is routed between Tier 1 nodes (BT's view was that its network did not have a hierarchical structure[567] whereby aggregation only took place on circuits between Tier 1 nodes).[568]

6.116 BT submitted that what ultimately matters for the purpose of assessing the extent of trunk competition, is CP presence at any node. It noted that the results of our analysis in Figure 6.8 suggested that there are some Tier 1 nodes where no CP (or relatively few CPs are present). BT contrasted this with a list of 121 non-Tier 1 nodes where there were more than 2 CPs present. It noted that, on average, these 121 nodes also have a greater number of CPs in proximity on average than is seen for the list of Tier 1 nodes.

[565] Table 45 of the June BCMR Consultation (Figure 6.8 in this Section).

[566] BT noted that the average number of OCPs present at the enlarged set of Tier 1 and Tier 1.5 nodes was also significantly above the average number present at the remaining (Tier 2 and Tier 3) nodes.

[567] SPC argued that BT's SDH network is not hierarchical but closer to a 'flat' network. This means that the route between any two nodes does not necessarily pass through any Tier 1 nodes. Tier 1 nodes are not connected in a mesh topology. Tier 1 nodes have no special role to play in the BT network. OCP interconnection happens at Tier 3 nodes regardless of whether they are collocated with Tier 1 nodes.

[568] Paragraph 78, page 239 and paragraph 82, page 241, S4.8.

Assumptions over the routing of circuits via Tier 1 nodes

6.117 In addition to questioning the overall significance of Tier 1 nodes in relation to OCPs' interconnection decision, BT also questioned our assumption under the TAN approach that trunk circuits are routed via Tier 1 nodes.

6.118 As explained above, our assessment of whether a circuit contains a trunk segment depends on whether both the ends of that circuit are within the same TAN catchment area or whether, instead, the two ends are in different catchment areas. When a circuit is between different catchment areas, we assume that it contains a trunk segment, consistent with BT's routing rules which assume that the circuit will be 'notionally' routed via the relevant (nearest) Tier 1 nodes and then between Tier 1 nodes to different catchment areas.

6.119 BT considered that the assumption that a retail circuit between catchment areas is routed via a tier 1 node (and notionally includes a trunk segment) simply results in an exaggeration of BT's trunk market shares and understates the market shares of others.[569] As described above, in BT's December 2011 paper, it referred to an example where it provides a partial private circuit (an access or terminating segment) that is used in combination with an OCPs own trunk network to deliver an end-to-end retail service. BT noted that where a circuit happens to cross the boundary of a catchment area it will be assumed that the circuit 'notionally' contains both trunk and terminating segments. BT noted that the reality was that it was only providing the terminating segment. BT argued that the 'trunk segment' in this case was only 'notional' (based on the routing assumptions), but it would result in an overstatement of BT's share of circuits sold in the trunk market. It further noted that we would understate the extent of OCP self-supply.[570]

Ofcom's market definition analysis applied to regional/national proposals

6.120 BT made a number of other specific points on the analysis we used to support our market definition proposals for regional and national trunk:

- *Demand and supply-side substitution:* BT disagreed with our view that the opportunities for indirect routing of circuits results in a national trunk market. It considered that the comparison of 'direct' and 'indirect' routes implies that the routing of trunk circuits is over specific point to point routes. It considered that once a service was on the core network routing was software controlled.

[569] This claim was explained in paragraphs 6.45 to 6.47 of the June BCMR Consultation. BT's key observation was that the underlying retail circuit requirement can be only quite indirectly reflected in the wholesale provision of that service. For example, using the scenario set out in Figure 6.9 above, a retail customer may require connectivity from Manchester to Nottingham (this is the overall retail requirement that potentially includes a national trunk). The wholesale provision could comprise two circuit ends provided by BT (Manchester – Leeds and Sheffield – Nottingham) and self-provision of the remainder by an OCP (Leeds to Sheffield). BT noted that this could result in an incorrect estimate of BT's share in the trunk market as the TAN approach would count two BT wholesale trunk circuits (Manchester – Leeds and Sheffield – Nottingham) compared to a retail requirement for one trunk (Manchester to Nottingham). Hence, a mismatch can arise between the retail and wholesale provision.

[570] This is because we do not have specific information on self-supply, so we have to infer the extent of OCP self-supply by netting off BT trunk sales (i.e. the count of BT trunk circuits) against the overall requirements for trunk (based on those retail circuits that we calculate would require a trunk). So if a PPC that is only really providing 'last mile' connectivity is counted as including a 'notional' trunk segment then this would be treated as a BT sale of trunk circuit. In turn, the OCP would be deemed to have not self-supplied any trunk itself. BT argued that if it were providing the terminating segments at both ends of retail circuit and these happened to cross the boundary of a catchment area then we would count two 'notional' trunk circuits. See Annex 5 for a further description of the measurement of trunk market shares.

Therefore, it considered that routing at the network level has no parallel to the notion of trunk routes at the retail level.

- *SSNIP analysis applied to trunk segments*: BT also expressed concerns over our SSNIP analysis as:
  - it was based around the notion that there are different levels of economies of scale and scope in regional versus national trunk (such that the two products, as defined, were not good substitutes). BT argued that these differences had not been substantiated and our finding of a lack of demand-side substitution was due to prior assumptions we had made over respective economies of scale and scope for national and regional trunk; and
  - BT also noted that in the SPC Network's report (Section 3.6), where it had applied the HMT to regional trunk, the test was not consistently passed.[571]
- *Common pricing constraints:* BT agreed that it was difficult to draw conclusions from the geographic discounts seen on two national routes (London Birmingham and London Manchester) for market definition purposes, where it has failed to sell more than a handful of circuits.
- *Homogeneity of competitive conditions:* BT agreed that many wholesale TI circuits that are allocated a trunk segment by Ofcom's market definition are unlikely to go via a Tier 1 node and are more like terminating segments. It considered, contrary to what we had suggested, that it would be relatively easy to identify this group of circuits that would be directly routed rather than provided over trunk. BT considered that if the total length of a PPC is less than the distance to a Tier 1 node then this would identify a circuit as directly routed.[572] (The implication is that these directly routed circuits are more like terminating segments. BT considered that once short boundary circuits are removed, the remaining circuits would have similar characteristics and would form a single homogenous trunk market).

Ofcom's considerations of consultation responses

6.121 In the following section we explain why, in light of stakeholder comments and further analysis, we have retained the national and regional TI trunk market definition based on TANs. We provide our further reasoning and evidence in support of regional and national TI trunk markets under the following headings:

- Reliance on the TAN catchment areas is appropriate;
- Our trunk definition was amended to address BT's concerns;

[571] In Section 3.6 of SPC's September 2012 report, it highlighted some regional trunk circuits linking a customer site to a CP node would serve a quite different purpose to a regional trunk between network nodes in different catchment areas. It found that in the language of a HMT, the monopolist would find it profitable to apply a SSNIP on some regional trunk routes (i.e. those 'more like terminating segments'), as customers would not be able to substitute with the latter.

[572] For example, if an OCP purchases a circuit Norwich to a point of handover in Kings Lynn then a circuit routed directly between those two points would have an approximate radial distance of 45km. If the circuit were assumed to route via the respective 'parent' Tier 1 nodes in Ipswich and Cambridge (used to serve Norwich and King's Lynn) then the terminating segments of this 'notional' route would be 62km (for Norwich to Ipswich Tier 1 node) and 61km (for King's Lynn to the Cambridge Tier 1 node). As explained above (see Figure 6.6) these 'notional' distances are only used to calculate the relative proportions of the wholesale PPC that are charged as 'trunk' or 'terminating' segments.

- Market analysis supports national and regional TI markets;
- Evidence on OCPs' purchasing behaviour supports a national and regional trunk definition; and
- Market/service share data also supports our approach.

6.122 Having set out our further reasoning and evidence for TI trunk markets, we then consider stakeholders' main criticisms.

Reliance on TAN catchment areas is appropriate

6.123 As discussed in above, in defining trunk markets we have relied on TAN catchment areas, which is a concept that is not new to this review. We set out below why we consider it a practical approach to defining trunk markets and one that is supported by evidence.

6.124 In the current review, prior to publication of the June BCMR Consultation, BT criticised the method for defining trunk – particularly where circuits crossed TAN catchment area boundaries. We did not agree with all of BT's concerns. Nevertheless, we recognised that 'short-distance' circuits that happened to cross the boundary of a catchment area may face different conditions of competition to longer distance providing aggregated links. On this basis, we sub-divided the market for trunk. We based this proposal on the same patchwork of 46 TAN catchment areas used in the 2007/8 Review, but with circuits now classified as follows:

- between non adjacent TANs = 'national trunk'
- between adjacent TANs = 'regional trunk'.
- within the same TAN catchment area = 'terminating segments'.

6.125 With regard to the alternative means of classifying connections which would be to treat long-distance circuits (e.g. >25km) as trunk and to treat 'short-distance' circuits as terminating segments, in our view, we could not rely on the distances of circuits alone. For example, a circuit in the North Western Scottish Highlands could be 100km or more and not contain any trunk services (since there are limited aggregation opportunities and hence limited CP aggregation points in the North Western Scottish Highlands). In this example, a circuit would be routed back to a nearby major population centre where at least one CP would have a trunk node (e.g. Inverness, Aberdeen etc). By contrast, in densely populated areas, circuits of less than 10km could be supplied over a trunk network. Therefore, the use of a simple 'distance based' criterion would be arbitrary and would fail to take into account the different competitive conditions our analysis has revealed for longer distance circuits providing aggregated links.

6.126 To better capture the scope for competition we rely on TAN 'catchment areas' (as shown in Figure 6.4 above). This approach should broadly reflect variations in competitive conditions as the TAN catchment areas have a larger footprint in those locations where traffic is less concentrated (e.g. the Scottish Highlands) and smaller footprints in areas of greater traffic concentrations.[573]

[573] So larger catchment areas will typically be associated with areas where traffic is less concentrated and the average lengths of terminating segments to core nodes will be longer.

6.127 Segmenting the UK into a patchwork of 46 TAN areas required analysis of traffic and interconnection of OCPs across the UK. We also needed a starting point to work from. So we used as a starting point the catchment areas of Tier 1 nodes, which we considered provided a practical and established unit for analysis (as was used in previous market definitions for trunk).

6.128 BT raises a number of concerns with the reliance on Tier 1 nodes (as discussed further below). However, we consider that the Tier 1 nodes correspond to many of the major cities in the UK (a point that BT accepts (see summary of responses above). It is these major cities that are the key points of interconnection for OCPs. Moreover, reflecting the observation that there is not a one-to-one correlation between Tier 1 nodes and OCP PoPs, we did not end our analysis at the Tier 1 node locations. Taking the Tier 1 nodes as a starting point, we then applied 'proximity' analysis (as explained above) to determine our TANs. This type of analysis is similar to the identification of the 'marginal exchange' as advocated by SPC Network in its March 2012 report (albeit with the analysis based on locations close to Tier 1 nodes rather than alternative node types such as local exchanges).[574]

6.129 In parallel to this analysis, in the 2007/8 Review we also looked at actual interconnection evidence (i.e. the areas in the UK where OCPs had located their points of presence). This enabled us to cross-check the results we derived from the 'bottom-up' proximity analysis. It therefore helped ensure that the proximity assumptions we used to capture the likely relationship between aggregation opportunities and distances mentioned above were sufficiently robust. The available evidence on OCPs' network build and interconnection decisions tended to confirm our results. In other words, the evidence suggested that the aggregation nodes we identified using our proximity analysis coincided with evidence on the areas in the UK where OCPs had located.

6.130 Hence, although the starting point was based on a relatively aggregated geographic unit (Tier 1 catchment areas) we then applied more extensive analysis to identify aggregation nodes. This analysis calibrated well to locations where CPs apparently have a point of presence (see Figure 6.8 above).

Our trunk definition based on TANs was amended to appropriately reflect BT's concerns

6.131 We recognised in the June BCMR Consultation, that in relying on TAN 'catchment areas' to differentiate between terminating and trunk segments there are issues when a CP purchases a circuit from a customer end to its POH that happens to cross the boundary of one TAN catchment area and another. While some circuits that cross TAN boundaries may have "trunk" characteristics, there are likely to be significant numbers that do not.

6.132 However, our approach to trunk market definition is based on a requirement to come up with a practical rule that distinguishes between services:

- that are generally likely to have 'trunk' characteristics and which can be contested by OCPs ('national trunk'); and

[574] SPC Network argued that we could identify a marginal exchange which would be the point at which a CP would be indifferent between building out to that node and buying leased lines services from a third party. Our analysis considered the trade-off between building a trunk network from an existing Tier 1 node location to another Tier 1 node in relatively close proximity given the potential savings that could be made in terms of purchases of terminating segment services from a third party.

- those where there will be many circuits that are effectively terminating circuits that OCPs are unlikely to be able to contest ('regional trunk').

6.133 Our metric does this in a sensible way, based on Tier 1 nodes and views as to where CPs aggregation points are likely to be located, and based on the purchasing patterns of CPs. Based on these factors we have then drawn the boundaries of our market using catchment areas of Tier 1 nodes as the building block to identify TANs. Hence, in general:

- National trunk will capture connectivity between the largest urban areas which are most obviously likely to be competitive (e.g. London to Birmingham, London to Manchester) and operators will have built core network to serve those areas, and is unlikely to include disproportionate numbers of circuits that are like terminating segments or otherwise not contestable; and

- Regional trunk will capture circuits that happen to cross a TAN boundary and 'notionally' include a trunk segment but where the competitive conditions may not be materially different to a terminating segment. We recognise that our approach to defining the two markets means that the regional trunk market captures circuits that are genuine trunk circuits in the sense that use would actually be made of an aggregated (trunk) link, albeit a short one between adjacent TANs. However, our assessment of variations in competitive conditions based on wholesale merchant market services shares (set out below) suggests that the number of regional trunk circuits that are contestable is not material.

6.134 Therefore, we consider that the underlying rationale for our market definition proposals is valid and in the following paragraphs we discuss the evidence that supports this:

- based on the standard approach to market definition;[575] and

- when looking at wider evidence.

6.135 We then discuss BT's concerns that this approach is too "BT-centric" (as it relies on Tier 1 nodes) and that those node locations do not provide a sensible basis to draw the line between terminating segments and regional and national trunk.

Market analysis supports our approach

6.136 When assessing wholesale market definition we set the boundaries of economic markets based on an analysis of demand and supply-side constraints and by looking at the extent of competitive provision of different network elements

6.137 We must first consider demand and supply-side substitution possibilities for a defined focal product. A candidate focal product for trunk services would be an individual trunk route (wholesale circuits sold to deliver connectivity between two points or over a particular route). However, as discussed above, in the June BCMR Consultation, reflecting substitution possibilities, we considered that trunk segment markets were likely to be wider in scope than an individual trunk route but a distinction could be made between national and regional trunk segments.

[575] See, in this respect, paragraphs 40 to 43 of the SMP Guidelines.

A single national trunk market

6.138 In the following paragraphs, we explain why we consider it appropriate to define a single national trunk market. This is because for a given retail requirement between two points, say, from London to Birmingham, if a CP has the relevant core network in each location then it may self-supply the trunk segment on its own network where relevant capacity is available. There are often multiple ways by which a national circuit could be routed (for example, a retail circuit from London to Birmingham could be delivered using a wholesale trunk service which might either be routed fairly directly across various intermediate nodes or indirectly for example using capacity on SDH-rings from London to Coventry and Coventry to Birmingham).

6.139 BT argued that it did not: *"share the sentiment ... regarding the routing of 'trunk' segments differentiating London, Coventry and Birmingham. As we have set out at length, this is at best a misleading way to characterise routing which is software controlled including resilience paths. It perpetuates the notion of individual trunk routes at the network level which has no parallel to the notion at the retail level."*

6.140 We recognise that multiple paths will exist to deliver a particular retail requirement. This is because it remains at the discretion of a CP to optimise its delivery of underlying wholesale requirements (for internal supply and the sale of capacity externally to third parties). In fact BT's statement seems to be consistent with our view that indirect routes (perhaps software-selected, as BT notes), will be substitutes for direct national trunk links, leading to the definition of a single market for national trunk segments.[576]

6.141 If a hypothetical monopolist sought to apply a SSNIP for a wholesale national trunk segment directly linking, say, London to Birmingham, it would not be profitable simply because there would always be alternative indirect ways of connecting the two end points. Consequently, following the standard approach to market definition, for a given requirement, we widen the market and then - through a chain of substitution – this results in any given national trunk segment between a starting point in one urban centre to a destination in another urban centre in a non-adjacent TAN being included in a single national trunk market.

Distinction between national and regional trunk segments

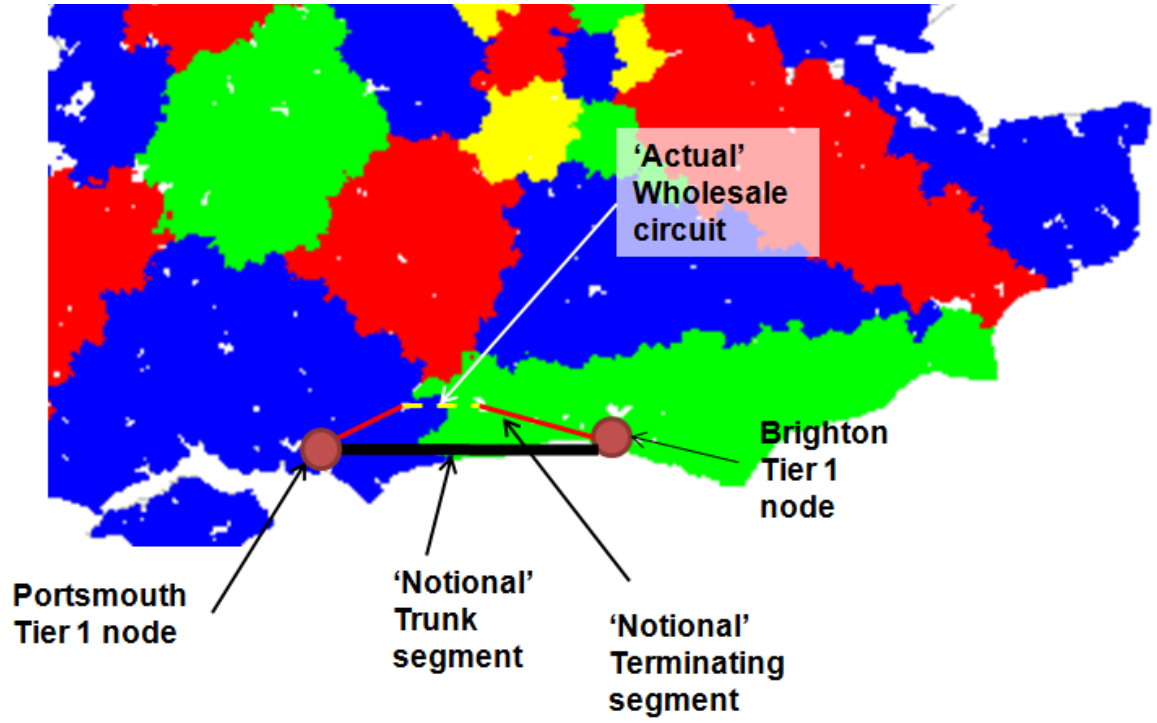
6.142 We consider that a distinction can be made between national and regional trunk markets, primarily because of the observed differences in competitive conditions between them. One reason for the existence of a distinct regional trunk market is that we observe that a number of CPs are purchasing network segments between their customer sites and their PoPs that happen to cross the boundary of the TAN catchment areas. In this context, these segments are not fulfilling the role of national trunk.[577]

6.143 These types of circuits are likely to be directly routed, like a terminating segment. A directly routed circuit might be as shown in Figure 6.10, which shows a short-distance circuit between the catchment areas of the Brighton and Portsmouth TANs (represented by the yellow dotted line).

[576] See also, in this respect, footnote 48 to paragraph 61 of the SMP Guidelines where it states "[i]t is highly unlikely that the provision of electronic communications services could be segmented on the basis of national (or local) bilateral routes".

[577] In the sense that they are not being used for the purpose of aggregating traffic.

Figure 6.10: 'Notional' trunk associated with regional trunk circuits



6.144 As we explained above (where we explained the routing assumptions associated with the TAN approach), the TAN routing rules assume that such circuits would notionally use a trunk segment that goes via Tier 1 nodes associated with each TAN. In Figure 6.10, routing of this 'notional' trunk segment is between the Brighton and Portsmouth Tier 1 nodes as a regional trunk circuit is defined as a circuit between adjacent TAN nodes.

6.145 In theory, a CP could compete to provide the circuit using its trunk network, perhaps purchasing a terminating segment to connect to a point like Tier Node 1 in the Brighton TAN area. However, we can see that a competitor who did so might not be competitive relative to BT using the 'direct' route and, indeed, Figure 6.10 is drawn in a way which makes it appear unlikely. In practice, whether a CP can compete in this way will depend on the locations of the circuit ends and the Tier 1 nodes, and on whether it has available trunk capacity. This is one reason why competitive conditions on regional trunk routes are likely to differ from those on national trunk routes. An indication of the extent to which they actually differ can be gained by comparing BT's shares of the regional and national trunk markets.

6.146 So for short-distance regional trunk circuits, we do not consider it would be efficient for a competing CP to route the circuit back to a major aggregation node to make more use of a national trunk network, for example, via a longer indirect routing.

Evidence of OCPs' purchasing behaviour supports a regional and national trunk market definition

6.147 In the above paragraphs, we set out our analysis and rationale for trunk based on the TAN approach and the distinction between regional and national trunk segments. In considering the case for regional and trunk, we have examined wider available evidence on OCPs' purchasing behaviour. This evidence suggests that many OCPs:

- rely on BT to provide TI circuits that are either entirely within TAN catchment areas (TISBO) or between adjacent TANs; but

- have limited reliance on BT for national trunk.

6.148 The evidence we have considered in support of our regional and national trunk market definition draws on analysis we set out under Issue 3. Under Issue 3, we have considered BT's arguments that we should have widened the scope of our trunk market definition, by identifying a competitive national trunk market based on OCP 'presence' at a large number of BT exchanges (as indicated by their purchases of interconnect products known as Point of Handover (POH) circuits). In turn, based on the exchanges where OCPs have apparent network presence, BT's proposal essentially suggests that we identify significantly a larger set of catchment areas (78 "Regional Aggregation Nodes" (RANs) versus our 46 TANs).

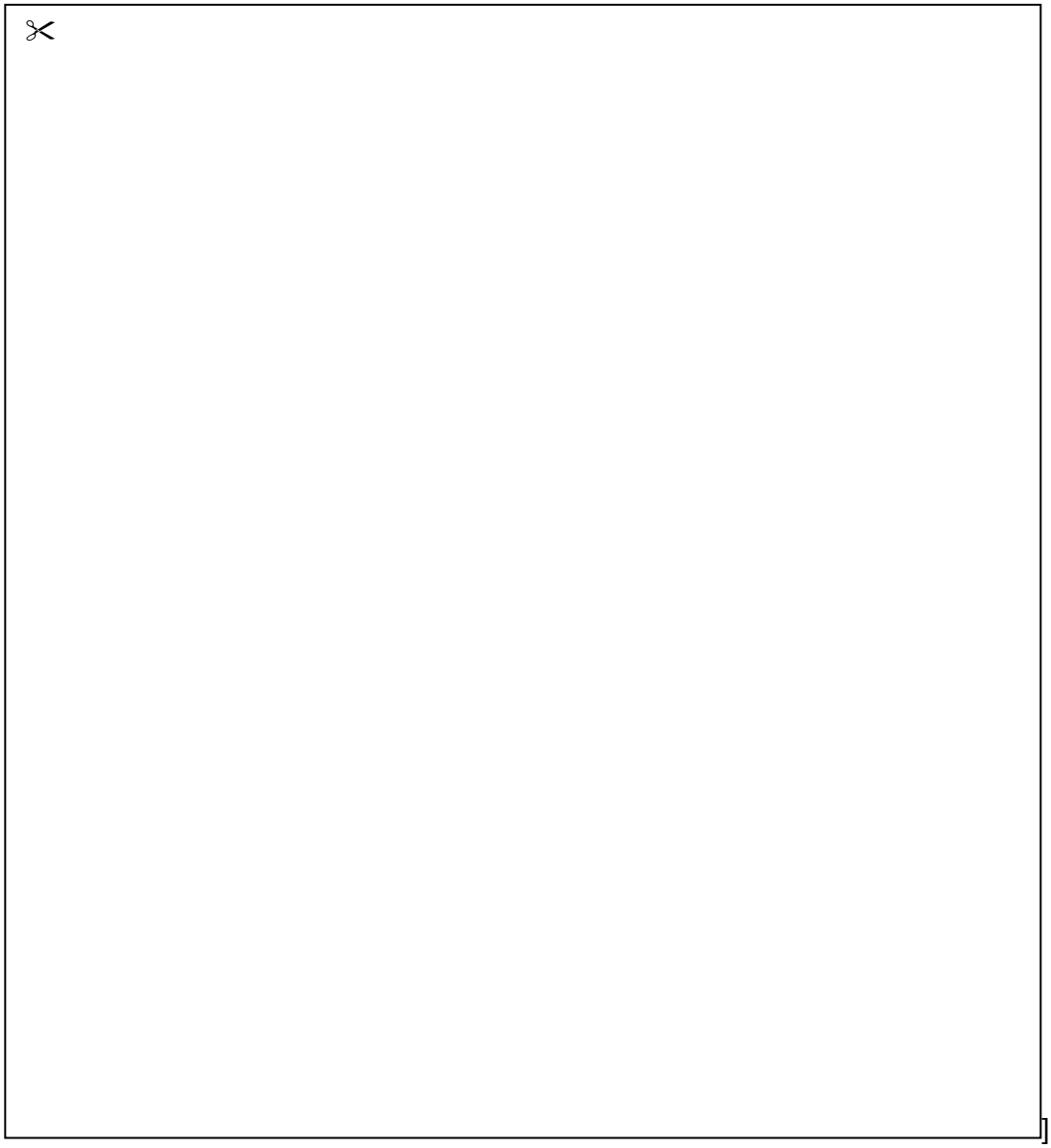
6.149 One of the pieces of evidence we have examined in our assessment of BT's alternative market definition proposals is evidence on OCPs' purchases of wholesale TI circuits from BT. We have examined the extent to which the particular catchment areas that BT has identified (i.e. the 78 RANs) are a good indicator of where OCPs reliance on BT's ends and where, as BT says, competitive trunk begins. If BT's RANs were a good proxy (as BT contends) then we might expect OCPs to rely on BT for local circuit ends within RANs (but for OCPs to provide trunk competitively from each RAN, either by relying on self-supply or on purchases of wholesale inputs from other CPs).

6.150 We examined OCPs' purchases of wholesale TI circuits from BT by considering the location of the two ends of the circuit (the A-end and the B-end). Our analysis suggests that there appears to be a significant 'regional component' to those circuit purchases. By 'regional component' we mean that circuits purchased from BT are not only used to provide connectivity from a customer end (in a RAN) to a relevant local exchange within that RAN (i.e. both the A-end and B-end are local access circuits entirely within a RAN). In many cases, the wholesale circuits purchased by OCPs from BT are used to go beyond the RAN boundary. The evidence we have considered suggests that most of the wholesale TI circuits that OCPs purchase from BT extend significantly beyond each RAN catchment area. On average across all of BT's wholesale circuit sales to CPs, we calculate that between 58%-60%[578] are circuits that start in a particular RAN linked to a point outside of the same RAN.

6.151 However, the evidence also suggested that the majority of circuits remain within a particular 'region' of the UK – and these regions tend to correlate to the TAN catchment areas we have relied on as the basis of our trunk market definition. In Figure 6.11 below, we show the outputs of this analysis, taking as an illustrative example BT's RAN in Aberdeen (for a detailed breakdown of information for each RAN see Figure 6.18 below).

[578] Based on circuit counts unweighted by bandwidth and excluding analogue circuit sales. The calculated range varies depending on the inclusion (or not) of access-tails provided as part of a VPN solution.

Figure 6.11: BT's sales of circuits to OCPs based on A and B-end locations



6.152 In Figure 6.11, we have superimposed the boundary of BT's proposed Aberdeen RAN (the light blue area) and our Aberdeen TAN onto the map (covering the light blue areas (Aberdeen RAN) plus the dark blue areas). If we compare the boundaries of our Aberdeen TAN and BT's suggested Aberdeen RAN, it would appear that the former would perform better in capturing more of the wholesale circuits that OCPs purchase from BT (reflecting what we term the "regional component" to those purchases).

6.153 The analysis suggests that there is a significant regional component to the circuits BT sells as they extend beyond BT's RANs. In a few cases there are some longer distance circuits to other parts of the UK, but the general picture is that circuit purchases are quite "regional" as they are generally used to serve the east Scotland region (but not exclusively BT's identified RAN).

6.154 This analysis suggests that our TAN approach (which results in fewer catchment areas than BT's RAN proposals) would better capture the point from which OCPs seem to be able to provide circuits onto their own core networks.

6.155 Hence, we consider that the evidence on the purchasing behaviour of OCPs suggests significant reliance on BT for 'regional' circuits. We explain in the following section that this general observation is reflected in our estimates of BT's market shares for regional and national trunk.

Market / service share data supports our approach

6.156 We have looked at evidence on variations in competitive conditions based on market shares. We observe large differences in BT's market shares between our regional and national trunk markets. We therefore consider that this supports our view that competitive conditions are likely to vary between the two markets. Our base case for BT's wholesale service share for national trunk is 33%. This compares to our estimates of services shares for regional trunk of 88% (with the latter similar to BT's share for TI terminating segments at low bandwidths).[579]

6.157 The above differences in service share are perhaps not surprising as the evidence suggests that BT accounts for significantly more sales to third parties of wholesale circuits with a regional trunk component (BT accounts for 81% of regional trunk circuits sold to third parties), whereas it accounts for 34% of circuits with a national trunk component. Hence, BT's share of sales to third parties is consistent with the view that regional trunk links (as well as TISBO services) are less competitive overall than national trunk.

6.158 We also note that the prices at which BT provides trunk segments have been subject to a charge control. In the absence of indications to the contrary, we have assumed that the regulated price at which BT has been obliged to offer trunk segments to be set at what would otherwise be a competitive level.[580] In this respect, the limited OCP share of wholesale merchant markets sales we have observed with a regional trunk component suggest either that OCPs have been physically unable to provide the regional trunk due to lack of presence and/or that they are unable (or indeed unwilling) to match or beat BT's regulated price. Either way, we interpret this to mean that that an OCP would either have to rely on BT or incur the significant sunk costs associated with digging and ducting and further investment to self-supply, the latter being a financially unviable option in comparison to the former. Compare this to the wholesale merchant market sales we have observed with a national trunk component where, despite both the obligation to supply and at a regulated price, BT accounts for only 34% of sales, and we consider this lends support to our conclusion that the competitive conditions for the supply of national and regional trunk segments are sufficiently heterogeneous as to warrant defining separate product markets

Stakeholders' criticisms of our market definition approach

6.159 Aside from the points already discussed above[581], BT and other stakeholders made three main criticisms of our market definition proposals.

[579] BT has criticised our market share analysis and claims that it cannot be relied upon to measure market power. We examine these measurement issues in more detail in Section 7 and Annex 5.

[580] See, in this respect, paragraph 42 of the SMP Guidelines.

[581] BT raised a number of points on our market definition analysis used to support the break between regional and national trunk, in particular with respect to demand and supply-side substitution. BT also had concerns about our service share analysis related to our national and regional trunk definitions, which we have already discussed in the paragraphs above and in Section 7 and Annex 5.

- BT was concerned that our market definition relies on a BT-centric view based on catchment areas associated with Tier 1 nodes.[582] SPC criticised this approach as it argued that if BT were to add a Tier 1 node on its network then our market definition would change. The key criticism was that Tier 1 nodes have no real significance in technical[583] or economic terms in informing a break-point between trunk and terminating segments *('criticism 1').*

- BT was concerned that the associated TAN catchment areas we use are based on arbitrarily drawn boundaries and throw up a number of anomalies that fail a "common sense" test ('*criticism 2'*).[584]

- BT (and other stakeholders) considered that the boundary between regional and national trunk could not be drawn using TAN catchment areas, as there were cases where national trunk could be a substitute for regional trunk and there were more mixed levels of competition on regional and national routes *('criticism 3').*

6.160 An additional point raised by EE/MBNL was that mobile backhaul services would not fall within the scope of our assessment of TI trunk markets. EE/MBNL's argument was that mobile backhaul market should be defined as a combined end-to-end wholesale service (so mobile backhaul services were essentially downstream of terminating and trunk segments and any mobile backhaul service would combine access and trunk). However, based on our analysis in Section 4 we have not identified a 'downstream' end-to-end mobile service and relevant RBS backhaul services are included in relevant wholesale markets TISBO markets. Nevertheless, to the extent that TI circuits cross adjacent TAN boundaries (including those sold to mobile operators) then they are also relevant to our assessment of trunk.[585]

6.161 In the following paragraphs, we address stakeholders' views and then discuss their alternative market definition proposals under Issue 3. We conclude that, even if some theoretical "anomalies" can be identified, the available evidence does not suggest that they are significant in practice. Furthermore, as discussed under Issue 3 there is not a good case for moving to alternative market definition approaches, based on the available evidence.

Criticism 1: Adopting a BT-centric view based on Tier 1 nodes

6.162 We agree with BT that our market definition is framed with reference to BT's network in the sense that the catchment areas of BT's Tier 1 nodes are used as the building blocks to define our TANs. However, we consider this approach is reasonable and appropriate and do not consider that our market definition for trunk is overly BT centric. Our market definition has moved on from relying exclusively on Tier 1 nodes (the approach used in the 2004 LLMR) as the break-point and instead builds on the

[582] "Economic Aspects of the Market Definition of TI Trunk", SPC Network, September 2012, page 33.

[583] In summary, SPC argued that BT's SDH network is not hierarchical but closer to a 'flat' network. This means that the route between any two nodes does not necessarily pass through any Tier 1 nodes. Tier 1 nodes are not connected in a mesh topology. Tier 1 nodes have no special role to play in the BT network. OCP interconnection happens at Tier 3 nodes regardless of whether they are collocated with Tier 1 nodes.

[584] Page 229, paragraph 14 BT main response.

[585] Telefónica also understood national TI trunk not to include RBS backhaul circuits. We agree that RBS backhaul are likely to fall predominantly within the TISBO market. In addition, for mobile networks the equivalent core nodes on mobile networks (such as MSCs) may well be different to the aggregation points identified (based on TANs). However, for analytical purposes we have applied the same routing rules to mobile circuits therefore to the extent that mobile circuits cross TAN boundaries then they would fall within our regional trunk counts.

analysis in the 2007/8 Review to identify TANs, which grouped together a number of areas served by BT network nodes.

6.163 In any case, any definition with reference to BT nodes is, to a degree, inevitable given the extent of BT's presence at the access level (i.e. in the markets for TISBO and AISBO). Since terminating segments are bought from BT in many cases, BT's nodes are the most relevant for the provision of trunk segments. Indeed, this is a point accepted by SPC Networks as:

> "BT has the most extensive network of nodes…and has the economies of scale in the Access market, outside of the WECLA."[586]

6.164 SPC went on to disagree however with our proposals as it considered that we had relied exclusively on the location of BT's Tier 1 nodes. One such criticism was that our definition of what constituted the trunk market would change if BT decided to introduce a new Tier 1 node in, say, Newbury. We do not agree with SPC Network's view that our market definition would necessarily have to change if BT introduced a new Tier 1 node. As set out above, our market definition has moved on from relying exclusively on Tier 1 nodes and instead identifies TANs, which grouped together a number of areas served by BT network nodes. Hence, to the extent that BT identified an additional Tier 1 node, it would not necessarily follow (as SPC asserts) that our market definition would change as a new Tier 1 node may well fall within the boundaries of an existing TAN.

6.165 BT's further contention is that even if we define our market with reference to its network, that the underlying rationale for TANs is based on the routing of circuits via Tier 1 nodes (as applied in the PPC charging model), which is fundamentally flawed as:

- circuits are rarely actually routed via a Tier 1 node; and
- most OCPs do not actually interconnect at Tier 1 nodes.

6.166 In relation to interconnection issues, we already argued above that there is a reasonable proximity of OCPs to Tier 1 nodes in TANs (see for example the evidence we considered in Figure 6.8 above). BT makes a wider criticism however that our market definition based on catchment areas is not appropriate as CPs have rolled out network beyond TANs. We have considered this point in response to BT's alternative trunk market definition proposals based on 'deeper' levels of regional interconnection below (and briefly above in the discussion surrounding Figure 6.11). We focus here on the issues over 'routing assumptions'.

6.167 We recognise that, in practice, there is likely to be a disjoint between actual physical routing and the assumed logical path of a circuit used for charging purposes under the PPC charging model. So in many cases, where BT provides a circuit with a trunk and terminating segment, we do not necessarily expect a trunk circuit has to be physically routed via a Tier 1 node in every case. However, in the context of regulation of TI markets, we consider that it is very important that actual routings are not used as this could mean that charges provided to competitors downstream could be set at the full discretion of the SMP operator. As we discuss above, the charging arrangements associated with PPCs are designed to enable wholesale providers to

[586] Page 32 Economic Aspects of the Definition of TI Trunk.

achieve equivalent services to BT based on the ability of rivals to compete effectively in downstream TI markets using those products.

6.168 More critically, we do not consider that the way circuits are actually routed on BT's network (or other CPs networks) undermines our approach to market definition based on TANs. For example, in the assessment of service share for the trunk market we only consider the count of circuits from one catchment area to another. If a circuit has ends in different catchment areas then the assumption is that it requires a trunk segment. So in Figure 6.4 above, say that we observe two trunk circuits sold: one from London to Birmingham and another from London to Edinburgh. For this purpose, we do not have to know where in that catchment area a circuit is first handed over (at either of the London or the Edinburgh ends). This is because our definition does not rely on the logical routing of a circuit to distinguish between trunk and terminating segments. The classification of a circuit as national trunk in this example would apply irrespective of whether a circuit is actually routed via Tier 1 nodes or lower tiers in BT's network (which BT highlights will often be the case).

6.169 We do not dismiss the relevance of Tier 1 nodes entirely, as these remain important for remedies purposes. We note that Tier 1 nodes do reside in particular exchange buildings close to where demand is concentrated. So there is a correlation between the location of Tier 1 nodes and likely proximity to the 'natural' aggregation points on the network for CPs.[587]

6.170 The evidence in the June BCMR Consultation also showed that many CPs were apparently interconnected with BT, a significant proportion doing so at points nearby to Tier 1 node locations. In any case, as we are relying on the catchment areas (and the assumption that CPs are likely to have at least one point of interconnection within those areas), we do not think that BT's rejection of the assumption of Tier 1 node routing affects our analysis for national circuits or our market definition.

Criticism 2: The catchment areas used are not a good basis to differentiate between trunk and terminating segments

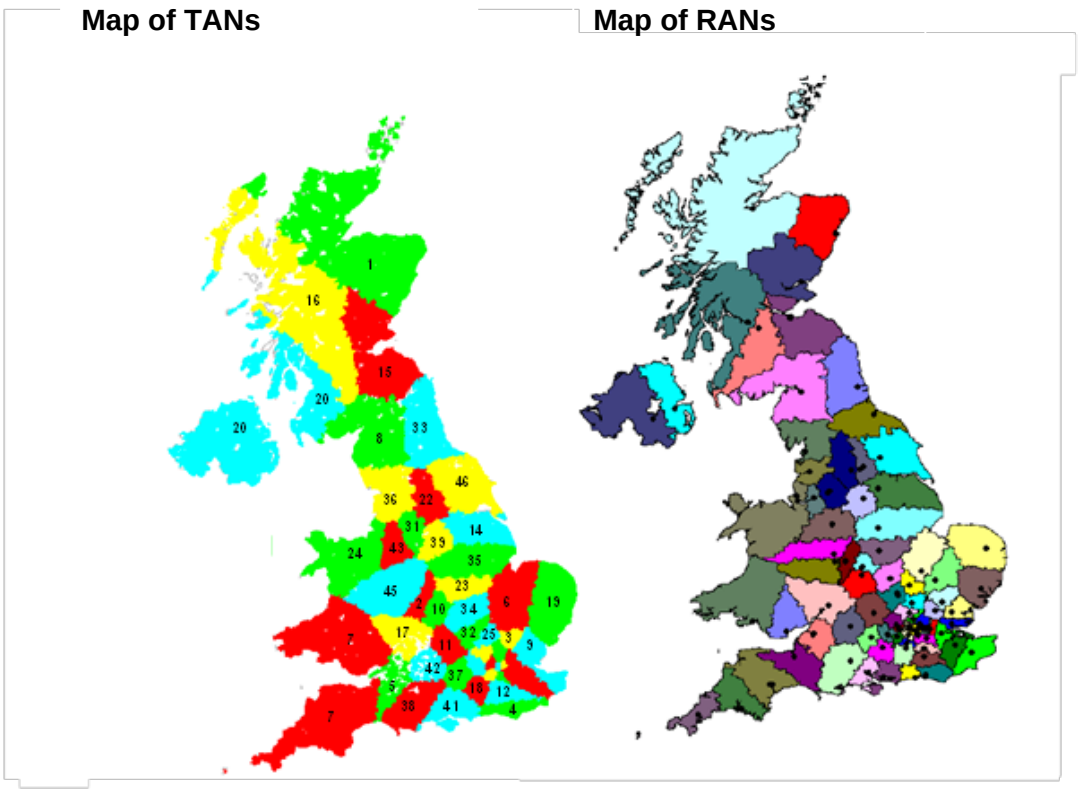
6.171 BT was also concerned that our approach to defining trunk markets based on TANs would result in significant anomalies that fail a 'common sense' approach. We note that, in the report prepared for BT by SPC Networks, SPC seems to accept that:

- circuits between major urban centres are the most likely to be competitive (such circuits account for the majority of connectivity purchased); and
- these routes generally correspond to connections between non-adjacent TAN catchment areas. Hence, BT finds the identification of 'national' trunk as *"a step in the right direction"*. BT's view that we should go further and identify a larger competitive trunk market is considered in further detail under Issue 3 (where we consider BT's alternative market definition).

6.172 We focus here on whether we could or should address "anomalies" within our own approach. However, it is worth noting that BT's alternative market definition (based on SPC Network's proposals) is also based on catchment areas albeit with 78 rather than 46 catchment areas identified (BT refers to these catchment areas as Regional Aggregation Nodes). In assessing the proposals put forward by SPC Network, we see that there is some common ground as some of the 'catchment areas' for the RAN and TANs are fairly similar (e.g. Liverpool, Newcastle etc).

[587] This is a point recognised by SPC in its September 2012 report.

Figure 6.12: Comparison of TAN and RAN catchment areas



Source: Ofcom 2013, (RAN map reproduced from SPC Network September 2012 Report)

6.173 The principal difference between our TAN based catchment areas and SPC's RAN based catchment areas is that SPC identify a greater number (we define 46 TAN catchment areas compared to SPC's 78 RAN areas). In effect, SPC's RAN approach creates a different dividing line between trunk and terminating segments such that more circuits are counted as competitive (part of a trunk market) rather than (uncompetitive) and in the terminating segment market.[588]

6.174 BT referred to some specific examples set out in SPC's report of anomalies associated with our trunk definition:

- Cardiff to Liverpool catchment areas are 'adjacent' and this would mean that a circuit from Plymouth to Liverpool would be treated as Regional Trunk.
- Circuits of similar lengths would be classified either as national or regional trunk or a terminating segment, e.g.
  - Hastings to Dover (National Trunk);
  - Norwich to Ipswich (Terminating segment); and
  - Norwich to Kings Lynn (Regional trunk).

[588] Unlike our methodology, BT's does not distinguish circuits between adjacent catchment areas as regional trunk. Any circuit within a RAN is a terminating segment, whereas any circuit between RANs is simply trunk.

- A circuit from the south of the Outer Hebrides to the north of the Outer Hebrides would be counted as a national trunk.

- In its own market definition proposals, SPC Networks also referred to corrections to make more logical areas – for example, where a location is next to an estuary (e.g. the Bristol channel), it suggested that any location should be parented to a node on the same side of the estuary rather than to a node across a waterway.

6.175 We note that some of these anomalies arise from BT's own routing rules and associated catchment areas. In first identifying TANs for our trunk market definition in the 2007/8 Review, we started with catchment areas based around BT's Tier 1 nodes. The precise boundaries of Tier 1 catchment areas were based on BT's parenting of locations in the UK to each of its 67 Tier 1 nodes. In this respect, the catchment areas associated with particular Tier 1 nodes already had some anomalies embedded within them. For example, a number of the catchment areas associated with BT's Tier 1 nodes span bodies of water (e.g. the Bristol channel).

6.176 BT's argument however was that the definition of the regional trunk market (i.e. circuits between adjacent TANs) serves to give these issues greater significance. We consider that on closer inspection, some of the specific anomalies that BT suggests are not valid. For example, SPC argued that our definition fails a 'common sense' test on the grounds that circuits of similar lengths are treated differently. But as discussed above, it can be entirely appropriate to treat circuits of the same distance differently. The scope for competition is related to where OCPs have previously invested to aggregate traffic (as discussed above). So a low bandwidth circuit to a rural location may have never justified investment in trunk capacity, but this contrasts with similar length competitive trunk between, say, central London and Reading.

6.177 We nevertheless recognise that some of the results look, on the face of it, at odds with the rationale for the proposed market definition. In particular, we accept that some potential anomalies could arise, for example when treating a circuit from Plymouth to Liverpool as a 'regional' trunk or circuits in the Hebrides as national trunk.

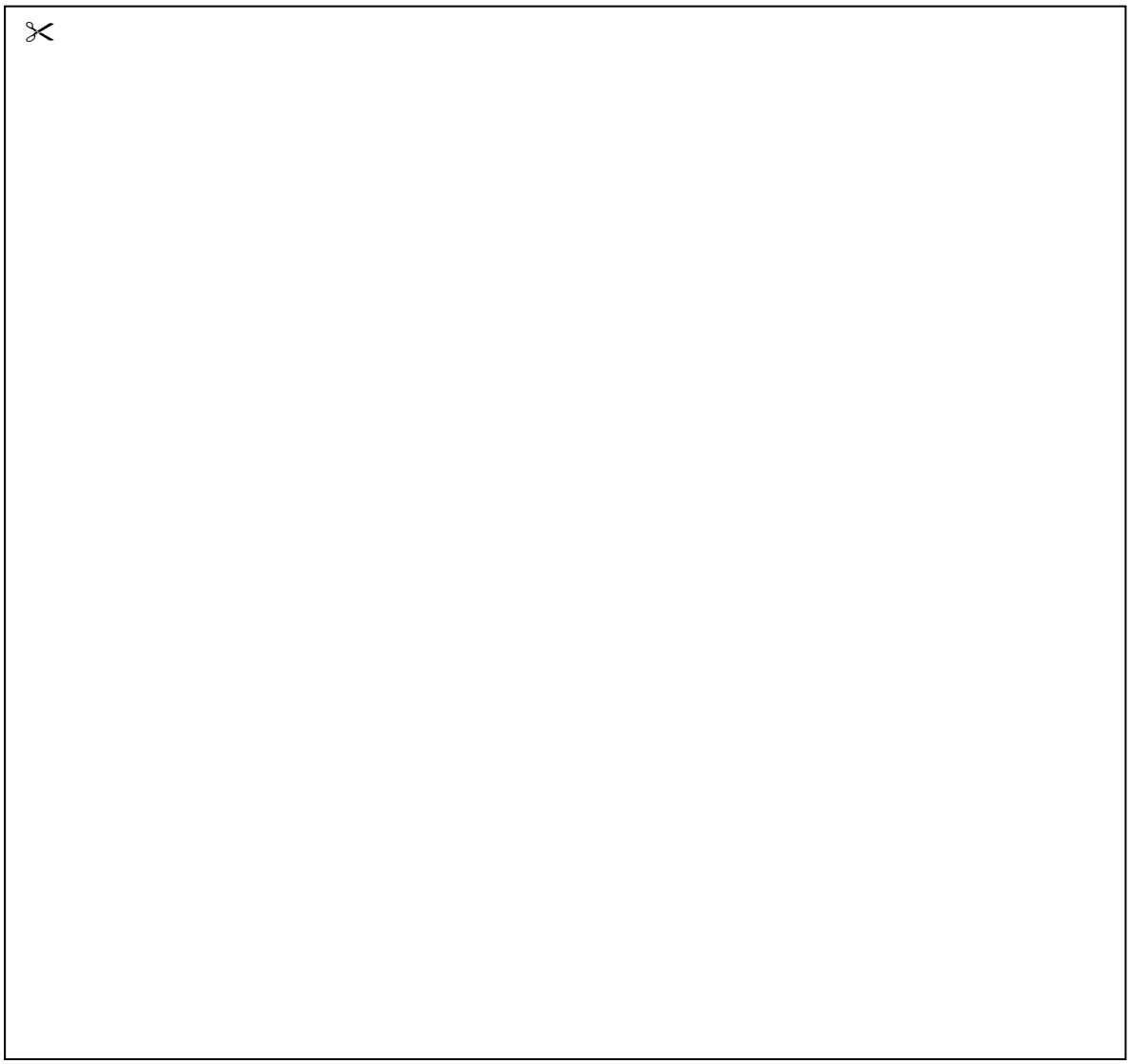
6.178 In relation to the concerns and risks discussed above, we think that the weight we attach to this issue depends on the materiality of the alleged anomalies. We could in principle conduct a fairly detailed exercise of re-drawing the boundaries of each catchment area to avoid potential anomalies (e.g. avoiding the parenting of a location to a node across a body of water). However, we note that market definition is not an end in itself but a means to undertake an analysis of competitive conditions for the purposes of determining whether *ex ante* regulation is required or not.[589] In many cases, if we were to draw the boundary differently we consider that the overall results of our analysis of competitive conditions would remain unchanged.[590]

[589] See, in this respect, the ERG Common Position (Section 4.2).

[590] In particular, we consider that we would continue to define two separate national and regional trunk markets and terminating segments markets, and our subsequent SMP assessments in these respective markets would also remain unchanged. We note that under BT's alternative market definition proposals (BT's RAN proposals as explained under Issue 3 below) a significant proportion of BT's wholesale circuits (that we would classify as either terminating segments and/or including a regional trunk segment) would instead be classified as containing a national trunk market segments. We estimate around [✂ ✂] circuits that we would classify as terminating segments and/or including a regional trunk would be classified as part of BT's national trunk market (based on BT's RAN proposals). We further estimate that BT would account for 73% of sales of circuits that BT would claim are 'competitively provided' within its national trunk market. Therefore, BT would account for a significant proportion of sales of wholesale circuits (i.e. in the merchant market) even though BT suggests those circuits are part of a 'competitive market'.

6.179 To consider this issue further in Figure 6.13, we present analysis of one of the key examples that BT refers to namely: circuits between the Cardiff/Newport and Liverpool TAN. We would treat all of these circuits as 'regional trunk' because Cardiff/Newport and Liverpool are adjacent TANs. BT argues that our market definition could result in a circuit that it sells from, say, Plymouth (in the catchment areas of the Cardiff/Newport TAN) to Liverpool being treated as regional trunk, whereas this circuit should be a national trunk component. We have looked at the TI circuits that BT sells that have ends in each of the catchment areas for the Liverpool and Cardiff/Newport TANs.

Figure 6.13: BT's external sales of wholesale TI circuits to third parties



Source: Ofcom 2013, based on s135 wholesale circuit information

6.180 In Figure 6.13, all of the circuits sold would be treated as regional trunk. In general, this treatment appears appropriate as many of the circuits sold are relatively short distance circuits that cross the boundary of one TAN and another which the 'regional trunk' definition seeks to identify, and there are few longer distance circuits, of which the route from Exeter to the south of Liverpool is the most obvious example.

6.181 Clearly, the above analysis has only looked at one example between the identified catchment areas. It highlights that there are some longer distance circuits that it

might be appropriate to treat more like national trunk. However, the number of circuits that fall within this category are small. Indeed, the lack of longer distance regional trunk in this example may reflect the fact that CPs are able to self-supply some circuits but rely on BT for circuits where there is a significant regional component.[591]

6.182 The overall conclusion that we draw from examining circuits sold between the Liverpool and Cardiff-Newport nodes is that most of them seem to be consistent with our view of 'regional' trunk definition. The likelihood is that, given BT's network reach (and limited network of BT's rivals in Wales), most 'regional trunk' circuits we observe in the analysis above would not be competitively served. Consequently, we consider that excluding a small number of 'anomalous' circuits would not alter our overall SMP findings in relation to each market.

6.183 The fact that OCPs actually purchase allegedly 'anomalous' circuits from BT also raises an important question about the consistency of this purchasing behaviour and the extent of competition that BT suggests exists. Put simply, the fact that an OCP purchases a circuit from BT between Plymouth and Liverpool (a 290km circuit) may indicate that no alternative supplier exists for this particular circuit.

6.184 We explain below, as set out in the June BCMR Consultation, that there are a number of reasons historically why OCPs may continue to rely on BT to a significant extent. This includes the provision of circuits beyond BT nodes where there is apparently presence of rival OCP with their own infrastructure. Under Issue 3 below we discuss these points in more detail and why we reject BT's alternative RAN proposals.

Criticism 3: the boundary between Regional and National trunk cannot be drawn using TAN catchment areas

6.185 Virgin (and BT) were critical of the split between regional and national trunk. Virgin argued that there were cases where a national route would be a substitute for a regional route and - via a chain of substitution – this could result in a single national trunk market. In addition, Virgin considered that there is a more mixed level of competition between routes than can be categorised by a simplistic regional / national split.

6.186 From the perspective of a national wholesale trunk circuit providing a substitute to a regional wholesale trunk, we do not consider that this argument has merit. In general, we identify demand for regional trunk services as arising where short distance circuits back to an OCP interconnection point happen to cross a TAN boundary. This circuit is more like a terminating segment (used to connect an end-user to an OCP's nearest point of handover), so it would not serve the same purpose as a national trunk. Nevertheless, we recognised in the June BCMR Consultation that not all demand for regional circuits (as identified by whether or not they link adjacent TAN catchment areas) arises in this way:

> "For example, we would expect that BT's trunk network nodes should be centred reasonably close to major cities even if they are in adjacent TAN catchment areas (e.g. Sheffield and Leeds).

[591] We also considered SPC's concerns over circuits from North to South Outer Hebrides, which it noted could be treated as national trunk. BT only sells one circuit with connectivity between these locations, which is not material in terms of trunk sales in the region. CWW also argued that Edinburgh to Irvine should be treated as regional trunk. However, on further examination of circuits sold between these two TANs we note that [✂]

> Therefore, in some cases, it would be efficient to route regional circuits that start and end close to the Sheffield and Leeds Tier 1 nodes over the trunk network. However, we think that it would not be practical to identify which of these "regional" circuits were:
>
> - more like traditional, long-distance trunk; and
> - more like termination.
>
> This would require us to assess each circuit sold case by case, which would add significant complexity which we do not consider to be proportionate."[592]

6.187 Therefore, we note that there is the prospect that in capturing the split between national and regional trunk based on TANs there could be some circuits which fall in the regional trunk for which it is economic to use a trunk connection between two TAN nodes. However, any approach short of a circuit-by-circuit assessment (which is not practicable) will involve a degree of approximation, and our approach is appropriate. We consider that BT's distance-based suggestion (as discussed above) would fail to capture all the directly-routed circuits. This would mean wrongly categorising some regional trunk circuits as national trunk when this was not warranted on the basis of competitive conditions (in the case of the regional trunk circuits, would be more similar to those of terminating segments).

6.188 Virgin also considered that its comment that there is a more mixed level of competition between routes also applied to national trunk. In defining a national trunk market, it submitted that we needed evidence that the competitive conditions on national trunk routes are sufficiently homogenous that we can identify a distinct market to regional trunk. However, we consider that a more appropriate prior question in the context of market definition is whether demand-side substitution is likely to exist (so competitive conditions are not determined on an individual route and shares of directly routed circuits may be uninformative of the extent of competition). As we set out above, we consider that national routes are demand-side substitutes for each other, but national routes are not substitutes for regional trunk.

6.189 Nevertheless, in our assessment of OCPs' proposals for a national market (discussed under Issue 3 below), we further examine competitive conditions in national trunk. Our analysis supports the view that CPs are better able to self-supply national trunk segments or purchase these services in merchant markets than they can for the terminating segments and regional trunk segments markets. This at least suggests competitive conditions for national segments are sufficiently different to those for regional trunk such that separate markets are warranted.

6.190 Hence, analysis of OCPs' purchases of trunk segments from BT is supportive of the view that some form of split should exist between on the one hand local / regional circuits and on the other national trunk circuits.

Issue 3: Stakeholders' alternative market definition proposals

6.191 Under Issue 3, we consider stakeholders' alternative market definition proposals. First, we summarise the concerns we set out with respect to BT's December trunk proposal in the June BCMR Consultation and why we rejected it. We then summarise

[592] Paragraph 6.116 of the June BCMR Consultation,

BT's response to our concerns in the June BCMR Consultation, and then consider BT's updated trunk market definition that it submitted as part of its response. This updated trunk market definition is based on Regional Aggregation Nodes (RANs), as suggested in the report BT commissioned by the consultants SPC Network, which we describe in further detail below. We then set out our assessment of BT's RAN proposals based on available evidence. We conclude that BT's RAN proposal does not provide an appropriate basis for defining the TI trunk market.

6.192 Finally, as a number of stakeholders other than BT have also submitted alternatives to our regional and national trunk proposals, we also summarise and consider their proposals. Again, we conclude that our TI trunk market definition remains the most appropriate.

Consideration of BT's December trunk proposal in the June BCMR Consultation

6.193 In the June BCMR Consultation, we noted that BT argued that we should base our trunk on an alternative market definition approach ("BT's December trunk proposal"). BT's December trunk proposal relied on identification of what it called a "competitive core" for the TI trunk market. It proposed that we should identify this competitive core based on the network nodes where OCPs were apparently present (based on where they were purchasing interconnection circuits from BT known as PPC points of handover). It argued that these nodes clearly and simply signal the breakpoint of "non-competitive" access part of wholesale TI provision. It considered that regulatory intervention beyond these points is unnecessary.

6.194 BT did not specify the minimum criteria for identifying the "competitive core". But in its December 2011 paper it noted that:

> "At 665 of those nodes CPs have decided there is sufficient business opportunity to provide a return on the investment needed to extend their network to include the BT serving exchange. In 247 nodes more than 1 CP has made the same calculation; that aggregation opportunities are such that the incremental returns will allow them to offer service on their own network cheaper than purchasing additional conveyance from BT."

6.195 It noted that, for example, that the minimum interconnection capacity for an aggregated POH is 63 * 2Mbit/s circuits, which was a significant investment for an OCP. However, it noted that once an OCP had incurred the cost of interconnection then OCPs had every incentive to use their own network at those points. It argued that we need to recognise the reality of widespread interconnection and competing networks (as indicated by CPs' PPC POH purchases), which when combined with a vibrant merchant market (i.e. markets where CPs are selling wholesale leased lines services to each other) would suggest a competitive trunk market.

6.196 In the June BCMR Consultation, we provisionally concluded that BT's proposed approach based solely on the location of interconnection points was inappropriate. In particular:

a) It would be inconsistent with the approach to market definition set out in the EC guidelines on market definition and SMP;

b) It relied on a single indicator of competitive presence (POH purchases); and

c) Measuring presence of operators based on POH purchases was not a sufficient indicator of competition.

(a) Inconsistent with guidelines on market definition

6.197 We noted that, in the standard approach to market definition, the first step was to identify a narrowly-defined "focal product". The SSNIP test was then used to determine whether this focal product should be regarded as forming a market by itself or whether the market should be broadened to include potential demand-side and supply-side substitutes. In the present context, an analysis of demand-side and supply-side substitution might lead to the definition of a market including a number of different trunk routes given the possibility of indirect routing, but would not bring in parts of the access and backhaul networks as these were clearly not demand-side or supply-side substitutes for trunk services.

6.198 We recognised that, for the purposes of simplifying the analysis, the market might also be broadened to include other trunk routes on the grounds either that they were subject to a common pricing constraint or that competitive conditions were sufficiently homogeneous to allow this. We noted that reliance on homogeneity of competitive conditions was more usual for the purposes of geographic market definition than for product market definition but, given the location-specific nature of trunk services and leased lines generally, we considered that the distinction between product and geographic market definition was blurred and homogeneity of competitive conditions could be useful for the purposes of product market definition as well. To look only at the location of interconnection points was inconsistent with this because it would omit all the steps referred to in the paragraph immediately above except the very last, and then to define competitive conditions as homogeneous on the basis of a single indicator, contrary to the ERG Common Position.[593]

6.199 We also said that we had to have regard to the EC Recommendation. In this respect, the EC's Explanatory Note highlighted the basis for identifying differences between trunk and terminating segments:

> "What constitutes a terminating segment will depend on the network topology specific to particular Member States and will be decided upon by the relevant NRA."[594]

6.200 Whilst the EC's Explanatory Note here refers to terminating segments, it was clear that the definition of the market boundary for terminating segments also necessarily informed the definition of the trunk market. The EC's Explanatory Note highlighted that any definition was linked to the network topology and not to be based solely on the number of interconnected operators at a particular location. We considered that the EC's Explanatory Note was most consistent with the standard approach to market definition because the wholesale leased line products actually sold, for example a trunk or terminating segment, were usually defined on the basis of the parts of the network used. It was then natural that this should be reflected in the definition of the focal product and the final product market definition. In this respect, we considered that our proposed market definition was also more consistent with this standard approach and with that set out in the EC's Explanatory Note.

[593] See Section 4.2.

[594] See Section 4.2.3.

6.201 We were also concerned that BT's December 2011 proposals would in effect reclassify some parts of the backhaul network as part of the trunk market on the basis that one or more CPs were purchasing a POH at particular nodes. The result would be a market definition in which terminating segments (including backhaul routes) were included within the trunk market when:

- they were not good substitutes for trunk services; and
- when there was in fact insufficient competing backhaul capacity to meet trunk demand from CPs (so BT's analysis would potentially include circuits as part of a national trunk market that were not good substitutes for each other).[595]

6.202 By including a number of routes that were more like terminating segments, we would also be grouping together services for which the competitive conditions were not the same as genuinely competitive national trunk routes (so BT's analysis would potentially fail on the basis that it did not combine services for which the competitive conditions were sufficiently homogenous).

6.203 We also pointed out that, even if the market data suggested that some CPs had built network to BT's local exchanges, there was no evidence to suggest that this was constraining BT. For example, there was no evidence to suggest that BT had priced those wholesale TI services that faced potentially greater levels of competition differently (than the locations where CPs were not apparently present).

6.204 We stated that we should only include services in the same product or geographic market where they were either good substitutes for each other or were supplied under homogeneous competitive conditions. Basing market definition on CP connection points would be inconsistent with these two principles.

(b) Reliance on a single indicator

6.205 We also explained that an assessment of competition in wholesale leased line markets should not be based on a single indicator. Indeed, this point was highlighted in the ERG Common Position on geographic aspects of markets, where it discussed the need for multiple indicators in order to segment a market:

> "The criteria for the assessment of the homogeneity of competitive conditions will usually be correlated (e.g. low barriers to entry are likely to lead to a higher number of operators, a lower market share of the incumbent operator and lower prices). However, the correlation is unlikely to be perfect. It is therefore likely to be appropriate to base the segmentation on a combination of several [….] criteria mentioned above. A segmentation based on a single criterion (e.g. the number of operators) will usually not be appropriate. The relevant criteria should be applied cumulatively and such that differences in competitive conditions between different markets are large while differences in competitive conditions within a market are small. The relevant thresholds for each of the criteria

[595] The intuition here is that a CP may have built out fairly limited backhaul capacity (e.g. a 2Mbit link to support interconnection of a number of sub-2Mbit/s circuits). We would not view the presence of an OCP with such limited capacity as providing trunk capacity capable of competing for trunk in that location.

which determine the scope of the market have to be determined on a case-by-case basis based on the characteristics of each market."[596]

6.206 We said that any market definition reliant on a single indicator would need to be supported by evidence that other market definition factors were not relevant and/or evidence that such an indicator was capable of accurately capturing the boundaries of the relevant market.[597] We considered that POH purchases were unlikely to be a sufficient basis for defining a separate market on their own.

6.207 We also noted that there was no evidence of variations in BT's pricing of backhaul circuits, which would support the inclusion of some such circuits in a "competitive core" or trunk market (and the remainder, based on BT's proposals, in an access market). By contrast, there was some evidence of discounting by BT on national trunk routes (between Tier 1 nodes in London and Birmingham and Manchester).[598]

6.208 We contrasted BT's proposals for a competitive core based on a single indicator with our proposal to define separate geographic markets for some TISBO, AISBO and MISBO services in the WECLA. We noted that our geographic market assessment was based on extensive analysis of a number of indicators, including CP network presence and BT's service shares; the impact of OCP presence on BT's pricing behaviour; and a further assessment that competition was likely to be sustainable (including an assessment of the interconnection opportunities available and the proportion of businesses in the geographic area that individual CPs were able to serve).

(c) POH presence is not a sufficient indicator of competition in backhaul

6.209 We considered that CPs' purchases of POH services were an indicator of presence at a node, but did not show the strength of the potential competitive constraint. For example:

- not all POHs were enabled to support different technologies. For example, an OCP might have interconnected to support PDH circuits but not SDH;
- not all POHs were connected to CPs' national trunk networks;
- the fact that an OCP is purchasing a POH at a BT node did not mean that that OCP has sufficient spare capacity (or efficient POHs) that they could then use to compete with BT; and
- OCPs did not have as extensive a network as BT, so they were also less able to provide resilience (e.g. two diverse paths) from each exchange location where they were purchasing a POH.

[596] See Executive Summary (see also Section 4.2).

[597] For example, in our reviews of Wholesale broadband access markets, we have sometimes defined markets on the basis of the number of principal operators connected at a BT exchange. This reflects the specific economic characteristics of the provision of WBA services using LLU and based on a full analysis of the evidence of variations in competitive conditions, which entailed looking at a number of indicators. For more discussion of the WBA see below.

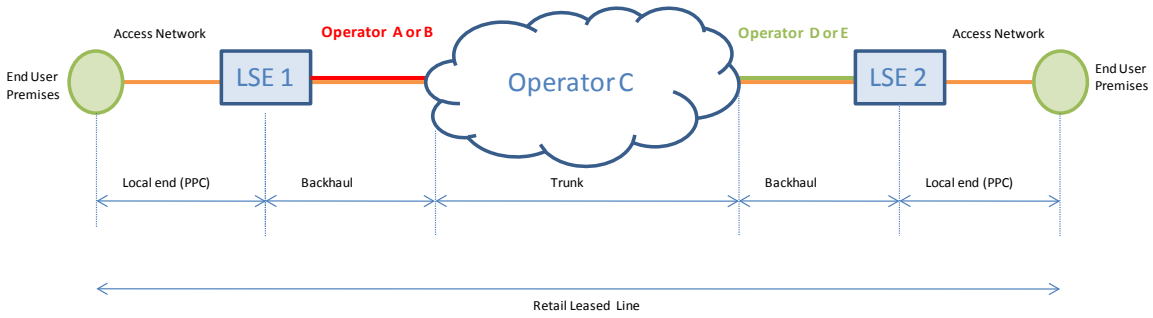
[598] We noted that BT also offered wholesale discounts for terminating segments in the London area but that this observed pricing behaviour was more consistent with our proposal to find a separate geographic market for certain TISBO services in the WECLA (rather than, for example, identifying this as part of a competitive core market).

6.210 These points suggested that even those OCPs purchasing POH at a node might also be reliant on BT for additional circuits at that location in order to reach other parts of the UK (and not only for access circuits). In addition, even if OCPs purchasing a POH had sufficient "presence" to self-supply any circuits requiring trunk from that location, there was no guarantee that OCPs would sell circuits to their rivals.

6.211 We were also concerned about the cost and practicality of interconnection for a CP relying on a merchant market for backhaul links. It was not necessarily the case that a healthy merchant market would be achievable at all locations, even those where two or more CPs had a POH.

6.212 We explained that, in practice, an operator with its core network connected at each TAN would face a number of difficulties in attempting to connect to end-users. We illustrated this point with an example, shown in Figure 6.14.

Figure 6.14: Example of end-to-end circuit provision issues



Source: Ofcom 2012

6.213 We used, as an example, a local serving exchange (LSE 1) with two CPs present (operators A and B) and another local serving exchange (LSE 2) with two other CPs (operators D and E). An operator (operator C) that did not have presence (i.e. it had only built out to BT's Tier 1 nodes) would be obliged to purchase access segments from BT and backhaul from the merchant market either:

- at one end either from operator A or B and at the other end from either operator D or E; or
- from BT on an unregulated basis to bridge the gap between regulated terminating segments provided by BT and operator C's own core network nodes in major urban centres.

6.214 We pointed out that, for a retail circuit with two terminating segments and a trunk segment this could result in operator C having to put together a circuit consisting of up to five circuit segments, two access segments from BT, middle-mile / backhaul connection from either operator A and/or operator B and self-provided trunk. These arrangements would be complicated even further if at the other end of the circuit operator C would have to conclude an interconnection arrangement with either operator D or E.

6.215 We considered that this would not be an efficient proposition either from a technical, operational or cost perspective. In addition, if an OCP was only providing a relatively small number of circuits, it would be economically prohibitive for an OCP to switch from BT to an alternative supplier. This was because there could be significant circuit rearrangement costs of handing over a circuit from one provider to another.

6.216 We accepted that these concerns could be mitigated if there was a single operator that had sufficient presence (and resilient capacity) at both ends of the circuit, for example if Operator A was present both at LSE 1 and 2. However, the available evidence[599] suggested that this was unlikely in practice. For example, we estimated that there were only 73 exchanges where both the largest two CPs (other than BT) still active in TI markets were present. Therefore, a provider looking to ensure resilient connections was likely to face a limited choice of alternative CPs with extensive national connectivity.

Responses to the June BCMR Consultation

6.217 Below, we summarise the points made by respondents, which are relevant to Issue 3, and explain how we have taken them into account in reaching our conclusions.

6.218 Stakeholders including BT and OCPs suggested alternatives to our regional and national trunk proposals based on 46 TANs. BT suggested that the extent of alternative competitive infrastructure was extensive and we should define a trunk market wider in scope (based on 78 node locations where OCPs had presence). A number of OCPs suggested that a national trunk market existed in which BT still had SMP (this was mainly based on their view that OCPs continued to rely on BT for a significant number of national trunk circuits).[600]

BT's Regional Aggregation Nodes proposal

6.219 BT offered an alternative trunk market definition proposal based on recommendations in the report it commissioned from its consultants (SPC). BT asked SPC to review the latest information on the proximity of CPs' networks to BT's nodes and to adjust the trunk definition accordingly. In the following paragraphs we provide a summary of SPC's September 2012 report, which was used as the basis for BT's RAN proposals.

Overall approach to market definition

6.220 Before discussing its proposals, SPC set out the relevant basis on which product and geographic markets should be defined (in line with established principles and guidelines). In relation to geographic market assessment, it referred to the EC Guidelines, which it suggested would entail an assessment of differences in competitive conditions. In this respect, SPC noted the ERG Common Position that makes clear that assessing competitive conditions on the basis of a single criterion, for example, the number of suppliers, is unlikely to be sufficient and that other measures of such conditions are likely to be required. It noted the ERG's view that whilst measures of competitive conditions are likely to be correlated they are unlikely to be perfectly correlated and thus more than one measure is needed. SPC noted for example that both the number of operators *and* service share of the leading operator may be used together rather than on its own.

6.221 SPC noted however that measuring service share is extremely difficult in the case of trunk segments and that even the ERG accepts that pricing behaviour can be a

[599] Based on analysis of OCP's purchases of POH circuits based on BT's response to our s135 information request.

[600] BT argued that stakeholder views summarised in the June BCMR Consultation of maintaining the existing trunk definition reflected their preference to maintain the status quo on the grounds that this would be least disruptive to their business models. BT did not consider this was a reasonable basis to maintain unwarranted regulation on BT.

difficult metric. SPC noted that it had therefore placed strong reliance on the number of operators, but that it had also considered barriers to entry.[601]

Product market definition:

6.222 SPC defined the relevant product markets based on BT's network of nodes as follows:

- access segments (that connect a customer premise to the nearest BT node/Local Service Exchange); and
- trunk segments (that connect CP's nodes).

6.223 SPC argued that the distinction between the two markets was due to the non-substitutability between access and trunk segments both on the demand and supply side.[602] SPC noted that its definition was more logical and economically appropriate relative to our proposals, as under our approach, nodes could change product market for example where BT re-classified a Tier 2 node as a Tier 1 node.

Geographic market definition:

6.224 SPC considered that while it was clear that the boundary between Access and Trunk could be set at a BT node building, it was also the case that competitive conditions were not homogenous at all node buildings.

6.225 It considered that one approach might be to consider these differences by looking at competitive conditions between routes between different node buildings. However, it did not consider that a route-by-route analysis of trunk would be practicable (as BT has around 1,100 nodes and such an assessment would entail consideration of over 600,000 trunk routes). It instead suggested that it was possible to define geographic markets made up of groups of nodes based on similar competitive conditions.

6.226 It suggested that a relevant starting point for assessing competitive conditions at different nodes should be the number of OCPs that have their own point of handover within reasonable distance of the BT node. It considered that OCPs within 500m of a BT exchange could be assumed to be within a "reasonable distance" and that at least two OCPs plus BT would be required to change the competitive conditions at a node.[603] SPC noted in our geographic market assessment of terminating segments, we appeared to accept that two additional operators to BT with substantial coverage are sufficient to find different competitive conditions.[604]

6.227 SPC calculated the count of BT exchange buildings with OCPs within different distance ranges.

[601] SPC argued that we had analysed barriers to entry in our geographic market definition of terminating segments based on postal sectors and dig distances, but that we had not done so for TI trunk.

[602] Page 32 of SPC's September 2012 paper (as noted under Issue 1 above, this point by SPC seems to contradict BT's views in relation to substitution between trunk and terminating segments).

[603] SPC referred to a number of studies (page 34-35) to support this. It concluded that "the weight of theoretical and empirical evidence suggests that there is a general case that three firms are sufficient for most of the benefits of competition to be available to consumers and for there to be sufficient competition to deter coordinated action." (page 35).

[604] Page 35 of SPC's September 2012 paper.

Figure 6.15: Example of end-to-end circuit provision

	1 or more	2 or more	3 or more	4 or more	5 or more	6 or more	7 or more
500m	284	121	60	36	8	2	2
1km	392	185	106	59	32	16	8
2km	601	321	192	131	81	57	33
5km	1075	786	547	400	286	225	143

Source: SPC Network, September 2012 Report, page 36.

6.228 In SPC's report it argued that given a number of potentially competitive exchanges one approach to defining geographic markets could be to identify:

- Market 1: segments between nodes where one of the final nodes has none or one OCP. Thus a Trunk segment between a node with BT plus one and another with BT plus three would be included in this market.

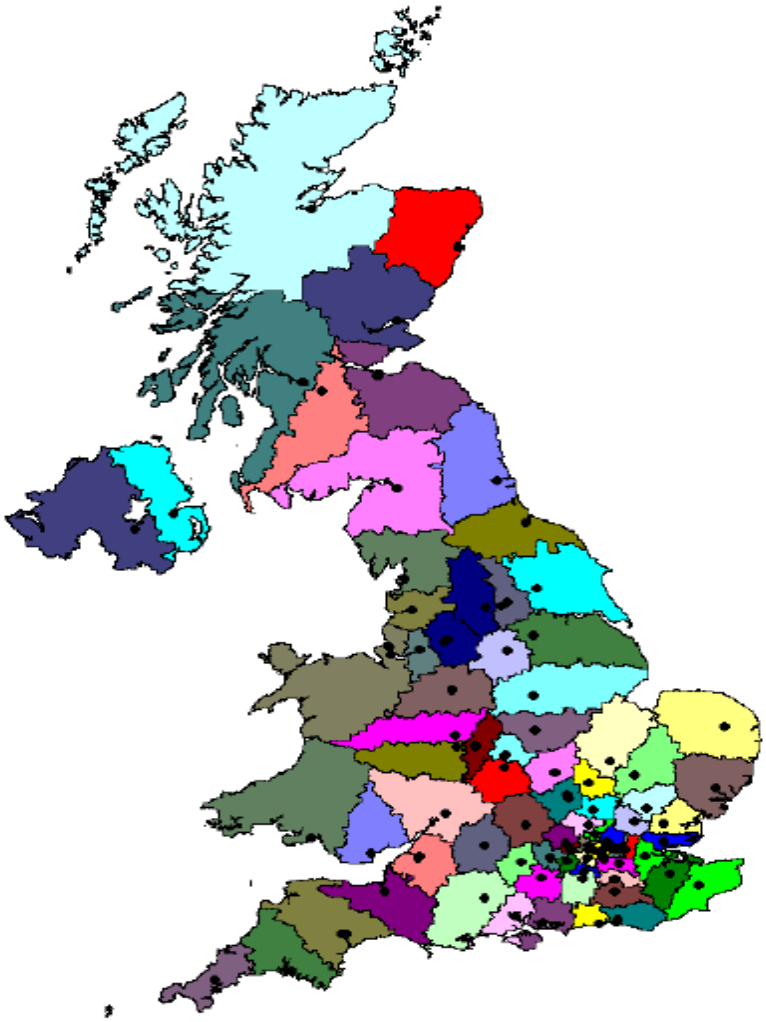
- Market 2: segments where both final nodes have BT plus at least two operators with a POH within 500m.[605]

6.229 SPC noted that there are likely to be many segments that run between a node with only BT and a node with BT plus at least two operators (where the circuit is handed over to the OCP) and a further segment between the OCPs' nodes. It considered that a segment between a Market 1 and a Market 2 node may (if the nodes are in reasonable proximity) be more like an Access or Backhaul segment than a trunk segment. Further, on additional analysis of the location of nodes with several OCPs presence, it found that some of the nodes are within close proximity of each other. For example, it found that there are three SDH nodes in Exeter all of which have two or more OCPs within 500m. It therefore proposed to maintain our TAN catchment area approach whereby nodes with several operators in geographically close proximity are aggregated together, but amended such that the market should be defined on the basis of Regional Aggregation Nodes (RANs), not TANs. Based on the above list of "competitive exchanges" (as shown in Figure 6.15), SPC produced an indicative set of 78 RANs (SPC also noted that it had made minor changes to RANs to create "more logical areas").[606]

[605] SPC explanation for a 500 metre assumption was as follows: "Handover between BT and an OCP can be in-span (ISH), customer-sited (CSH) or a combination of the two (extended reach ISH). With ISH, an OCP may appear to have a POH, say, 1.5km from the BT node but to have logical handover within a much shorter distance. From an economic perspective, whether the fibre that connects the BT node to the OCP point of presence is owned by the OCP (ISH) or BT (CSH) may not be important. However, we believe it may be difficult to establish proximity of handover based on logical connectivity, and so have based our proposal on OCPs having a POH within 500 metres of the BT node, irrespective of whether handover is in-span or customer-sited." Page 34, SPC Network, September 2012.

[606] For example, where a location is next to an estuary to ensure it is parented to a node on the same side of the estuary rather than to a node across a waterway.

Figure 6.16: Proposed catchment areas under BT's RAN proposals



Source: SPC Network, September 2012 Report.

6.230 SPC noted that it had assessed what effect this revised definition of aggregation node would have on competition in the trunk market. It compared the extent of interconnection (based on operators purchasing POH at Tier 1 nodes (in the case of TANs) and at the competitive exchanges it had identified under its RAN proposals. It suggested that *"under Ofcom's proposals, two OCPs interconnect at 100% of TANs and a third interconnects at 97%. Under our proposal, the third OCP has slightly less interconnection, having points of handover at 91% of RANs. However, this is 91% of the 78 RANs (71) rather than 97% of 46 TANs (45)."* [607]

6.231 SPC noted that under our TAN proposals we defined connectivity between adjacent catchment areas as regional trunk as we considered it "more like termination" than it is like national trunk. It did not consider that it was necessary to identify a regional trunk market under its RAN proposals. It provided the example of an OCP supplying retail circuits between a customer's offices in Norwich, Ipswich and Cambridge that wished to connect all three. SPC argued that an OCP would only need to acquire a

[607] SPC Network, September 2012 Report, page 37.

terminating segment from each office to the respective nearest RANs and then self-supply trunk segments between the three RANs. These connections between the RANs would therefore not be "like a terminating segment" but actually like a trunk segment.

6.232 SPC noted that its proposals had concentrated on a single indicator (i.e. the number of OCPs with a POH within 500m of the BT node). It highlighted its reservations over the use of other indicators such as service shares and pricing behaviour (as set out above). It noted however that the ERG common position proposed a fourth indicator: barriers to entry (i.e. economic or technical factors that make it difficult or prevent firms from entering a market to compete with existing suppliers).

6.233 SPC argued that it was self evident that barriers to entry do not suddenly become higher at exchanges other than BT's Tier 1 nodes such that entry is restricted. SPC suggested that the number of BT nodes other than Tier 1 nodes where OCPs were using their own infrastructure demonstrated this.[608] SPC also argued that OCPs are today not investing in SDH networks but in all-IP networks that offer a variety of interfaces, both TI and AI. It considered that barriers to entry are thus further reduced as OCPs benefit from dynamic gains and economies of scope.

6.234 SPC did not formally assess BT's potential SMP in a national trunk market consisting of connectivity between the 78 RANs. But it expected that, given the presence of a least two other operators at each node, with the same three OCPs present in over 90% of the RANs, it would be unlikely that BT would be found to have SMP on this re-defined market.

BT's further comments on the SPC proposals

6.235 BT suggested that SPC's report shows that:

- a definition of trunk based on 78 Regional Aggregation Nodes ("RANs") would more truly reflect the competitive position and would not rely on any notional assumptions about how circuits are routed over BT's network;
- all connectivity between these nodes (with no regional/national distinction) would fall within a single trunk market that, according to BT, the evidence showed would be competitive; and
- connectivity within the catchment area of each node would be classified as terminating segments.

6.236 BT suggested the following advantages of the SPC Network approach:

- it would eliminate a large number of anomalies and inconsistencies in Ofcom's proposals such as:
  - the classification of connections between adjacent large cities being regarded as 'national trunk'

[608] At page 40 of its September report, SPC referred to "marginal node" which it defined as the node at which an OCP would be indifferent between investing in its own facilities to provide connection to other nodes (i.e. building network to that node) and buying trunk services from BT. At a particular node, an OCP would be indifferent between building and buying where the profit from owning trunk less the fixed cost of the facility is the same as the profit the OCP could realise where it relies on BT for trunk less the cost of the purchased wholesale circuit.

- problems with the existing model, where circuits are assumed to cross the Bristol Channel, Thames estuary etc that do not happen in reality.

- it would meet the Commission Guidelines by excluding trunk on the grounds of replicability.

- it could still be fitted to the 'notional' routing model we had adopted (even though BT has reservations over its use).

6.237 BT argued that the evidence is unequivocal that alternative infrastructure exists to the point where two or more likely three alternative operators could compete for all of BT's existing leased lines business using their own trunk networks (based on their presence at BT local exchanges). BT suggested that Ofcom appears to accept the presence of competing operators.

6.238 In addition to BT's view that two or three operators could compete for trunk based on self-supply, BT submitted that it had also shown there are few barriers to impede competition for trunk based on supply of services to third parties. BT considered that the evidence in wholesale leased lines markets showed that CPs are able to come to arrangements with each other to provide wholesale services. BT noted that in other leased lines markets Ofcom finds a thriving merchant market (with the implication that the same conditions should apply for trunk).

6.239 BT argued that its obligation should be to provide connectivity between any point within a RAN to the nearest competitive exchange in each RAN. But, reflecting the presence of competing networks, it argued that it should generally not have to provide connectivity between a point in a RAN catchment area to a point outside of RAN catchment area. This was because, in BT's view, rival CPs would be able to provide their own infrastructure in competition to BT (or purchase competing services).

6.240 In a letter to Ofcom of 17 December 2012, BT subsequently clarified that in certain circumstances it might still be appropriate for it to have an obligation to provide terminating segments outside of a RAN. BT explained that it should still have to provide a terminating segment where the distance from the customer end to the OCP's point of handover was shorter than the distance of a circuit from a customer end to the "competitive node" location within a RAN (which BT defines as exchanges where 2 or more OCPs are present). BT's justification for this approach was "a reflection of the legacy nature of PPCs with a degree of in-built inertia in the routing not only for BT but also of CPs".

6.241 In BT's view, the proposals to continue to regulate trunk services are not consistent with the EC's three criteria test. BT argued that it was empirically undeniable that there are not high barriers to entry given the replicability of trunk services by other operators. BT submitted that TI services are in any case migrating and the industry is adopting common core networks. In its view, Ofcom has not demonstrated that it could not deal with issues of competition under national (or Community) competition law. BT argued that other NRAs do not regulate trunk services and Ofcom is an outlier.

6.242 BT considered that, at the very least, we should either revert to defining the market on the basis of the catchment areas associated with the 67 Tier 1 nodes and remove

the additional layer of TANs and/or deregulate all trunk segments between Tier 1 nodes in the WECLA.[609]

BT's views on our comments on the December 2011 trunk proposal

6.243 In its response to the June BCMR Consultation, BT provided further comments to our (and other stakeholders') objections to its December 2011 trunk proposals. We have summarised these comments here as they have some read-across to its RAN proposals.

6.244 We set out below BT's comments on our concerns that:

- BT's approach to market definition was not compatible with the EC Guidelines on market definition and SMP;
- the reliance on a single indicator (POH purchases) was inappropriate as the basis for defining a trunk market; and
- the POH purchases are not a sufficient indicator of where leased lines (whether "backhaul" or "trunk") are competitive.

Approach to market definition

6.245 BT argued that its proposed approach was compatible with the EC guidelines and that the method it had proposed was similar to the general approach that was followed by Ofcom in the WBA market review. BT noted our comments in the June BCMR Consultation that market definition and SMP cannot always be divorced and it pointed to instances in the BCMR where it considered we had also relied on market share indicators to justify market boundary distinctions such as for:

- our geographic assessment;
- for AI and TI; and
- access and backhaul markets.

6.246 BT also argued that our own assessment relied heavily, and almost exclusively, on market share as the basis for identifying regional and national trunk markets.

Reliance on a single indicator (POH purchases)

6.247 BT agreed that it was not appropriate to rely on a single indicator for the assessment of SMP. It stated that its December 2011 proposal was not meant to be all embracing, but it had provided an alternative approach that justified consideration given the flaws in our proposals.

[609] BT argued that trunk circuits in WECLA at all bandwidths should be deregulated. It argued that the level of demand in London justifies aggregation into higher bandwidth trunk circuits even for relatively short distances. Such trunk circuits would use circuits above 8Mbit/s, which should not be regulated where the end points are within the WECLA (i.e. all segments at any bandwidth between Tier 1/1.5/2 nodes in the WECLA).

POH presence is not a sufficient indicator of competition in backhaul

6.248 BT did not consider that the concerns raised by UKCTA and Ofcom (over the use of POH purchases as an indicator of competition) were substantial or material. BT set out its response to a number of points and objections made by Ofcom and UKCTA:

- *Diversity is a crucial part of PPCs:* BT noted that in most TAN areas, CPs had more than one POH so they could in principle route circuits to different locations. BT further noted that it provides a number of resilience options for PPCs, which means that a CP would not have to rely on BT for trunk when providing high availability circuits to customers. BT argued that diversely routed high availability circuits are in any case a small proportion of the market (less than 1%). It also noted that end-to-end availability of a circuit is not only a function of diverse routing (in particular separate paths) and in this respect many BT exchanges are single fibre but still deliver high availability. BT also noted that guaranteeing availability on a more complex network that has evolved through time (as has its own network) may be more difficult than on a simpler (OCP) network with fewer links.

- *The need for national wholesale providers:* BT estimated that a number of CPs have sufficiently extensive national network that they can compete to provide trunk segments. It showed analysis of its own retail circuits that notionally require trunk and calculated the number of unique CPs that had POHs at both ends of the trunk circuit. It estimated that two CPs had 100% coverage and another covered 98% of BT's retail circuits.

- *Lack of spare capacity at POHs:* BT noted that 50% of POH capacity was not used on average and that the PPC market was in decline, which would free up further capacity in future. CPs are expected to roll-out new technologies so BT's expectation is for more competition not less. BT thought that it was untenable to argue, as CWW had, that spare capacity of 622Mbit/s was needed at a POH before competitive provision can be offered for a 64Kbit/s circuit.

- *Not all POHs are enabled to support different technologies:* BT thought that it was not clear that technology used at the POH would have any influence on a CPs' ability to provide competition for trunk services at that node.[610]

- *Not all POHs are connected to CPs' national trunk networks:* BT considered that the idea of a trunk network separate from a terminating network is at best a weak distinction and this objection is not well founded.[611]

- *End-to-end competition issues:* BT argued that the example we presented over the impact of deregulating trunk on CPs reliant on BT would not be as material as suggested.[612] BT noted in any case that there are only four main players

[610] BT argued that POH are either ISH or CSH – where CSH connects BT's CPE to a CP's CPE the network technology either PDH or SDH is not relevant or visible to the other network. ISH requires the use of SDH.

[611] BT's view was that once on a CP's network given sunk cost of duct, fibre and accommodation it would be a CPs' decision whether to incur the incremental investment to upgrade their equipment or pay BT's FAC to carry the circuit further. The capacity of a CP's network is not fixed and would be expected to grow in response to new business.

[612] Merchant providers would combine local ends with their own network to provide relevant connectivity from the end-user back to a CP's own core network.

(including BT) and others are niche providers who do not need or want national coverage.[613]

Ofcom's considerations of consultation responses

6.249 In the following paragraphs, we have assessed BT's alternative trunk market definition based on RANs. We conclude, on the basis of our further analysis, that these alternative definitions are not supported by the available evidence and do not provide a better alternative to our regional and national TI trunk definition.

Acceptance by BT of many aspects of the TAN approach

6.250 We note that BT has put forward an approach that takes as it starting point the catchment areas approach that we are using. Similar to our TAN approach, BT's RAN proposals result in a patchwork of catchment areas across the UK albeit with a greater number of smaller areas known as RANs. It is important, therefore, to stress at the outset that there is common ground between the RAN and TAN proposals, which in our view reflects the practicality and intuitive attraction of Ofcom's approach.

6.251 However, the basis on which BT's consultants SPC identified the proposed 78 RANs is effectively a repeat of BT's December trunk proposals (as we described above). This is because the approach to identifying "competitive exchanges" under the RAN proposals still relies on the assertion that the presence of two or more OCPs at an exchange would clearly mark the boundary between terminating and trunk segments. The main difference to BT's December trunk proposals is that it has identified RAN catchment areas so that areas potentially served by relevant "competitive exchanges" (where two or more OCPs have presence) are identified.[614]

6.252 We note that a number of times, SPC's report attempts to justify the strong reliance on OCP presence (based on two or more operators) as the basis for identifying RANs. In particular, SPC refers to the "presence" of two or more CPs as a commonly used criterion to define markets and it cites a number of examples of research on the number of competitors needed for markets to achieve competitive outcomes:

- Bresnahan and Reiss (1991): developed a model of market entry to estimate how many competitors are needed, given market size, in various retail services in US towns, and which suggest most of the increase in competition comes with entry of the second and third firm;

- An economic policy note prepared for the Dutch NRA, OPTA (2006): this asked the question, in the context of merger policy, whether two competitors were enough. This paper reviewed the approaches by the US Department of Justice[615] and European Commission, and according to SPC this paper highlighted that 3 to 2 mergers were normally viewed as problematic whereas 5 to 4 mergers are not; and

[613] BT suggested that at paragraph 6.100 of the June BCMR Consultation we had assumed all CPs will want resilience to the same degree as BT but this is not necessarily the case. BT noted that CPs position themselves differently commercially and resilience will vary as a selling point.

[614] In addition, the RAN proposals effectively group areas served by "uncompetitive" exchanges with "competitive" exchanges to form relevant RAN catchment areas.

[615] SPC also referred to analysis by the US DOJ that looked at pricing with few and many competitors in particular markets. SPC suggested that this analysis showed *"the price falls by 42% below the monopoly price with the presence of the first three entrants [sic] firms, but only by a further 15% with the next three entrants."* (http://www.opta.nl/en/news/all-publications/publication/?id=2051, page 10).

- Davies, S (2003): review of the Competition Commission's assessment of the acquisition of the supermarket Safeway. According to SPC, this paper shows that the CC allowed Morrisons to acquire Safeway to ensure that the number of supermarkets in most geographic markets remained above 3.7 on average to prevent coordinated action between firms.

6.253 In our view, a number of the references that SPC cited do not clearly support the suggested view of relying on the presence of two operators plus BT alone, or are of limited relevance. The OPTA report and DOJ evidence was not as strongly worded as SPC has interpreted.[616] For example, Davies, S (2003) considered the question: "How many sellers do we need for effective competition?" In the context of UK supermarket mergers, his view of the CC's conclusions was that *"...three is insufficient, but four is OK."*[617] So, if SPC were to rely on this study to inform the number of operators needed for effective competition, it might be more consistent with using four operators (BT plus three).

6.254 Bresnahan and Reiss suggest that the largest benefits to competition come with the addition of the third firm in a market with subsequent entrants having a smaller impact. We recognise that a market does not necessarily have to be highly fragmented before it can be regarded as competitive. However, the number of firms necessary to generate effective competition will vary from market to market and a case specific assessment needs to be made. The paper BT cites looks at very specific markets, namely professional services such as dentists in small towns. The results cannot be extrapolated directly to competition for wholesale leased lines markets.[618]

6.255 SPC also referred to examples in other Ofcom market reviews that it considered provided a precedent of relying on CP presence to define the boundary of markets. For example, it referred to the use of two or more CPs criterion as the basis for defining separate defining geographic markets in the context of the Wholesale Broadband Access Market Review (WBAMR).[619] However, we consider that the WBAMR approach cannot simply be read across without modification:

- In the WBAMR, we considered "presence" based on LLU providers that have invested in co-location equipment at a local exchange. In the WBA market however there is clear geographic correlation between OCP presence and their ability to serve a defined set of customers from that location (based on the available regulated inputs (unbundled copper loops)). By contrast, for the reasons we explain below, there are reasons to suggest that it is not always the case that

[616] In the OPTA report, it considered that, *"there is no "magic number" for the minimum number of competitors necessary for effective competition. One way to approach this is to look at the rules of thumb used by competition authorities. The European Horizontal Merger Guidelines declare markets with an HHI below 2000 as normally as non problematic. Although very roughly, this suggest that between 5 and 6 market players with similar market shares might provide effective competition. The practice of the European Commission shows that 3-to-2 mergers are normally viewed as problematic, whereas 5-to-4 mergers are typically only regarded problematic in particular circumstances."* (http://www.opta.nl/en/news/all-publications/publication/?id=2051, page 10).

[617] See page 4, Centre for Competition and Regulation Newsletter, Issue 5, November 2003, "How many sellers do we need for effective competition?"

[618] In any case, the paper is not unambiguous about its conclusions. The supplemental discussion on tyre prices at the end of the paper suggests that although the benefits of further decreases in concentration are low when looking at relatively concentrated markets, there are gains when moving to un-concentrated markets.

[619] See Ofcom's "Review of the wholesale broadband access markets", statement, 3 December 2010 at http://stakeholders.ofcom.org.uk/binaries/consultations/wba/statement/wbastatement.pdf

a CP can provide competitive trunk circuits from the nearest local exchanges where that OCP has purchased a POH from BT;

- in relation to CP "presence" in the WBAMR we only included the main Principal Operators as offering a significant competitive constraint (rather than counting the presence of every single operator that purchased LLU inputs). A simple application of this approach to leased lines markets could mean including only the 'main' OCPs purchasing POH (i.e. the largest OCPs also active in merchant markets) as an indicator of competitive constraints: this underlines the difference in the methodologies, reflecting the differences in the economic characteristics of the markets in each case;

- when defining markets in the 2010 WBAMR, we also considered wider criteria other than presence of Principal Operators to support differentiation of markets. This included analysis of service shares, marketing behaviour etc in line with relevant EC guidelines. We further note that fully competitive markets in the WBAMR were originally defined using BT plus the presence of three Principal Operators – only in later reviews were areas with BT plus two other Principal Operators (where BT's share was less than 50%) brought in.

6.256 The approach used to define geographic markets in the WBAMR prior to the 2010 review had attracted EC criticism (following the notification of our WBAMR proposals) that the use of a single indicator was not usually a sufficient basis to define separate geographic markets (as set out in the ERG Common Position). Indeed, OCPs responding to BT's December trunk proposals stressed the need for more than one indicator of competition when defining markets (and referred to the EC's comments on our WBAMR). In addition, the fact that, in the 2010 WBAMR, Ofcom used more than one indicator – e.g. service shares as well as the number of operators present – was a point that SPC recognised.

6.257 In our view, justifying the use of a single indicator would require clear and compelling evidence that such an indicator is suitable on its own for defining the boundaries of markets. Below, we further explain why the evidence suggests that BT's proposed identification of 'competitive' exchanges based on where two or more OCPs are present (based on purchases of POH) would not necessarily be a good indicator of competitive supply. Our view is supported by evidence on OCPs' purchasing behaviour.

6.258 Hence, the parallels that SPC suggests exist between the WBAMR and its approach to identifying TI trunk markets are not as strong as it suggests. Indeed, consistent with the approach advocated in the ERG Common Position, the lesson we can draw from the WBAMR is that it is usually necessary to consider a wider and more stringent set of criteria in order to identify separate markets.[620]

6.259 One of the reasons that SPC presented for not relying on other indicators is that it considered other indicators of competition for trunk unworkable, referring in particular to concerns regarding our estimates of service share. As we discuss in Section 7, we consider that it is possible to provide estimates of service share for the identified

[620] We further note that the presence of CPs based on co-location of equipment at local exchanges is irrelevant to the present discussion, which is about the ability to provide competing infrastructure from BT exchanges. A Principal Operators' co-location provides no indication that the operator is in a position to provide connectivity from that exchange back to its core network, which is exactly the issue we are trying to consider for the definition of trunk markets. Indeed, our analysis in the June BCMR Consultation suggested that BT accounts for nearly [✂] of the two largest LLU providers' backhaul requirements.

regional and national trunk markets. On the other hand, we think that some of the issues of service share estimation are more difficult when we consider some of the approaches to market definition that SPC put forward. For example, an approach that SPC initially advocated would entail estimating service shares on routes between over 600,000 node pairs (each of which it argued could in principle be an individual market). The number of routes that would need to be examined and the granularity of such a definition would be neither practical nor be likely to provide a reliable estimate of variations in competitive conditions.

6.260 Reflecting this impracticality, SPC therefore proposed to identify RANs based predominantly on a single indicator (OCP purchases of POH services), but it also proposed entry barriers as a second indicator. We do not consider that reliance on 'entry barriers' as the basis for identifying variations in competitive conditions that are then used to define the boundaries of trunk, is a practical option. For example, we do not consider that it would be possible to assess variations in entry barriers by RAN or route, as it is difficult to envisage the information we would be able to gather and use to assess this. Such barriers may vary depending on the location of both ends of a given circuit, which may make different routes from the same location face different competitive conditions.

6.261 We note that SPC did not suggest a workable approach to assess entry barriers. Instead it merely asserted that because OCPs have invested in POH then there must be low barriers to entry in trunk markets. But if the only basis for suggesting that 'entry barriers' can be used as an indicator of differences in competitive conditions relies on OCP presence (based on POH purchases from BT), then SPC effectively has relied only upon a single criterion (i.e. OCP POH purchases). Therefore, we consider that while SPC appears to accept the criticism of the use of a single indicator to define a market for trunk circuits, its RAN proposals do not address this concern.

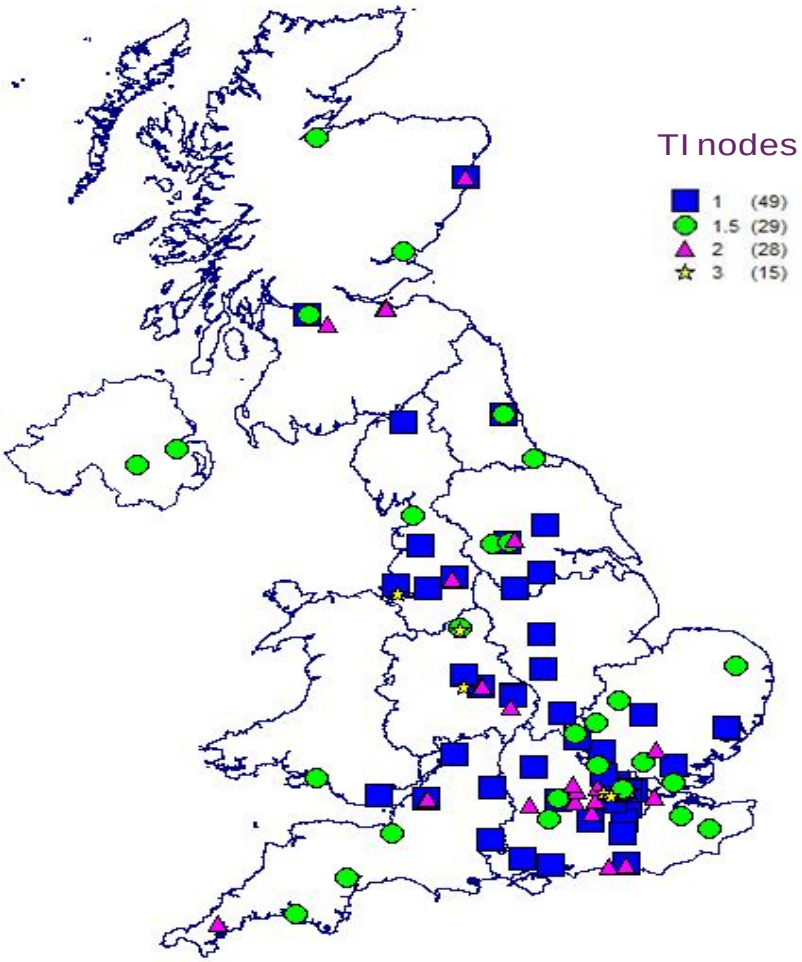
6.262 We also note that SPC's analysis of 'competitive' exchanges (Figure 5 of the September 2012 paper and Figure 6.15) suggested that using three OCPs plus BT instead of two OCPs plus BT would make a significant difference to the number of "competitive" nodes. For example, SPC analysis suggested that if we were to rely on three OCPs plus BT then this would suggest the identification of 60 nodes compared to 121.[621] So SPC's analysis suggests that the identification of competitive exchanges based on the use of a single indicator of competition is quite sensitive to the number of CPs parameter. In addition, if the number of operators present at exchanges changed over time then this could render the market boundary unstable.

Assessment of BT's proposed competitive exchanges

6.263 In the following paragraphs, we examine the data BT has relied upon to generate its RAN proposals. Based on data underlying SPC's proposals we show in Figure 6.17 below the relevant BT exchanges where two or more OCPs are within 500 metres of an exchange (which is the base assumption SPC used to identify "competitive exchanges"). We also show in Figure 6.17 below the different tiers of nodes on BT's network that SPC identified as "competitive".

[621] SPC consolidated this list of 121 into a list of 78 RANs reflecting the proximity of a number of competitive exchanges to each other. Applying the same approach to consolidate the list of 60 exchanges into catchment areas might similarly produce a smaller list of RANs (potentially quite close to our own proposals). Indeed, we note that around 60 per cent of the locations where three or more CPs (plus BT) are present would be existing Tier 1 nodes. The majority of the remaining identified exchanges with three or more operators would be in major city locations such as London, Birmingham etc so would likely be grouped together within our existing list of TANs.

Figure 6.17: OCP presence at different levels in the BT network



Source: Ofcom 2013 (based on BT data on OCP's Point of Handover purchases used in SPC's September 2012 report)

6.264 Consistent with our determination of the TAN catchment areas, BT's RAN catchment areas also tend to be focused on the key urban centres, which are the points in the UK where OCPs have located their POHs. According to the data there is a "presence" of two or more CPs in 112 exchange locations. A number of these locations could in principle justify a further trunk node relative to our TAN approach (for example these additional points coincide with towns and cities such as Belfast, Exeter, Inverness, Maidstone and Swansea).

6.265 We note however that some of the competitive exchanges identified by BT are in the same location (four have identical easting and northing coordinates) and a number of others are in very close proximity such that there would be limited prospect that circuits between these locations would be treated as a trunk segments.[622] If nodes are in close proximity it may be that a particular CP chooses to locate at one and not the other as either is sufficient for providing national trunk to elsewhere (and there is limited traffic within the area to be at both points).

[622] SPC seems to accept this point as it groups a number of nodes that it identifies as competitively served in the Exeter area to form a single Exeter RAN.

6.266 The first point to recognise is that, according to these data, there is significant OCP 'presence' at Tier 1 node locations (based on the criterion that SPC relies, there is proximity of 2 or more CPs to 49 of the 67 Tier 1 node locations). SPC's analysis confirms that that 49 of the 67 Tier 1 nodes have CP presence and this results in 100% of TANs served by at least two CPs.

6.267 In a number of cases there is also an overlap or very close proximity between lower Tier exchanges and Tier 1 node locations. Hence, even if BT says that Tier 1 nodes do not have particular significance to the definition of trunk, in fact the node locations where a CP has chosen to interconnect may be collocated or very close to a Tier 1 node. The objections that BT raised about CP interconnection at Tier 1 nodes have no practical significance for our subsequent assessment of market power when OCPs are connected at a point close to or associated with Tier 1 nodes.

6.268 There are nevertheless a number of additional exchanges at lower Tiers in BT's network (Tier 1.5, Tier 2 and Tier 3)[623] with apparent CP presence. According to BT, this justifies changing the market definition so that the scope of the trunk market is expanded. But, as we have set out above, we have significant conceptual concerns with BT's approach as set out in the June BCMR Consultation, including the fact that it relies only on a single indicator to identify so-called "competitive" exchanges. We noted that there were a number of reasons to doubt reliance solely on an OCP "presence" criterion based on POH purchasing data:

- CPs are reliant on BT over a wide range of routes reflecting the fact that it would not be efficient to re-route some terminating segments purchased to other nodes without incurring significant costs;
- Capacity constraints may limit the scope for further self-provision of trunk or provision of competing services to others;
- OCPs also have requirements for resilience and diversity that they cannot always meet on their own networks; and
- the specific locations of platforms such as the DPCN (where routing is constrained by a limited number of DPCN nodes).

6.269 BT argued that these points did not have force. For example, it submitted that, given OCPs were migrating customers off the TI platform, then this was likely to suggest that OCPs would have spare capacity on existing POH links. BT noted that OCPs' purchases of PPCs with resilience options are fairly limited. We continue to believe that these concerns remain valid (we have set out further reasoning below). In addition to further assessing these points, we have also considered available evidence of competition for trunk across BT's proposed RANs based on the purchasing patterns of CPs.

Wider evidence of OCP purchases of TI circuits

6.270 In Figure 6.18 below, we present an analysis of all wholesale TI circuits BT sells to external parties. We have considered for each circuit the actual geographic locations of those TI circuits based on the easting and northing coordinates for the starting location (A-end) and end location (B-end) of an individual circuit. For a significant number of BT's proposed RANs there is apparently significant reliance on BT to

[623] As set out in Figure 6.7 above, broadly speaking Tier 2 nodes sit on SDH-rings in regional large towns and Tier 3 on regional medium towns with a number of additional nodes below this level.

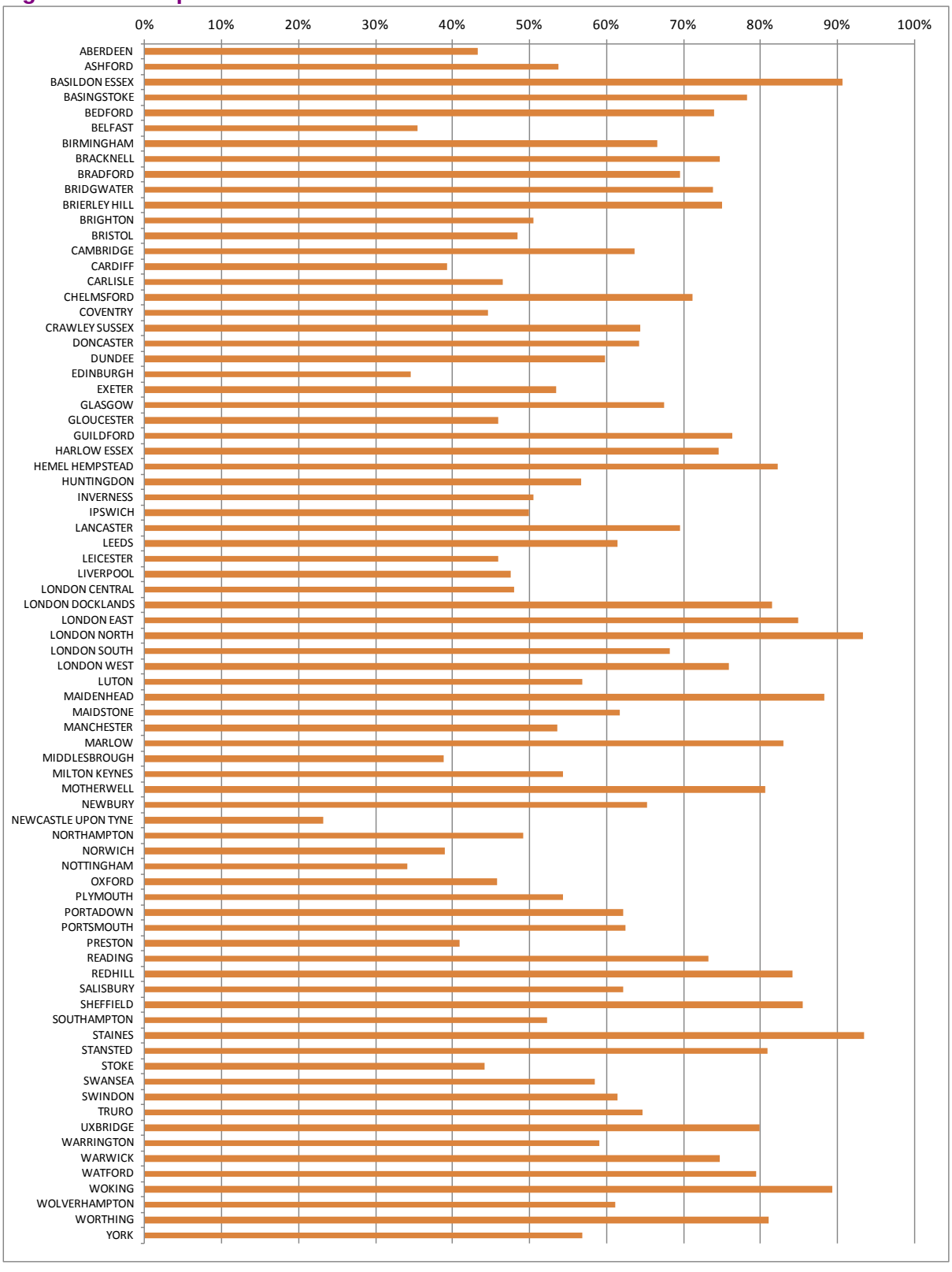
provide wholesale circuits to OCPs beyond the 'competitive' RAN areas that BT has identified.

6.271 BT argues that the evidence is completely unequivocal that alternative infrastructure exists to the point where two or (more likely) three alternative operators could compete for all of BT's existing retail leased lines business without requiring any 'trunk' service as it is defined by Ofcom.[624] BT suggests OCPs' network connectivity from locations where it is purchasing POH could be used to provide significant competing trunk from each RAN location. But if that were the case, then we would expect far fewer circuits sold by BT to cross the boundaries of a particular "competitive" RAN area.

6.272 Hence, if BT is correct then we would expect limited OCP reliance on connectivity outside of each RAN from BT (where it claims there is sufficient OCP presence at competitive exchanges). On the other hand, if the issues we raised in the June BCMR Consultation (as set out above) are valid then exchanges where two or more CPs are apparently purchasing POH may not be sufficient to ensure competition is effective – as there may still be significant reliance on BT for circuits outside of a RAN catchment area.

[624] BT analysis of the ability of OCPs to compete to provide trunk based on BT's retail circuits as it did not have access to other operators' circuit data.

Figure 6.18: Proportion of BT TI circuits sold that fall outside of RAN areas



Source: Ofcom 2013 (based on s135 circuit data)

6.273 On average, we calculate that 58-60% of circuits are supplied by BT either to or from a point outside of the RAN in question (for a circuit with either an A-end or B-end in one of BT's 78 defined RANs linked to an A or B-end point outside of that RAN). This suggests that OCPs rely on BT for a significantly large number of regional circuits

that under our market definition we might treat as terminating or regional trunk components.

6.274 The above data only considers BT's sales of regional trunk from each RAN location and does not include OCPs self supply or sales to one another. It could be the case that other CPs could also be competing to provide "competitive" trunk and BT's sales to CPs are only a small share of regional connections. Therefore, if this were true, we could be understating the extent of competitive trunk from each RAN. However, BT accounts for 81% of all wholesale circuits sold to third parties (containing a regional trunk component), and has a large share of circuits sold in TISBO retail markets. In this context, it is unlikely that OCP "presence" could account for a large number of circuits at these RANs.[625] On the other hand, there is stronger evidence that OCPs are competing for national trunk as BT accounts for only 34% of wholesale trunk circuits sold to third parties that contain a national component. Therefore, almost two thirds of national trunk sales are accounted for by trunk sales by players other than BT.

6.275 We have also attempted to estimate BT's service shares for its proposed RAN market definition (using a method equivalent to our base case estimates of service share for our national trunk market).[626] According to this analysis, BT's share would be 79%, which is significantly in excess of the threshold of 50% for a finding of dominance. Therefore, if we adopted BT's proposed market definition, the computed service shares would be indicative of market power in the national market (based on BT's RAN proposals). BT's definition of the trunk market will include the circuits in the national trunk market as defined by Ofcom (of which BT's share is less than 40%). This implication is that BT's share of the circuits included in its version of the trunk market based on RANs (not in Ofcom's) is significantly higher. This would then tend to support the view that, by itself, the presence of two interconnecting CPs is not a sufficient condition for effective competition in the provision of trunk segments. It could also mean that competitive conditions within the trunk market as BT would define it would be far from homogeneous.

6.276 We have not conducted detailed per circuit analysis to account for the 'clarification' that BT issued with respect to its RAN proposals in the letter of 17 December 2012. BT considered that circuits from a customer site in one RAN to an adjacent RAN could still be subject to the requirement for BT to supply those circuits where they pass a "radial distance" rule.[627] However, similar to the analysis presented in Figure 6.11 (where we compared circuits sold outside of the Aberdeen RAN) we have

[625] To give a sense of the extent of merchant sales, we estimate that only 16% of all wholesale TI circuit sales are wholesale sales by OCPs. On average, OCP sales of wholesale circuits represent only 7% of all circuits sold within TANs (terminating segments), they represent around 19% of all circuits with a 'regional trunk' and around 66% of all circuits with a 'national' trunk component.

[626] BT's proposals would suggest counting circuits between RANs as national trunk. Therefore, we have calculated BT's share for a 'national' trunk based on the count of circuits linking different RAN catchment areas. We used postcode data for circuits to allocate each end to the relevant local exchange. In turn we relied on data provided by BT to allocate local exchanges to a particular RAN. This process resulted in a classification of a circuit as either contain or trunk (between RANs) or terminating segments (entirely within a RAN). We then calculated BT's share of the trunk market using the same service share method set out in Annex 5. Even under alternative scenarios (similar to scenarios 4 and 5 as explained in Annex 5), we estimate BT's share (based on its trunk definition) would still be well in excess of 50%.

[627] According to this rule, BT would still be obliged to provide a wholesale TI circuit from a customer premise to third parties' POH in an adjacent RAN. This requirement would apply where the radial distance of that circuit from a customer premise to the OCPs' POH location (outside of the RAN) is no greater than the distance from the customer premise to the nearest competitive exchange (within the RAN). Therefore, it is possible that some proportion of the circuits that go outside of the RAN in question are in fact captured by this rule.

examined the location of circuits sold by BT from each RAN using the same mapping approach. This exercise of examining maps for each RAN suggested that when a circuit goes outside of the RAN, it is not mainly routed to the next closest 'competitive exchange' location. Therefore, this would suggest that BT's RANs (or the nearest competitive exchange) would not provide a good basis for identifying the boundary between trunk and terminating segments.

6.277 Hence, we consider that the analysis above provides additional reasons for rejecting BT's assertion that we should rely on the POH criterion alone to identify competitive exchanges. We note that the evidence focuses only on BT's external sales of TI circuits, so does not fully assess all aspects of wholesale provision such as self-supply. However, in the following paragraphs we discuss other reasons for not defining markets solely on the basis of BT's POH criterion.

Why OCP POH does not guarantee an effective competitive constraint

6.278 As discussed above we identified a number of explanations as to why OCP "presence", as indicated by information on their purchases of POH, may not be a sufficient indicator, in and of itself, of competition.

- Diversity is an important feature of the provision of TI services;
- The need for national wholesale providers to have extensive national connectivity in order to ensure effective end to end competition; and
- Lack of spare capacity and POHs enabled to support different technologies.

6.279 We discuss each of the above points in the following paragraphs.

Diversity is an important feature of the provision of TI services:

6.280 In the discussion above, we highlighted that OCPs did not have as extensive a network as BT (when combined with other considerations such as technology and capacity limitations), which suggested that they would be less able to provide resilience (where this entails diverse paths).[628] In some cases, therefore, it may be that an OCP requires connectivity from a customer premise to another network node (rather than just providing a circuit to the nearest local exchange). Therefore, even if in principle a CP might have ability to provide one path, it may still have to rely on BT for a diverse path. Such issues are not unique to PPC services, as a number of LLU and mobile operators in response to the CFI and the June BCMR Consultation have highlighted the importance of diverse routing as one of the reasons why they continue to rely on BT.

6.281 BT suggested that there are relatively limited numbers of PPCs that it sells with resilience via a protected second circuit. However, stakeholders highlighted[629] resilience as a significant issue whereby they self-supply one circuit themselves and rely on BT for the resilient circuit. We also observe that in most areas we have examined where CPs may have more than one POH, there is a significant regional component to OCPs' purchases of TI circuits that extends beyond individual RANs.

[628] A diverse path would potentially entail physically separate routes from a customer's premises to a CP's node(s).

[629] See for example EE/MBNL's response to the June BCMR Consultation and CWW's comments on BT's December 2011 trunk proposals.

We consider resilience is likely to be one explanation for this (in addition to the points below).

The need for national wholesale providers

6.282 In the June BCMR Consultation, we noted that the fact that an OCP had a Point of Handover in one location did not guarantee that it had the capability to provide national trunk services across the UK. In response to this point, BT estimated that a number of CPs can provide nationwide trunk solutions. It showed analysis of its own retail circuits that notionally require trunk and calculated the number of unique CPs that had POHs at both ends of the trunk circuits. It estimated that two CPs had 100% coverage and another covered 98% of BT's retail circuits. BT therefore argued that those CPs would be in a position to compete for BT's downstream business.

6.283 However CWW, the largest operator other than BT told us that some of its POH do not link back to its national core network, as BT suggests would be the case:

> "For a POH to be capable of being used to provide a competitive constraint it is necessary to consider the end to end provision of the circuit. For example we have a number of POH that have been novated into our business as a result of contracts we have taken over. Many of these POH do not sit on our core network and are of no use to us other than for the specific circuits they support today, either it may not be possible or we may have upgrade our core network in order to be able to use them for 'generic' PPC circuits."[630]

6.284 This quotation explains why not all POHs are connected to CPs' national trunk networks. BT considered that the idea of a trunk network separate from a terminating network is at best a weak distinction and this objection is not well founded. BT argued that based on OCP presence, then it follows that OCPs have the capacity to compete for nearly all of its retail circuits (where BT provides the terminating segment). However, BT's arguments appear to be based on its assessment of prospective competition (i.e. based on OCPs being willing to invest further) rather than current OCP presence providing a competitive constraint. We recognise the need for our analysis to include a forward-looking structural evaluation of the relevant market. However, consistent with the SMP Guidelines, it also requires an analysis of any available evidence of past market behaviour when assessing the future prospects of the relevant market.[631] Our market analysis has shown, first, that current OCP presence does not provide a sufficient competitive constraint, and secondly, that prospects for greater competition in TI markets over the course of the three year review period are poor as OCPs are not investing in infrastructure to support TI services. This context is important to any assessment, as it means that we need to focus on evidence of actual competition. In addition, the quotation above from CWW explains why some of the locations where it is purchasing POH would not necessarily link back to their main core network.

Capacity constraints and POH enabled to support different technologies

6.285 Some OCPs argued that POH capacity constraints would prevent an OCP competing for trunk. In response to this point, BT highlighted that if a CP has invested in network and is using high capacity POH (offered at a minimum bandwidth of 155Mbit/s) then

[630] Email from CWW, 19 March 2012

[631] See, in this respect, paragraphs 27 and 35 of the SMP Guidelines.

it is likely to have spare capacity available given current OCP utilisation rates and the predicted decline in the overall market. BT also thought that it was not clear that technology used at the POH would have any influence on a CPs' ability to provide competition at that node.[632]

6.286 We accept that, at some node locations, OCPs may have spare trunk capacity where an OCP is purchasing "aggregate" POH links but may not be fully utilising the capacity. However, it is important to consider the type of POH circuit that OCPs are purchasing, as not all POH are high capacity links. In some cases, OCPs purchase 'retail' POH whereby the 2Mbit/s circuit is handed over as an individual bandwidth (i.e. an individual 2Mbit/s circuit) and not over a high capacity aggregate link. Therefore, in many cases the POH circuits that CPs are purchasing from BT are not necessarily combined with other circuits at those locations and provisioned over high capacity links. In these circumstances, we cannot assume that an OCP (that might be purchasing only a single 2Mbit/s POH link) would be capable of providing fully competitive trunk services from that location.

6.287 In order to understand the type of POH circuits provided, we have examined the circuit data that BT provided on nearly 14,000 POH circuits by location.[633] However, the majority of these circuits remain 'retail' POH whereby the circuit is provided as an individual bandwidth (i.e. an individual 2Mbit/s circuit) and not over a high capacity aggregate link. So we cannot assume that the 'presence' of an OCP necessarily means that it has spare trunk capacity in that location.[634]

6.288 CWW has also explained that there was an issue in particular with sub 2Mbit/s circuits which use BT's Digital Private Circuit Network (DPCN) whereas 2Mbit/s and above circuits use BT's SDH network. CWW explained that the DPCN itself has no trunk hierarchy as it is connected together using exclusively 2Mbit/s bearers between Digital Cross Connects and does not aggregate above 2Mbit/s.[635] CWW observed that it would be unlikely that a POH used to support sub-2Mbit/s services would be effective basis to provide competitive trunk due to the limited capacity of the circuit.

6.289 CWW also told us that, as sub-2Mbit/s volumes have declined, it has consolidated its TI network to a smaller set of nodes where it can still justify the cost of higher capacity 2Mbit/s interconnection links to support the underlying connectivity. Therefore, this suggests that as volumes in the market decline it may become uneconomic to retain the existing overall depth of interconnection.[636] Therefore, the arguments put forward by CWW further undermine BT's view that, as the market declines, OCPs will gain spare capacity on existing links. Indeed, with the decline in TI markets leading to a decline in the number of interconnection links that are sustainable, the opposite may be true as CPs remove capacity to save costs.

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[632] BT argued that POH are either ISH or CSH – where CSH connects BT's CPE to a CPs CPE the network technology either PDH or SDH is not relevant or visible to the other network. ISH requires the use of SDH.

[633] See also Ofcom's 2011 model published as part of the review of Point of Handover Pricing: http://stakeholders.ofcom.org.uk/consultations/revision-points-handover-pricing/summary

[634] Indeed, the fact that an OCP has not moved circuits over to high capacity aggregate links might suggest limited capacity in that location.

[635] The DPCN network is constructed via the connection of multiple bearers. These are 2Mbit/s pipes within which the sub 2Mbit/s circuits are transported between the nodes. The bearers on BT's DPCN network will carry circuits belonging to various CPs. Bearers within the DPCN network are not CP specific. In order to take circuit capacity off the DPCN network at a point of interconnection CPs purchase a dedicated 2Mbit/s access bearer. This dedicated access bearer transmits to the CP its specific sub 2Mbit/s circuits.

[636] [✂] . CWW submission to Ofcom, 7 January 2013.

End to end competition

6.290 BT argued that the impact of deregulating trunk on CPs reliant on BT, in the example we presented (see discussion above at Figure 6.14), would not be material in terms of the CPs affected. BT argued that rival major wholesale providers would combine local ends (purchased from BT) with their own network which they could then resell as a circuit to wholesale customer (with a less extensive core network) to deliver a retail solution. BT noted in any case that there are only four main players (including BT) and others are niche providers who do not need or want national coverage.

6.291 We consider that BT's comments do not undermine the points we raised regarding end-to-end competition. Within that discussion we highlighted that there may be situations where a smaller player will have less extensive trunk network so currently relies on BT significantly. Our example served to highlight that it would not be credible for such a small CP to roll-out further network even to a sub-set of RANs. The circuit data available to us shows that smaller operators do require circuits that would contain connectivity beyond RANs. Moreover, we note that it is not only the four main players [✂)] that are major purchasers of national trunk.[637] Hence, any move to de-regulate trunk on the basis of BT's RAN proposals would create a requirement on those CPs to procure circuits from alternative providers (or to continue to purchase circuits from BT on an unregulated basis). There would also be switching costs for OCPs who could no longer purchase from BT and, as noted above, it is not clear that OCPs would have sufficient capacity to cope with significant new demand for third party sales. This may well limit the effectiveness of the constraint that the presence of rival OCPs would impose on BT if BT's proposal were adopted.

Overall context to the TI trunk market

6.292 We consider, as set out above and as raised by a number of stakeholders, that the context against which we can consider TI trunk markets is important. This market is in significant decline and the prospects of further competition emerging are severely limited. Although the forecasts for customers remaining on TI services remain relatively high in volume terms, they represent relatively low value circuits (as most customers buy lower priced circuits of 2Mbit/s or below). Given high fixed and sunk costs, it is unlikely that CPs will be willing to invest significantly to expand their trunk networks. We also take into account possible barriers to switching associated with TI trunk services. In particular, for a CP to provide competing trunk services instead of purchasing them from BT, the CP might have to move one of the circuit ends (i.e. the interconnection point for the terminating segments) from one location to another in order to connect to its trunk network (to an alternative third party supplier), which is costly. In the context of the TI market, where end-users may be migrating to alternative services, the required payback periods associated with network investments could potentially be quite short.

6.293 We consider it is revealing in this respect that BT suggested a "radial distance" rule associated with its RAN proposals.[638] BT noted that this was "a reflection of the

[637] We calculate that [✂] have the most extensive connectivity with BT. However, we calculate that [✂] are among the top five OCPs with the largest requirements both for 'national' and 'regional' trunk segments. As these CPs have less extensive interconnection with BT [✂] this potentially suggests that these OCPs would need to rely heavily on third parties (either BT or an OCP) for the provision of trunk unless their national and regional trunk requirements were heavily concentrated in a small geographic area of the UK. (Analysis based on BT data on POH purchases within 500m of a BT exchange).

[638] Despite arguing that the boundaries of RANs based on identification of 'competitive' exchanges should be the basis of identifying competitive trunk, it proposed a "radial distance" rule. According to this rule, BT would still be

legacy nature of PPCs with a degree of in-built inertia in the routing not only for BT but also of CPs."[639] This point serves to highlight why OCPs with apparently 'deep' levels of network presence are still reliant on BT for a number of regional trunk and terminating segments. For instance, OCPs such as CWW have fairly extensive interconnection with BT. In recent years, it has acquired a number of other leased lines providers often with smaller core networks and greater reliance on BT (as OCPs with smaller core networks would require longer length PPC). Where operators such as CWW acquired a rival firm, where possible it has moved circuits purchased from BT onto its own core network to exploit economies of scale. But CWW has told us that there are limitations to this due to the costs of re-assigning potentially only a small volume of circuits from one POH location to another, which may make it uneconomic to do so. CWW considers this barrier is significantly material (and is supported by the market data that shows that it is still one of the largest purchasers of PPCs from BT).

6.294 Therefore, we see that the costs of circuit re-assignment could create a significant barrier to switching between providers. In turn this could tend to reinforce any market power possessed by BT. The available evidence, particularly CWW's reliance on BT in spite of apparently fairly extensive network 'presence', is consistent with this view.

Trunk market within the WECLA

6.295 BT argued that even if we did not alter our market definition for national and regional trunk, we should identify circuits within the WECLA as national trunk.[640] BT's main argument was that as we had proposed to deregulate TISBO circuits at higher bandwidths (34/45 and 155Mbit/s), so it would be inconsistent to continue to regulate trunk circuits in the London area, as these would be provided over similar high capacity links. CWW argued, alternatively, that all connectivity between TANs in the Greater London area should be treated as 'regional trunk'.

6.296 We do not agree with CWW's proposal as there is a significant concentration of circuit demand within the London area and operator presence. On this basis, it is likely that circuits in the between non-adjacent TANs in the Greater London area would be provided competitively over trunk routes. There may be an issue, however, regarding shorter distance circuits that happen to cross adjacent TANs within the central London area.

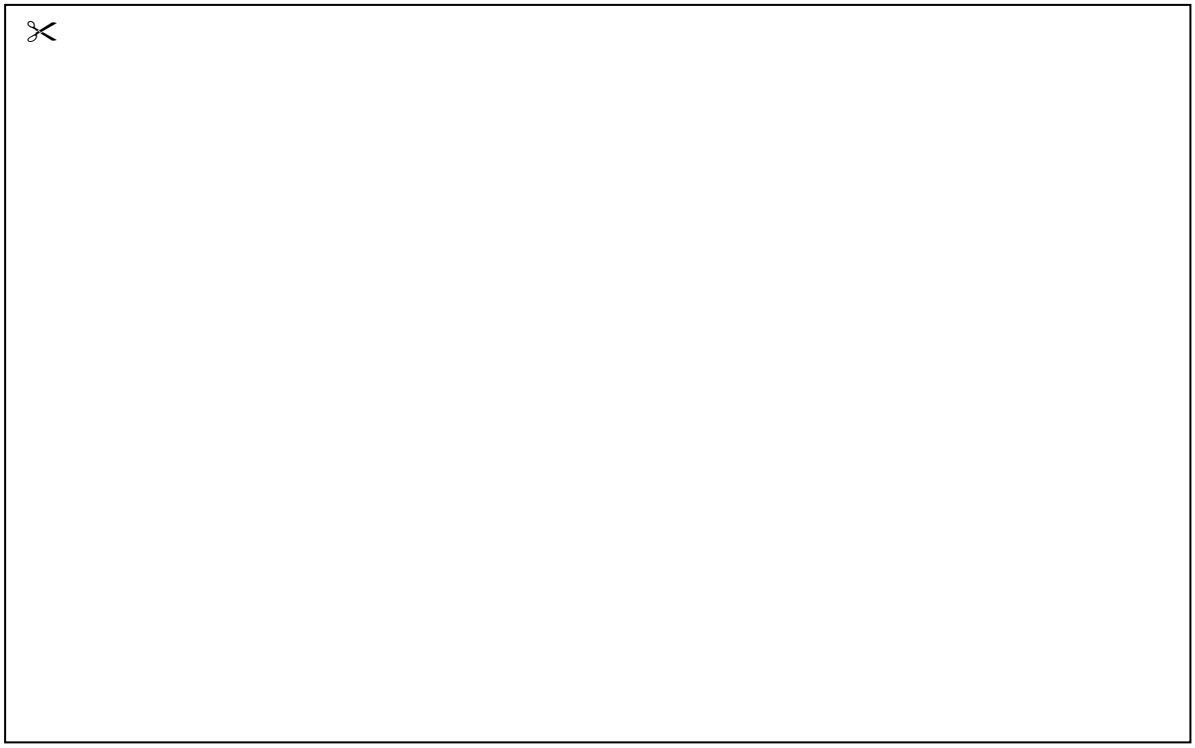
6.297 In the analysis below we show the distribution of circuits sold by BT for different bandwidths between nodes in the London area. Adjacent TANs such as London Docklands to London Central are coloured in yellow.

required to route circuits from a point inside a RAN to exchange outside (where the local exchange 'outside' is closer on a radial distance basis than the nearest 'competitive' exchange within the RAN).

[639] BT letter to Ofcom, 17 December 2012.

[640] BT also argued that we revert to our 2004 LLMR based on 67 Tier 1 nodes but provided no evidence in support of this proposal. In fact, its own analysis suggested that two or more CPs were not present at every Tier 1 node, whereas there is better correlation of OCP presence to our 46 TANs.

Figure 6.19: Distribution of BT wholesale circuit sales by bandwidth*



* Red text = same TAN (terminating segments); Yellow highlighted text = Adjacent TAN (regional trunk segments); No highlight = Non-adjacent TAN (national trunk segments).

Source: Ofcom 2013, based on s135 circuit information

6.298 Based on the evidence above, we note that the majority of circuits provided between TANs within the London area are 2Mbit/s or below, which are much lower bandwidths than the high bandwidth TISBO circuits that we conclude are competitively supplied in the WECLA. This alone does not suggest that those circuits are not provided over trunk as this connectivity could, in principle, be provided on aggregate higher capacity bearer circuits (at 34/45Mbit/s and155Mbit/s). But we also note that most circuits are between adjacent TANs with relatively short distances involved. Therefore, it is unlikely that CPs reliant on BT for the provision of low bandwidth TISBO service would find it efficient to re-route such circuits onto their own networks. These circuits are likely to be mostly low bandwidth circuits from a customer premise back to a POH which happen to cross a TAN boundary and so include a notional trunk segment. This evidence is consistent with our view that competitive conditions in the supply of regional trunk circuits between adjacent TANs in the London area are more like those of a low bandwidth 'terminating segment'.

Single trunk market

6.299 UKCTA members and a number of individual CPs argued[641] that they still rely on BT for a significant proportion of national trunk circuits. These stakeholders argued that, given the context to this market and barriers to switching, there is limited merit in changing our market definition. We have therefore considered the available evidence on OCP's purchases of national trunk circuits. Based on evidence on BT's service

[641] In addition to arguing for a single national trunk market, in a subsequent submission (7 January 2013) CWW argued that we should alternatively identify a single national market for sub-2Mbit/s trunk in which BT has SMP. [✂] .

shares and OCPs purchases of national trunk, we see that there is evidence to support separate regional and national trunk markets.[642]

Service share analysis

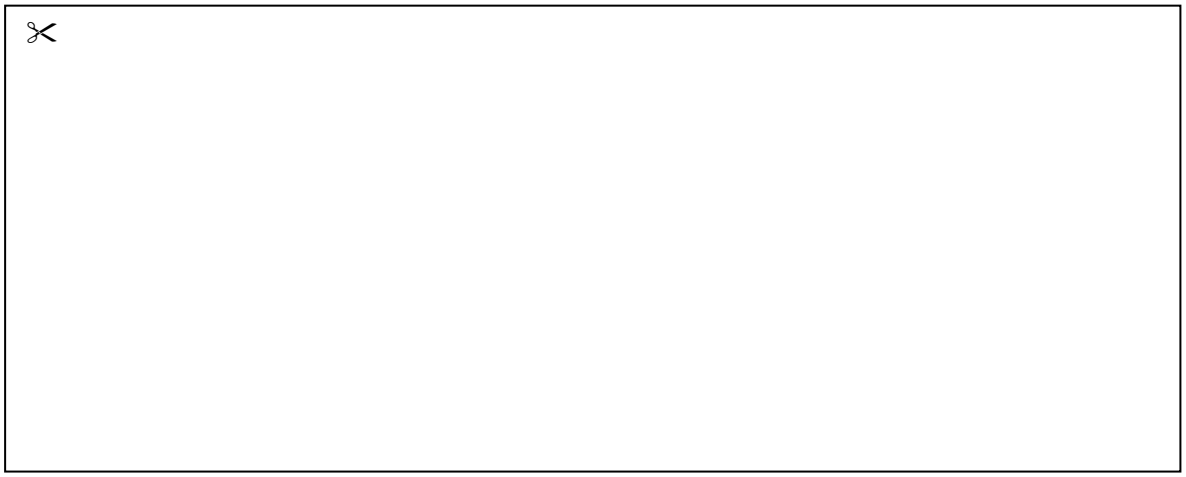
6.300 We note that in estimating service shares in our June BCMR Consultation, we estimated BT's share of the national market to be up to 49% compared to up to 89% for regional trunk. Stakeholders queried whether a 49% share was indicative of a competitive national trunk market, as we had suggested.

6.301 We have updated our estimates of BT's market shares, which continue to suggest significant differences between BT's share of national and regional trunk, but with BT's national trunk shares now below 40%. These changes in market share reflect the further analysis we have taken to improve the underlying circuit data we have used to assess different leased lines markets, including TI trunk markets (these data processing steps are discussed in Annex 5). We now calculate under our base case that it has a share of 33% of the national TI trunk market.[643] We discuss our broader finding that BT does not have SMP in national trunk in Section 7.

Reliance on BT for national trunk segments

6.302 UKCTA suggest that their members still rely on BT to a significant degree for circuits that extend outside a single TAN catchment area. Figure 6.20 below shows the breakdown of each CPs total number of wholesale circuits sold to third parties into terminating segments only or that contain either a regional or national trunk component (according to our market definition).

Figure 6.20: Wholesale TI circuit sales*



*Note: Circuits unweighted by bandwidth and excluding analogue circuits and VPN tails.

Source: Ofcom 2013, based on s135 wholesale circuit information]

[642] UKCTA also asked a number of questions aimed at understanding why we have now identified a national and regional trunk network when we did not do so in the 2007/8 Review, which we discuss in Section 7.

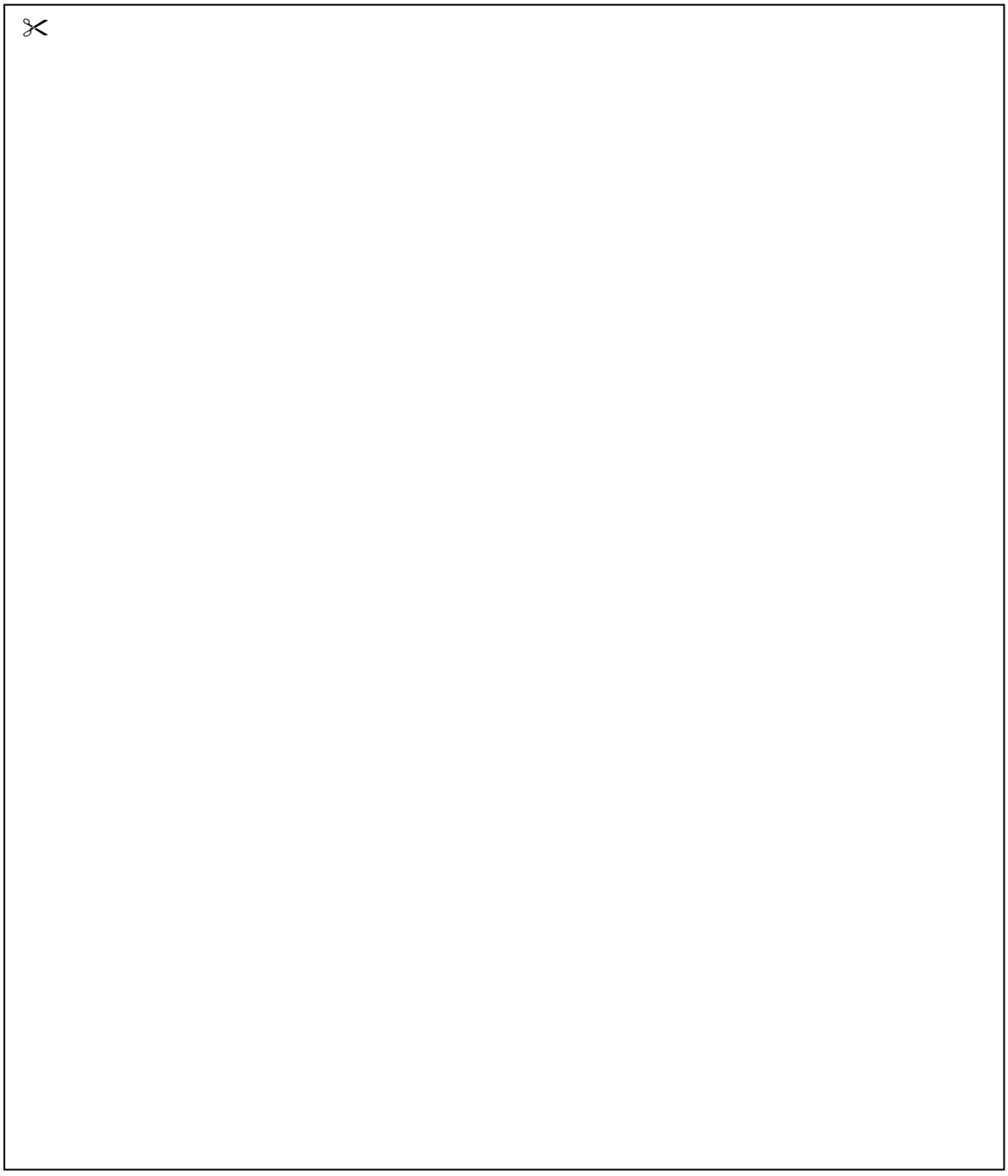
[643] In any case, we explained in the June BCMR Consultation, that we saw our estimate of 49% as an upper bound to our estimate of BT's service share of national trunk. We also noted that the presence of competing infrastructure for national trunk routes.

6.303 If we look at the proportion of circuits that BT sells externally, only 4% of all of its circuit sales contain a national trunk component (if we ignore terminating segments, this statistic suggests that 13% of all BT TI circuits sold with a trunk component are national trunk components). By contrast, in relative terms, a number of other CPs are selling a greater number of circuits with a national trunk component, whilst there are also some, especially in the London area, which sell a higher proportion of terminating and regional trunk segments. Overall, OCPs seem to have been better able to enter and compete for wholesale national trunk segments (reflecting the longer distance and existence of competing infrastructure). In turn, the ability of OCPs to better compete for national trunk is potentially one reason why, relative to other major CPs, BT's retail TI circuits requiring a national trunk are a smaller proportion of all BT's total retail sales (around [✂] of BT's retail sales require a national trunk component whereas around [✂] of OCPs retail sales require a national trunk).[644] This statistic suggests that OCPs are competing more effectively against BT for longer distance national TI circuits.

6.304 The above analysis only considered the extent to which OCPs might rely on BT in aggregate. We have also considered the picture by each TAN catchment area as, even if OCPs' reliance on BT for the provision of national circuits is small overall, it could be concentrated in particular locations. In Figure 6.21 below, we show the absolute numbers of circuits sold with a circuit end in the relevant TAN catchment area to show the extent to which circuits originating in each TAN rely on a trunk component.

[644] Estimates based on retail circuit sales (unweighted by bandwidth and excluding analogue circuit sales and circuit sold as inputs to VPNs).

Figure 6.21: Count of BT wholesale TI circuits with national trunk component by location*



*Note: Circuits unweighted by bandwidth and no uplift applied for missing geographic information. Wholesale sales data also excludes sales of analogue circuits and VPN tails.

Source: Ofcom 2013, based on s135 wholesale circuit information]

6.305 As shown in Figure 6.21, spread across each TAN the number of circuits that BT sells to OCPs with a national trunk component is in many cases insignificant. In total there are some [✂] circuits with a national trunk component, compared to [✂] circuits with a regional trunk component, and ✂] circuits sold as a terminating

segment only.[645] Therefore, OCPs 'national trunk' requirements based on BT's sales of wholesale circuits are much less significant than sales of regional or terminating segments.

6.306 The above analysis is based on an assessment of OCP purchasing patterns and their relative reliance on terminating, regional and national trunk. One reason for differences in these purchasing patterns is likely to relate to the underlying retail demand driving those wholesale purchases. Hence, we have compared retail demand for services with trunk components with wholesale purchases of trunk. According to this data, the relative proportion of OCPs' retail TI circuits that would apparently require either a national and regional trunk segment are 20% and 23% respectively, and 57% of all retail circuit sales are terminating segments only. But if we compare these retail requirements to the proportion of wholesale circuits BT sells, then we see that BT sells relative fewer wholesale circuits with national trunk (4%) and relatively more circuits with a regional trunk component (27%). As BT's wholesale business is selling a larger proportion of wholesale regional trunk and a smaller proportion of national trunk, this suggests a lower degree of self-supply by OCPs of regional trunk components and greater self-supply (or purchases of trunk from other CPs) for national trunk.[646]

Market definition should take into the account the market context

6.307 UKCTA members highlighted the fact that CPs are not actively investing today to build the capability to bypass BT's TI trunk network. It would therefore be too late and disruptive to change regulation of this legacy market now on the presumption that CPs will be prepared to amend their networks to achieve the necessary bypass. UKCTA's argument seems to be that although OCPs can apparently self-supply trunk circuits, they still rely on BT for PPCs to a significant extent and some of these circuits contain a national trunk component that is not commercially viable to self-provide. The impact of deregulation in this context would therefore simply allow BT to raise its prices for national trunk routes.

6.308 CWW had particular concerns about its reliance on BT for sub-2Mbit/s trunk and argued for a single national trunk market for sub-2Mbit/s TI services. However, as we set out under Issue 5, we consider that it is appropriate to define TI trunk markets at all bandwidths. In particular, for national TI trunk services, the nature of trunk is such that CP providing long-distance circuits at sub-2Mbit/s is likely to support long distance links on higher capacity bearers also used to deliver services at 2Mbit/s and above. Hence, a CP present in the national market is likely to be able to supply services at all relevant bandwidths. On the other hand, there may be some merit to CWW's comments on potential barriers to switching in relation to TI trunk services that might create a higher hurdle for a CP reliant on BT for some sub-2Mbit/s circuits that include a national TI trunk segment. While CWW provided some general examples of the cost of circuit migrations and how this could affect sub-2Mbit/s, it did not provide evidence to substantiate the number of circuits (out of its current BT purchases) that would be affected in this way.

[645] If uplifts were applied to account for wholesale circuit sales with missing geographic information then these circuit counts would rise to: [✂].

[646] A complete comparison between OCPs' retail requirements and wholesale purchases (based on BT's sales) is somewhat difficult as a national requirement can be delivered either via a 'national' purchase or either via a 'regional trunk' and 'terminating' segment purchase (with the national component self-provided)). Nevertheless, we have attempted to account for these issues via various sensitivities in our SMP assessment.

6.309 In order to assess the case for separate (single) trunk market sub-2Mbit/s further, we have considered whether the competitive conditions for sub-2Mbit/s are sufficiently homogenous. Our analysis suggests that BT accounts for around [✂] of wholesale sales of sub-2Mbit/s services of national TI trunk compared to around [✂] regional TI trunk sales. Our overall estimate of BT's wholesale service shares (including self-supply) suggests a [✂] of national TI trunk at sub-2Mbit/s compared to a far higher share of regional TI trunk ([✂]). Therefore, the competitive conditions would appear sufficiently distinct such that it would not be appropriate to define sub-2Mbit/s services as part of a single trunk market. This observation, in addition to the fact that there is scope for OCPs present in the supply of other bandwidths to provide a proportion of its national sub-2Mbit/s circuits competitively (reflecting our definition of TI trunk at all bandwidth as CPs present in the supply of national trunk at all bandwidths), does not suggest a national market.

6.310 We are mindful that our national definition could entail some CPs currently purchasing national trunk from BT being impacted (this includes sub-2Mbit/s and higher bandwidth services). However, we do not consider that we can maintain a single market definition, as there appears to be a national trunk market in which the competitive conditions are distinct both from terminating segments and regional trunk. We nevertheless consider these issues regarding potential market power in the regional and national markets in Section 7.

Issue 4: Ofcom's definition of AI trunk

6.311 The discussion of trunk under Issues 1 to 3 focused primarily on the TI trunk market. However, as noted above, in the 2007/8 review and in the June BCMR Consultation, we applied the TAN approach used to define TI trunk markets to the AI market (i.e. to define the break-point between the AISBO and AI trunk). Under Issue 4 we discuss our definition of AI trunk using the TANs, but also some of the differences in the nature of AI and TI services that led us not to define 'regional' and 'national' segments for the AI trunk market. Having set out relevant starting definitions for AI and TI services, we then consider under Issue 5 whether we should continue to define separate AI and TI markets or whether there is a single trunk/core market.

6.312 For the AI market, we identified 56 AI TANs, which broadly speaking mapped onto similar locations to the 46 TI TANs but reflected some differences between the locations of BT's major nodes for the AI services (referred to as Openreach Handover Points or OHPs) and the locations of Tier 1 nodes. We also identified a further ten AI TANs based on the major population and business centres at which CPs were likely to interconnect their core networks with BT to serve AISBO markets. As with TISBO, we defined AISBO as a circuit between any two points within a TAN catchment area. Any circuits between TAN areas (and routed via OHPs) would include AI trunk segments. However, we noted that some short-distance Ethernet circuits which cross TAN boundaries could be provided on an end-to-end basis (such as BT's WEES services) without being routed via OHPs. We proposed not to treat those circuits as trunk (either "regional" or "national").

6.313 We noted that BT was not currently required to provide AI trunk services. It was however required to provide AISBO circuits from a network or customer end up to the relevant OHP within the TAN, and to provide short-distance AISBO circuits, which cross boundaries. Unlike similar TI circuits, these latter circuits were not deemed to include a trunk segment. As noted above, the fact that TI circuits that crossed TAN boundaries were deemed to include a trunk segment was one reason why we

observe different competitive conditions in regional and national TI trunk markets.[647] But because short-distance AI circuits crossing TAN boundaries were classed as terminating segments, with no notional usage of the core network, they do not affect competition in AI core conveyance in the same way. Hence we did not identify a regional trunk market for AI circuits.[648]

6.314 For AI circuits, we discussed why it was not necessary to identify a 'regional' AI trunk service. As noted above, Ethernet services are typically provided either as:

- Networked Ethernet services: where Ethernet is provided over aggregated backhaul and trunk links (for example BT provides aggregation using its EBD services); and

- Point to point Ethernet services: where Ethernet circuits (such as BT's EAD services) are offered over dedicated point-to-point links.

6.315 In the case of networked Ethernet services, these link customer or BT network ends back to BT OHPs. As AI trunk was defined by reference to BT OHPs then services linking OHPs in different TANs would be trunk. By contrast, a dedicated point-to-point circuit (such as EAD) would not be provisioned over BT networked Ethernet services. On this basis, the economies of scale and scope that CPs could realise in the provision of individual point to point circuits were more limited than for networked Ethernet services. The nature of dedicated point-to-point Ethernet services means that they would therefore not fall within AI trunk market, as they are more like AISBO services. Furthermore, for point to point Ethernet circuits (such as BT's EAD circuits) there were limits to their use as part of a national trunk as:

- there was a technical limit (a maximum 25km radial distance for the standard EAD service); and

- it would be uneconomical to provide long-distance capacity over dedicated point-to-point circuits because this would not allow the user to exploit available aggregation economies.

6.316 We therefore considered that end-to-end AI circuits spanning TAN catchment areas (such as EAD type circuits) were very unlikely to be used to provide an equivalent to a trunk or core conveyance service.

6.317 Therefore, we proposed to identify an AI trunk market for aggregated connections between major network nodes (OHPs) in separate TANs. However, in light of the nature of Ethernet services, we did not consider it necessary to identify a regional trunk market including point-to-point circuits spanning AI TAN catchment areas. Therefore, point-to-point Ethernet circuits such as EAD were included in the terminating segment market.

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[647] This was because many of these circuits spanning TAN boundaries shared the characteristics of terminating segments (i.e. they were relatively short-distance circuits enabling a CP to serve end-user premises by connecting it to the nearest BT node). In these cases, the use of a trunk circuit connecting two Tier 1 nodes was only notional, a product of the logical routing model assumed as explained under Issue 2 above).

[648] Indeed, as part of its Undertakings commitments, BT is required to offer on an EOI basis effective access and backhaul services. Unlike PPCs provided for the TI market, these circuits can be provided on an end-to-end basis between end-user sites. This point was reflected in the January 2008 consultation, where we noted that: *"When providing short circuits across potential catchment area boundaries, therefore, competing operators are not obliged to purchase partial circuits linking customer sites to their own POPs; they can purchase end-to-end circuits with a more efficient and direct physical routing. This is an EOI approach which provides competitive parity without the need for what might be termed artificial transfer charging arrangements."* (Paragraph 6.138).

November BCMR Consultation

6.318 In the November BCMR Consultation, we set out a clarification over the definition of AI TANs (in particular how we determine which circuits would be deemed to be trunk and which would deemed to be terminating segments for the purposes of applying remedies to AI markets). Although this clarification was related to the application of AI remedies, it is also relevant to our description of AI TANs as part of our trunk market definition.

6.319 As set out above, in the June BCMR Consultation our understanding was that, similar to the TI trunk market, BT had defined geographic catchment areas for each AI TAN based on the mapping of postcodes to exchanges 'served' by BT's main network nodes (OHPs). Hence, in the June BCMR Consultation when we discussed AI trunk circuits we referred to circuits routed via OHPs in different TAN catchment areas. We noted that some short-distance Ethernet circuits cross TAN boundaries could be provided directly without being routed via OHPs and would be terminating segments (i.e. they would not contain a trunk segment). However, in its response to our June BCMR Consultation, BT pointed out that we were incorrect to suggest that BT or anyone else had defined the geographical boundaries of the AI TANs in terms of catchment areas. BT noted that Openreach provides terminating segments between any two points (subject to any technical limits), with the exception of circuits which link OHPs assigned to different AI TANs (in which case it is deemed to be a trunk segment).

6.320 Hence, in the June BCMR Consultation, when we refer to circuits that cross boundaries of specific AI TAN catchment areas as potentially containing a trunk, a simpler and more precise definition of AI trunk segments should have instead referred to circuits actually routed between OHPs assigned to different TANs (for a list of OHPs and relevant TANs see Section 12, Table 2).

Responses to the June BCMR Consultation

6.321 Below, we summarise the points made by respondents, which are relevant to Issue 4, and explain how we have taken them into account in reaching our conclusions.

6.322 Only BT provided specific comments on our AI trunk market definition, although Exponential-e provided comments on AI trunk, which we consider more relevant to our remedies (and we have discussed in Section 12).

6.323 BT did not consider that we should identify separate AI trunk markets nor should BT have any obligation to supply services across TAN boundaries. It argued that we had not provided evidence that is justified by competitive conditions.

6.324 BT accepted that an Ethernet network can include a 'core' or trunk network capable of switching and disaggregating traffic and aggregate 'access tails'. BT submitted however that the configuration of a CP's network depends on detailed CP choices and does not have to bear any relationship to BT's network. Therefore, the points on an OCP's network where it aggregates or switches traffic need not coincide with BT network nodes such as OHPs (BT also considered that similar arguments apply for TI networks).The process of multiplexing can easily cross technology (e.g. AI and TI) – so that packet based services can be carried on TISBO and circuit emulation can be used to carry legacy TI traffic across AISBO circuits (e.g. MEAS).

6.325 BT's view was that the reality of mixed traffic over access tails and core networks underlines BT's view that core networks should not be treated as separate AI and TI trunks.

Ofcom's considerations of consultation responses

6.326 In our definition of AI trunk markets, as with TI trunk, we have adopted an approach based on TANs, although differences between the network nodes for AI and TI markets mean that we have identified 56 AI TANs.[649] But, again as in the TI trunk markets, AI circuits between major network nodes[650] in different TANs are treated as trunk.

6.327 In relying on the TAN approach to define AI trunk markets, we have considered whether the market definition based on 'regional' and 'national' TI trunk should also apply for the AI market. We consider that we should not identify separate AI trunk markets split by regional and national trunk.

6.328 BT argued that the mixed traffic access and core networks underlies BT's view that we should define a single core network and not identify separate TI and AI trunk markets. We discuss this below as Issue 5. BT also argued that it should not have any obligation to supply any AISBO services that cross TAN boundaries as, it argued, we have provided no evidence that an obligation to supply is justified by competitive conditions. However, as discussed above, the nature of these services makes them like any other AISBO service. We have therefore treated any circuit that does not link OHPs associated with different AI TANs as AISBO services.

Conclusions

6.329 We have concluded that it is appropriate to identify an AI trunk market for connections between major network nodes (OHPs) in separate TANs. However, in light of the nature of Ethernet services, we do not consider it necessary to identify a regional AI trunk market. Any point-to-point circuits that do not link OHPs in separate AI TANs will be part of the AISBO market (e.g. point to point Ethernet circuits such as EAD are part of the terminating segment market).

Issue 5: Trunk versus alternative core conveyance

6.330 Below we set out the proposals we made in the June BCMR Consultation, together with our reasoning in relation to our assessment of trunk versus alternative core conveyance services. We then summarise the responses we received on this issue and explain how we have taken them into account in reaching our conclusions. Finally, we present our conclusions on Issue 5.

Our proposals in the June BCMR Consultation

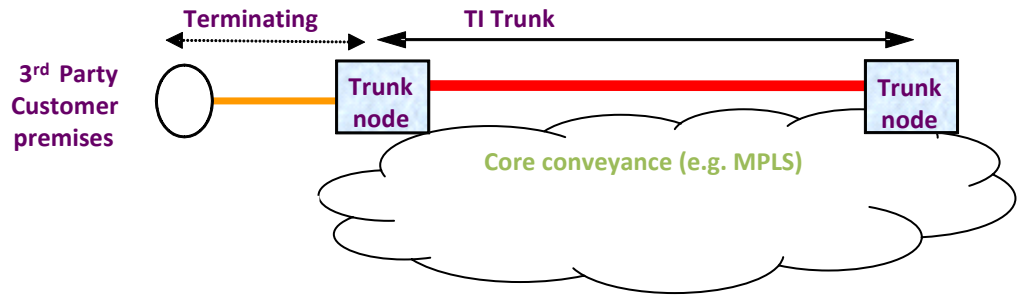
6.331 In the June BCMR Consultation, we considered whether we could identify separate markets for the different 'types' of trunk/core networks that were used to support different leased lines services (including retail AI, retail TI services and other retail services that make use of leased lines). Figure 61 of the June BCMR Consultation,

[649] We discuss in Section 12 that the implementation of TAN remedies for AI markets is also not identical reflecting the nature of regulation applied to AI markets.

[650] Tier 1 nodes in the case of TI markets and OHPs in the case of AI markets.

which we reproduce below, provided an illustration of trunk and terminating segments used as wholesale inputs to deliver a downstream retail leased lines service.

Figure 6.22: Trunk versus terminating segments



Source: Ofcom 2012

6.332 For retail TI services, many CPs were likely to make use of point-to-point SDH/PDH trunk circuits that employed time division multiplexing technologies. However, we observed that many CPs also had their own core connectivity based around packet-switched technologies. We referred to these alternative core networks collectively as 'core conveyance' services (including ATM or other IP-packet based services). In principle, using certain switching technologies such as Multi-Protocol Label Switching (MPLS), it was possible to prioritise traffic on packet-based networks to deliver 'business class' services. Indeed, many CPs made use of core conveyance to provide AI services (so for our starting definition we included AI trunk as primarily a core conveyance service). We considered whether trunk circuits used to deliver retail TI services (TI trunk) were in a separate market to other forms of core conveyance (such as AI trunk).

6.333 We noted that since we found that national TI trunk and national AI trunk are competitive when analysed as separate markets, in principle we would be likely to come to a similar finding of a competitive national trunk market whether or not we identified a combined AI and TI market. Nevertheless, for completeness and given the market we identified for regional TI trunk segments (i.e. circuits spanning TAN catchment area boundaries), we have considered whether core conveyance services and regional TI trunk circuits could fall within the same market.

6.334 Given the similarity of these regional circuits to terminating segments, we considered that the factors underlying our finding of separate AISBO and TISBO markets (as set out in Section 4) were likely also to be applicable to regional circuits. Nevertheless, as CPs might have been in a position to make use of TI trunk or core conveyance for some regional circuits, we considered in our market assessment whether TI trunk and core conveyance services would fall in the same market. We set out below our assessment based on the following criteria:

- *Technical assessment:* we considered the capabilities of TI trunk and core conveyance, developments in the market and any technical barriers that might exist in the use of trunk/core networks to support different services;

- *Demand-side substitution:* we assessed whether core conveyance services could deliver all of the requirements of a TI trunk network (i.e. whether a CP currently requiring a TI trunk circuit could in theory substitute to purchasing trunk over, for example, an MPLS network);

- *Supply-side substitution:* we considered whether a CP currently providing core-conveyance services (and not currently providing TI trunk) could easily switch to provide TI trunk, such that it would impose an additional competitive constraint;[651] and

- *Interconnection and other barriers to switching:* we considered any factors that might affect the ability to switch circuits delivered over TI trunk to core conveyance.

Technical assessment

6.335 We noted that BT had now deployed its 21st Century network utilising multi-protocol label switching (MPLS) technology on an IP-packet based network over WDM fibre in the backhaul and core network. One of the main features of the 21CN was its ability to support multiple services over a common packet-based network.

6.336 Core conveyance using MPLS enabled greater ability to 'emulate' dedicated leased line services due to improved management of priority traffic and increased support for SLAs on latency and jitter. Initially, at least, BT used the 21CN to support its wholesale broadband access services and Ethernet products including point-to-point services and Ethernet VPNs. We noted that BT was not supporting TI trunk services using "emulation" over the MPLS network, and it appeared that BT would continue to offer CPs wholesale TI services delivered 'natively' using SDH technologies.[652]

6.337 SDH/PDH trunk networks employed TDM to deliver low latency and synchronous dedicated point-to-point circuits. The distinguishing characteristic of core conveyance, as opposed to SDH/PDH trunk segments, was that core conveyance offered a higher degree of flexibility reflecting the nature of the packet-based technologies employed. For example, wholesale broadband access services would make use of core conveyance networks because they offered flexibility and allowed, on a per user basis, virtual paths to be offered at low unit cost. Many point-to-point Ethernet solutions (including VPNs) were supplied in dedicated or contended variants. BT's Ethernet services offered standard contention rates of 5:1 and premium (uncontended) services over the same network.[653]

6.338 In considering under our market definition whether to identify TI trunk and core conveyance as in the same market, we considered TI trunk against a candidate close substitute service on a core conveyance network. We identified uncontended services provided on core conveyance networks as the closest 'candidate" substitute for a TI trunk circuit. We noted that on packet-based networks, uncontended 'virtual paths' could be employed through routing and switching technologies such as (Multiprotocol Label Switching (MPLS).[654] This looked similar in many respects to a dedicated point-to-point trunk circuit on an SDH-network.

6.339 However, it was less clear that MPLS would deliver the same quality of service for those users that valued very low latency services. We referred to the fact that even

[651] We do not consider this in the alternative (i.e. an operator of TI trunk supply-side substituting to provide core conveyance), as we are not aware of there being any major operators of TI networks not currently present in the supply of AI services.

[652] A native-TDM service is provided directly using technology types such as SDH or PDH rather than emulation of TDM services over Ethernet networks.

[653] http://www.btwholesale-inspire.com/products2/data/ethernet

[654] MPLS attached labels to data packets, which can be used to provide functions such as managing different data streams based on the priority or service plan so as to reduce latency or data loss of packets.

though core conveyance services might be used to deliver business-grade services to end-users, BT's statements suggested that it would continue to support TI products on its 21CN using 'native-TDM' technologies rather than attempting to emulate TI services on a core-conveyance network. In particular, BT did not propose to develop TDM-emulation solutions for its 21CN network for low latency requirements. We noted that, instead, it was planning to offer native TDM-based services.

6.340 We considered that, at the very least, BT's intention to continue to support "native-TDM" products reflected the continued demand for TI trunk services, even if "emulation" services over MPLS networks now offered a quality of service closer to that of TI services than previously. On this basis, while for a number of users core conveyance was a potential substitute, it remained the case that BT would continue to support the strict performance requirements of TI users based on access to 'native' TDM-based services. This suggested that a sufficient number of end-users would not find an MPLS-based service an adequate substitute for a native service to make it economic to retain the TDM network in use.

Demand and supply-side substitution

6.341 We assessed whether the trunk services that formed part of the leased lines trunk market were constrained by core conveyance services. As with other leased lines services, it was necessary to identify all relevant products that might provide direct constraints by assessing demand-side and supply-side substitution opportunities. We also considered the relevance of any indirect constraints.

Direct demand-side constraints

6.342 We considered whether core conveyance networks could provide a demand-side constraint on regional TI trunk services provided over an SDH/PDH network (or vice versa).

6.343 We considered whether a user of a TI trunk service would switch to a core conveyance service in response to a SSNIP. We considered that, in many cases, the performance that could be offered using either SDH-trunk or dedicated paths across core conveyance networks should be broadly acceptable. For example, we thought it likely that a number of retail TI customers that no longer needed the strict service requirements of an end-to-end TI service might in any case be thinking of migrating to other services.[655] So it was possible that there was a sub-set of retail TI customers that would be unaffected by a switch of their SDH-trunk to a core conveyance network (such as MPLS).

6.344 However, for some users of SDH/PDH services with very strict quality of service requirements, it might not be possible to replicate SDH/PDH-trunk over dedicated broadband conveyance capacity with the same guarantees. We thought that there would remain some users for whom access to TI services was necessary to deliver certain service characteristics. Indeed, BT's plans for its 21CN were to retain access to a 'native SDH' layer, which suggested that this residual demand could not be met using MPLS (or, in the alternative, that there remained sufficient demand for access to the 'native SDH' layers).[656]

[655] Indeed, many retail customers rely, for example, on VPNs that utilise TI access tails, but with the core connectivity provided over a packet-based MPLS network rather than dedicated fixed TI trunk links.

[656] According to BT's wholesale website its main core and backhaul network (sometimes loosely referred to as the 21CN) utilises multi-product label switching (MPLS) technology over WDM links. Initially, at least, BT is utilising

6.345 Therefore, in response to a SSNIP on trunk services, we considered that wholesale providers would be unlikely to switch from using SDH/PDH-trunk to core conveyance services in order to deliver traditional interface services. This finding was consistent with our assessment of AISBO and TISBO markets under Issue 1 in Section 4. Indeed, even if the performance characteristics of core conveyance had been identical to TI trunk, there were still also a number of barriers to switching from TI trunk services, which we also discussed in the June BCMR Consultation.[657]

Indirect demand-side constraints

6.346 We also considered whether substitution at the retail level provided an indirect constraint on the pricing of wholesale products. The question was whether a SSNIP at the trunk level (which would translate into a price increase at the retail level) would prompt sufficient retail switching to make such a trunk SSNIP unprofitable.

6.347 At the retail level, we proposed to find TI leased lines in a separate market to those services such as VPNs, Ethernet and ADSL that were likely to rely on core conveyance. Therefore, it was unlikely that there would be an effective constraint from end-users switching from TDM-based retail services to these services. On the other hand, at the retail level we proposed to find SDSL and digital PDH/SDH services in the same retail TI market. And because SDSL services would tend to rely on a core conveyance rather than SDH/PDH trunk networks, then in principle it was relevant to consider any indirect constraints from SDSL services. However, we considered that the inclusion of SDSL in the TI market would not result in core conveyance services offering a competitive constraint on TI trunk.[658] In addition, in the opposite direction, we did not consider that core conveyance would be constrained by TI trunk based on indirect constraints.[659]

6.348 Therefore, we did not consider that indirect constraint arguments would provide a basis for a combined TI trunk and core conveyance market.

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the 21CN to support its wholesale broadband access services and Ethernet products including point-to-point services and Ethernet VPNs. However, it does appear that even on its 21CN, BT offers the ability to access directly the SDH-layer. This may suggest that there will be ongoing demand for TI trunk services that is supported over a SDH trunk network that is distinct to an MPLS-based service.

[657] We also considered that demand-side substitution at the wholesale level would be unlikely to occur when viewed from the perspective of core conveyance services switching to dedicated SDH-trunk. This is because switching from providing a retail service using core conveyance capacity to providing such capacity over SDH-trunk would erode the main benefits (such as flexibility and the efficiency advantages of shared capacity) of using conveyance services.

[658] In our retail market definition, we included SDSL in the TI market, because other TI service types (analogue, SDH/PDH) could provide a competitive constraint on SDSL prices. However, we did not consider that SDSL would provide a sufficient competitive constraint on the price of other TI services. This meant that the competitive constraint for TI markets only worked in one direction (i.e. other TI services offer a competitive constraint on SDSL). On this basis, we do not consider that an 'indirect' constraint (arising from retail TI customers switching to SDSL) would constrain a hypothetical monopolist from imposing a SSNIP on TI trunk services.

[659] We consider that it is unlikely that a SSNIP at the wholesale level would generate sufficient switching from SDSL to SDH/PDH to impose a sufficient constraint. A SSNIP on core conveyance would not result in as large an increase in the retail price of SDSL given that core conveyance is only one element of the retail cost stack. SDSL is such a small proportion of core conveyance that it is very unlikely to be a constraint. Furthermore, we note that demand for SDSL is relatively insignificant and is in decline. Therefore, we do not think that it is appropriate to rely on indirect substitution between TDM-based services and SDSL as a reason to place core conveyance in the same market as TI trunk.

Supply-side substitution

6.349 We said that, in general, for supply-side substitution to be relevant to our assessment, we would require that CPs:

- could enter the TI trunk market relatively easily within a short-space of time (i.e. they had an existing network capacity of some variety); and
- were not already 'present' in the TI trunk market (i.e. they were not currently providing a TI trunk service over that core capacity).

6.350 For the TI trunk assessment, we believed that, in principle, supply-side substitution was a relevant factor to consider because there were some CPs with core conveyance networks not currently providing their own TI trunk services.

6.351 In considering the ease of entry, we returned to the technologies that CPs might employ in core conveyance networks or trunk networks. If a CP had a core conveyance network (and was not already present in the market), then it was likely to be running this network over a WDM transmission layer.[660]

6.352 Within the context of this market definition framework, we considered that there was a difference between the technical capability of providing a single TI circuit over WDM and the provision of a fully functioning TI trunk network. We did not think that operators with core conveyance networks (not currently supplying TI trunk), in response to a SSNIP, would be willing to invest in necessary TI equipment to enter the market and offer a competing TI trunk service (particularly in relation to regional trunk routes).[661]

6.353 This was because in order to achieve a fully functioning (and efficient) trunk network, investment in additional multiplexing equipment and interfaces to support the SDH/PDH standards would be required.[662] A CP that had only invested in an MPLS network was unlikely to want to enter the market in a relatively short timeframe in response to a SSNIP. Therefore, if a hypothetical monopolist applied a price increase (SSNIP) to TI trunk circuits, we did not consider there would be sufficient supply-side substitution to make that price increase unprofitable.

6.354 On this basis, we did not consider that CPs (not currently present in the market) would provide an effective competitive constraint.

Interconnection and other barriers to switching

6.355 In addition to the above demand and supply-side considerations, we explained that there were likely to be other barriers to a CP currently purchasing TI trunk switching to core conveyance services. First, we noted that differences in the location of points on core conveyance networks and on TI trunk networks where CPs interconnect were likely to represent a significant barrier to providing TI trunk and core

[660] In theory a CP might have an IP-MPLS network run over an SDH trunk layer over WDM. However, we would expect any such operator to already 'present' as it is already likely to be offering TI services.

[661] We observe that all major CPs with their own core networks employ WDM networks as the transmission medium in the core. In principle the same physical fibre and WDM transmission medium could be used to deliver both an MPLS-enabled and TI trunk network.

[662] For example, [✂].

conveyance over a converged platform.[663] Second, even where the interconnect points for AISBO and TISBO services coincide there might still be remaining barriers to switching.

6.356 Under the above hypothetical monopolist test, we considered (on the demand-side) whether a CP would switch from a TI trunk service to one using dedicated paths over its own conveyance network (or provided by another wholesale provider). Similarly (on the supply-side) we investigated whether a supplier (not currently present in the supply of TI trunk services) could utilise its capacity on core conveyance network to provide separate TI trunk circuits.

6.357 In considering demand and supply-side substitution, it is relevant to consider that CPs are typically reliant on BT for terminating segments to provide the 'last mile' connectivity from their own 'trunk'/core networks to customer premises. CPs with their own core networks interconnect with these other operators in order to compete in the provision of national retail services. We noted that the interconnect points for AI and TI services may be in different locations. This reflected the historical evolution of their networks, whereby some CPs had retained separate SDH networks and had built those networks to support the provision of TI services to the localities where demand was concentrated. Other CPs, focused on AI markets, (such as TalkTalk and Sky) might not have been significant providers of TI services and hence not deployed SDH networks. Those CPs might have instead relied on third parties such as BT to provide the majority of wholesale inputs for TI services (rather than deploy TI interconnection significantly deeper into the network). Therefore, historically, there had been a degree of separation between the interconnect points for AI and TI markets.

6.358 Even if an OCP's core conveyance network was interconnected at similar points, this was not the only barrier to switching that needed to be overcome. For example, there might still be circuit reassignment/migration costs in moving a circuit currently provided using a regional SDH circuit to a CP's own core conveyance network. In addition, for existing supply, there would in any case be some disruption to the end customer's service when switching between one network and another.

6.359 Given the legacy nature of TI services, it was unlikely to be worthwhile for a CP to move a proportion of its circuits onto its own network (especially if the volumes were low) and in particular where this risked disruption to end-users. Hence, if a hypothetical monopolist imposed a SSNIP on trunk, it would not necessarily be easy for a CP to simply migrate those TI trunk circuits onto its own core conveyance network without incurring significant costs. Therefore, in addition to our technical assessment and demand and supply-side considerations, we considered that there could, in any case, be significant barriers to switching for the installed base of legacy TI services.

6.360 Any such barriers were likely to be particularly important for regional circuits where there were likely to be insufficient circuits to generate economies of scale. Such economies of scale are needed to overcome the fixed costs incurred in switching from one network technology to another (this would particularly be the case in the short to medium term if this were only for an individual or few regional trunk circuits).

[663] For example, some BT node locations for TI services do not coincide with its OHPs. In addition, an OCP may have only invested to support interconnection of particular TI trunk services (such as sub-2Mbit/s services), so there would be barriers to switching to providing AI trunk at the same location.

6.361 As demand for wholesale services, including trunk, is a derived demand, then given that there were separate retail TI and AI markets, this suggested identifying separate TI trunk and core conveyance markets at the wholesale level. We noted that there were potential technical barriers to the use of core conveyance networks for the provision of TI trunk, and we did not think supply-side substitution would impose an effective constraint. We observed that the locations where CPs had core connectivity might not necessarily coincide in all circumstances with TI trunk locations. Even if a CP had a POH for regional TI trunk circuits relatively close to its own core conveyance network, it did not entirely eliminate the costs associated with circuit migrations and reassignments. On this basis, we proposed to retain separate TI trunk markets (distinct from core conveyance).

Responses to the June BCMR Consultation

6.362 Below, we summarise the points made by respondents, which are relevant to Issue 5, and explain how we have taken them into account in reaching our conclusions.

6.363 Only BT provided comments on our proposals for trunk and core conveyance market definition. BT considered that we could not rely on the fact that it continues to utilise its legacy SDH network for TI-based services as an admission that such a network still offers significant advantages over its all-IP counterpart in terms of low latency and synchronous connectivity. BT submitted that any CP that owns legacy SDH networks is merely choosing to “sweat the assets” of the old technology whilst progressively migrating customers that utilise the 21CN. BT noted that the fact that it continues to use its ’native-TDM‘ platform is unexceptional, as no CP will change a system with heavily sunk costs and huge costs of migration.

6.364 BT did not agree that the available evidence suggested that there were still users of SDH/PDH with very strict service requirements (as discussed in Section 4). Even if there is a rump of users remaining on TI services, this is not sufficient to ensure that a SSNIP is profitable (as it is the extent to which marginal customers that would react to a SSNIP that are most important constraint). BT submitted that, given CWW believed most circuits will migrate to AI in a few years, it seems less likely still that the price of SDH/PDH trunk is not constrained by AI services (although BT seemed to accept that switching would not occur in the other direction, from AI to TI).

6.365 BT argued in relation to interconnection and barriers to switching that the economics of core conveyance have now moved decisively in favour of Ethernet. The number of circuits at which it becomes attractive to transport TDM as Ethernet is now quite small and a 100Mbit/s can carry up to 50 2Mbit/s lines, making it the technology of choice for trunk.

6.366 BT considered that CPs could quickly extend or augment their networks to meet new demand by purchasing AI backhaul on regulated terms from BT until they are ready to invest in new equipment themselves. This enables them to compete in the TDM market where they can buy TDM tails from BT and carry their “core” requirements over Ethernet on their own infrastructure without adding SDH equipment to their network. BT believed the opportunity for this is greater in the shorter trunk market where CPs would carry the first part of any ‘national trunk’ circuit on their own infrastructure and just buy from BT whatever remains.

Ofcom’s considerations of consultation responses

6.367 We accept that for higher bandwidth services, Ethernet is likely to be the technology of choice going forward both for terminating and trunk segments. However, there is

significant continued demand for TI trunk (as we have also discussed previously in Section 4, Issue 1) with respect to AI and TI services.

6.368 We do not agree that in response to a SSNIP on TI trunk segments, a CP would be likely to switch to providing the trunk segment over Ethernet links. Such a change would likely only occur as part of a significant overall change in a downstream customers' retail connectivity.

6.369 As discussed above in our summary of the June BCMR Consultation, given the legacy nature of TI services, it might not be worthwhile for a CP to move a proportion of its circuits onto its own network (especially if the volumes were low) and in particular where this risked disruption to end-users.[664] Hence, if a hypothetical monopolist imposed a SSNIP on trunk, it would not necessarily be easy for a CP to simply migrate those TI trunk circuits onto its own core conveyance network without incurring significant costs. Therefore, in addition to our technical assessment and demand and supply-side considerations, we considered that there could be significant barriers to switching for the installed base of legacy TI services. Any such barriers are likely to be particularly important for regional circuits where there were likely to be insufficient circuits to justify switching from one network technology to another in the short to medium term. In addition, the declining volumes in the TI market would act as a disincentive to further investment.

6.370 In our wholesale assessment of TISBO and AISBO services in Section 4, we also discussed the observed migration of some services from the former to the latter. We noted that the rate of migration would not likely be affected by a SSNIP, which would be insignificant when compared to the large price differentials between AI and TI that prevailed. This suggested that users who were in a position to switch without incurring significant costs, or who did not have a strong demand for TI service characteristics, would already be likely to do so, but others would not, and were unlikely to be influenced by a SSNIP. We consider that similar arguments would apply to regional trunk and core conveyance.

6.371 BT did not consider that the evidence that it is still supporting TI services over its native SDH/PDH network was indicative that TI trunk services are in a separate market. We discussed BT's continued use of its TI network and any implications for our market definition in Section 4 (Issue 1).

6.372 We highlighted that if BT's arguments were correct (i.e. that AI and TI are in the same market), then it may well suggest that it would be more efficient to provide both services over the same underlying AI network (with TI services provided on the AI network using relevant 'circuit emulation' techniques). It is also the case that, if the forward-looking costs of the native SDH network were high because assets needed replacing, the case for switching to a single network where possible would be stronger. But the fact that existing assets can be used does not mean that parallel running of two networks has no additional costs, and it will generally be expected to lead to higher costs than a single network in the long-run.[665] This in turn would potentially suggest that turning-off the TI network would be justified if the objective were to minimise network costs and there were no other concerns. However, we considered that the fact that both AI and TI services continued to be supported on separate networks was consistent with there being barriers to doing so, which could be consistent with underlying demand for TI services (and/or barriers to switching for

[664] [✂].

[665] See the general discussion in the July LLCC consultative document at paragraph 4.75, and the discussion of the forward-looking costs of providing TI services at paragraphs 5.166 – 5.178.

legacy customers). We consider that such arguments also apply to our consideration of TI trunk versus core conveyance services.

Ofcom's conclusions

6.373 As demand for wholesale services, including trunk, is a derived demand, then the fact that there are separate retail TI and AI markets suggests identifying a separate TI trunk and core conveyance markets at the wholesale level. We note that there are potential technical barriers to the use of core conveyance networks for the provision of TI trunk and we do not think supply-side substitution would impose an effective constraint. We observe that the locations where CPs have core connectivity may not necessarily coincide in all circumstances with TI trunk locations. Even if a CP has a POH for regional TI trunk circuits relatively close to its own core conveyance network, it does not entirely eliminate the costs associated with circuit migrations and reassignments. On this basis, we have concluded it is appropriate to retain separate TI trunk markets (distinct from core conveyance).

Issue 6: Bandwidth

6.374 Below we set out the proposals we made in the June BCMR Consultation, together with our reasoning in relation to whether we should identify bandwidth breaks for TI trunk (national and regional) and core conveyance services. We then summarise the responses we received on this issue and explain how we have taken them into account in reaching our conclusions. Finally we present our conclusions on Issue 6.

Our proposals in the June BCMR Consultation

6.375 In the June BCMR Consultation, we proposed a number of bandwidth breaks for retail and wholesale AI and TI markets. Under issue 3, we considered whether we should identify any similar bandwidth breaks for wholesale trunk services.

6.376 Our proposal was not to identify any bandwidth breaks. Each trunk or core conveyance market covered all bandwidths.

Ofcom's analysis

National TI trunk and core conveyance

6.377 We did not consider it appropriate to define distinct markets for national TI trunk segments at different bandwidths.

6.378 We noted that it would be highly inefficient to deliver, for example, dedicated long-distance 2Mbit/s retail leased line circuit over an individual 2Mbit/s trunk route. By its very nature, on trunk segments, traffic was aggregated together to enable efficient bulk transport over high capacity bearer circuits. Indeed, in order to provide competitive trunk, a CP would seek to exploit these economies of scope and scale by aggregating traffic at any relevant bandwidth. Therefore, for a CP to provide trunk competitively, it was likely to be present at all bandwidths on a given trunk route and competitive conditions were likely to be similar for all bandwidths on that route. In addition, an operator with existing trunk capacity could easily switch from providing one bandwidth to another.

6.379 On this basis, we proposed to identify a single TI trunk market at all bandwidths. The same logic would apply for core conveyance services, as these services would also

be subject to similar economies of scale and scope. We also identified a single core conveyance market at all bandwidths.

Regional TI trunk

6.380 The remaining question we considered was whether to identify bandwidth breaks for regional TI trunk.

6.381 Many regional trunk circuits spanning TAN boundaries shared the characteristics of terminating segments – i.e. they were relatively short-distance circuits enabling a CP to serve an end-user premise by connecting it to the nearest BT node. In these cases, our classification of a circuit as 'trunk' was a product of the logical routing model assumed, and the actual economic characteristics of the circuit remained similar to those of a terminating segment in that there would be limited opportunities for traffic actually to be aggregated together using trunk segments (in these circumstances the 'trunk' segment identified would be 'notional').

6.382 On the other hand, we noted that in some cases it might be efficient for BT or an OCP to provide a circuit spanning a TAN boundary by actually using a trunk circuit connecting major aggregation nodes (in these circumstances the 'trunk' segment identified would match closely the likely 'real' routing of that circuit). Where a trunk circuit was actually used, competitive conditions in the provision of the trunk segment (and its unit cost) would reflect the realisation of economies from aggregating traffic from multiple end-users for the various different bandwidths of retail circuit. We said that the provision of bandwidth over aggregate trunk could then point to a regional TI trunk market at all bandwidths.

6.383 As suggested above, if regional trunk was more like a terminating segment then defining a regional trunk market at all bandwidths might, on the face of it, appear inconsistent. However, we stated that it is important to recall that market definition is not an end in itself.[666] In this context, the majority of regional TI trunk circuits were low bandwidth services (i.e. at 2Mbit/s or below). For example, we estimated that higher bandwidth regional TI trunk exceeding 2Mbit/s represented less than 5% of the total count of regional TI trunk circuits sold to third parties by BT or OCPs. We stated that given that the number of high bandwidth TI trunk circuits was not material and, outside the WECLA, BT has SMP in all bandwidths of TISBO except 622Mbit/s (where circuit numbers are very small), we considered that our SMP finding was robust.[667]

Responses to the June BCMR Consultation

6.384 Below, we summarise the points made by respondents, which are relevant to Issue 6, and explain how we have taken them into account in reaching our conclusions.

6.385 Only BT commented on our trunk proposals and agreed that it is not appropriate to define bandwidth breaks. However, it considered that the finding of no SMP at Very High Bandwidth TI services should be extended to Trunk by changing the definition of trunk from 'all bandwidths' to 'all bandwidths below 622Mbit/s).

[666] The end goal is an analysis of competitive conditions for the purposes of determining whether *ex ante* regulation is required or not. See, in this respect, the ERG Common Position (Section 4.2).

[667] We consider that regional TI trunk is likely to have competitive conditions similar to terminating segments. For terminating segment markets at similar speeds, in our SMP assessment we find that BT has SMP (its market share is well in excess of 50% threshold for a presumption of dominance). Therefore, BT has a similar share for TI regional trunk given the prevalence of low bandwidth trunk circuits.

Ofcom's conclusions

6.386 As set out above we continue to consider it is appropriate to define TI trunk markets at all bandwidths. We have considered, however, BT's argument that we should limit the TI trunk markets to services below 622Mbit/s.

6.387 In relation to national TI trunk, we do not consider that it is appropriate to define a national TI trunk market below 622Mbit/s. As we set out in the June BCMR Consultation, we consider that the nature of trunk services is such that traffic is aggregated together to enable efficient bulk transport over high capacity bearer circuits. For a CP to provide trunk competitively, it is likely to be present at all bandwidths on a given trunk route or routes and competitive conditions are likely to be similar for all bandwidths on that route. In addition, an operator with existing trunk capacity could easily switch from providing one bandwidth to another. Hence, we consider that a CP providing national trunk at 622Mbit/s would be able to compete to provide lower bandwidths, such that the competitive conditions for the provision of national trunk services across bandwidths are sufficiently homogeneous. On this basis, we consider it appropriate to identify a national TI trunk market at all bandwidths.

6.388 In relation to regional trunk, as recognised in the June BCMR Consultation, there could be an argument for identifying bandwidth breaks on the basis that regional trunk segments are similar to terminating segments.[668] However, as BT supplies so few TI circuits at speeds of 622Mbit/s and above for its PPC services, changing our market definition will make no difference to our subsequent market power assessment.[669] Hence, we continue to define the regional trunk market at all bandwidths. Nevertheless, we consider the practical implications of our regional trunk market definition further in our assessment of TI regulatory remedies (in light of our SMP findings).

6.389 Therefore, we conclude that we should retain our TI trunk definition:

- TI regional trunk at all bandwidths; and
- TI national trunk at all bandwidths.

[668] According to the TISBO definition, this could include identifying a market for regional trunk excluding regional trunk services across the UK at 622Mbit/s and services above 8Mbit/s in the WECLA.

[669] Based on circuits for which we have geographic information, across the whole of the UK (including in the WECLA+) BT's sells a total [✂] TI regional trunk circuits above 8Mbit/s (around 2% of regional TI trunk circuits at all bandwidths). Indeed, at 622Mbit/s BT sells [✂] circuits at 622Mbit/s in total (including terminating segments) ([✂] of which would be classified as regional trunk).

Section 7

SMP assessment

Introduction

7.1 In the preceding Sections we have set out our definitions of the relevant markets. In this Section we present our significant market power (SMP) assessment in each of those relevant markets, explaining where we find SMP and where we do not.

7.2 We have structured this section as follows:

- summary of conclusions on our SMP assessment;
- our approach to SMP assessment;
- SMP assessment in the relevant wholesale symmetric broadband origination markets:
  - o assessment of factors common to the relevant wholesale symmetric broadband origination markets;
  - o analysis and conclusions as to the existence, or not, of SMP for wholesale TISBO, AISBO and MISBO markets;
- analysis and conclusions as to the existence, or not, of SMP in the relevant retail markets; and
- analysis and conclusions as to the existence, or not, of SMP in the relevant wholesale markets for TI trunk segments.

7.3 In each of the above:

- where relevant we set out what we said in the June BCMR Consultation;
- where stakeholders have responded we summarise those responses;
- we set out our considerations of consultation responses; and
- having considered consultation responses we then set out our conclusions.

7.4 Four of the markets in which we find BT to have SMP are not in the EC's Recommendation[670]: three retail markets and the market for regional trunk segments. The EC's Recommendation includes a list of markets that, according to the European Commission, may warrant ex ante regulation. When identifying markets other than those in the EC's Recommendation, we must ensure that the following three criteria are cumulatively met for each market:

i) the presence of high and non-transitory barriers to entry;

[670] Commission Recommendation of 17 December 2007 on relevant products and service markets within the electronic communications sector susceptible to *ex ante* regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services.

ii) a market structure which does not tend towards effective competition within the relevant time horizon; and

iii) the insufficiency of competition law alone to adequately address the market failure(s) concerned.[671]

7.5 Therefore, along with our SMP assessments, we explain why we have concluded that the three criteria test is satisfied for the three retail markets and the market for regional trunk segments.

Summary of conclusions on our SMP assessments

7.6 Figure 7.1 below sets out our conclusions with regard to the existence, or not, of SMP in the relevant markets.[672]

Figure 7.1: Decisions regarding market power

Relevant market			SMP designation
Wholesale / Retail	Product scope	Geographic scope	
Wholesale	Low bandwidth TISBO (<=8Mbit/s)	UK excluding the Hull area	BT
		The Hull area	KCOM
	Medium bandwidth TISBO (>8Mbit/s, <=45Mbit/s)	UK excluding the Hull area & the WECLA	BT
		The Hull area	KCOM
		The WECLA	No SMP
	High bandwidth TISBO (>45Mbit/s, <=155Mbit/s)	UK excluding the Hull area & the WECLA	BT
		The Hull area	KCOM
		The WECLA	No SMP
	Very high bandwidth TISBO (622Mbit/s)	UK excluding the Hull area	No SMP
		The Hull area	KCOM
	Low bandwidth AISBO (<=1Gbit/s)	UK excluding the Hull area & the WECLA	BT
		The Hull area	KCOM
		The WECLA	BT

[671] See paragraph 2 of the EC's Recommendation.

[672] For clarity, we refer to three sets of relevant markets in this section: 'relevant wholesale symmetric broadband origination markets', 'relevant retail markets' and to 'relevant wholesale trunk segment markets'.

	MISBO	UK excluding the Hull area & the WECLA	BT
		The Hull area	No SMP
		The WECLA	No SMP
	National TI trunk segments	UK	No SMP
	Regional TI trunk segments	UK	BT
Retail	Very low bandwidth TI retail leased lines (<2Mbit/s)	UK excluding the Hull area	BT
	TI retail leased lines, >=2Mbit/s and <=8Mbit/s	UK excluding the Hull area	No SMP
	Low bandwidth TI retail leased lines (<=8Mbit/s)	The Hull area	KCOM
	Low bandwidth AI retail leased lines (<=1Gbit/s)	The Hull area	KCOM

Approach to SMP assessment

Definition of SMP

7.7 SMP is defined in the Act as being equivalent to the competition law concept of dominance. A CP shall be deemed to have SMP if, either individually or jointly with others, it enjoys a position equivalent to dominance, that is to say a position of economic strength affording it the power to behave to an appreciable extent independently of competitors, customers and ultimately consumers.[673]

Approach in the June BCMR Consultation

7.8 In the June BCMR Consultation we explained how our approach to SMP assessment involved taking due account of the Commission's SMP guidelines (SMP Guidelines)[674] and, where relevant, having regard to the equivalent guidelines published by Oftel[675] and to the ERG's revised working paper on SMP[676] (ERG SMP Paper).

7.9 We also explained how the SMP Guidelines:

- set out a non-exhaustive list of criteria for assessing SMP;

[673] See section 78 of the Act.

[674] Commission guidelines on market analysis and the assessment of significant market power under the Community regulatory framework for electronic communications networks and services, 2002/C 165/03.

[675] http://www.ofcom.org.uk/static/archive/oftel/publications/about_oftel/2002/smpg0802.htm

[676] Revised ERG Working Paper on the SMP concept for the new regulatory framework (September 2005)

- state that a dominant position may derive from a combination of these criteria, and that taken individually the criteria need not necessarily be determinative.[677]

7.10 Consequently, our proposed SMP findings were based on an overall assessment of the application of a number of these criteria to each relevant market. This overall assessment enabled us to undertake a thorough and forward-looking analysis of the economic characteristics of each relevant market, based on existing market conditions.[678]

Consultation responses

7.11 In the June BCMR Consultation, we asked the following:

Question 5: Do you agree with our approach to SMP assessment?

7.12 The majority of responses expressed general agreement with Ofcom's approach. The main exception was BT, who felt that Ofcom placed too much emphasis on market shares and not enough on other criteria. BT provided comments on each individual criterion and these are summarised in the next section under the relevant headings, followed by our response.

7.13 BT said that Ofcom's view of the relevant retail market was too narrow and created a systemic bias against BT in assessing market power. It argued Ofcom should instead take a more open-minded view of the wider market and user behaviours in its SMP assessment, in particular by giving greater emphasis to the analysis of competitive constraints, including services that sit outside or near the margins of our defined markets.[679]

7.14 Virgin broadly agreed with our approach but said that the market share assessment needs to be treated with a degree of caution due to mis-reporting of data in previous reviews. It argued that Ofcom should ensure it makes its SMP assessment in the round and that we should not rely solely on market shares (consistent with Commission guidelines).[680]

7.15 MBNL raised concerns about Ofcom's approach to mobile backhaul, arguing that we did not adequately address the weaker competitive constraints on BT Wholesale in the provision of leased line circuits used for national mobile backhaul. This is considered in paragraphs 7.155-7.157 below.

Ofcom's conclusion on its approach to SMP assessment

7.16 Having considered consultation responses, our approach to SMP assessment remains as set out in the June BCMR Consultation. We have taken due account of the SMP Guidelines and, where relevant, we have had regard to the equivalent guidelines published by Oftel and to the ERG SMP Paper.

7.17 By way of introductory background, our market analysis has shown that within the UK, BT continues to have a ubiquitous fixed network outside the Hull area. Whilst

[677] Paragraph 79.

[678] Consistent with the SMP Guidelines (see paragraphs 75 and 78).

[679] See for example part 1 of BT's response, Section 3, Section 4.1 and Section 4.4.

http://stakeholders.ofcom.org.uk/consultations/business-connectivity-mr/?showResponses=true

[680] Virgin response, page 21

other CPs have built infrastructure in certain geographic areas, none has the scale of BT. The second largest fixed network operator in the country is Virgin, which is currently connected to approximately one half of residential households and, according to our network reach analysis, can compete to supply some [✂]% of large business sites in the UK using its own network. CWW has the third largest network and, even though it has generally targeted business customers, it is able to supply about [✂]% of large UK business sites. Furthermore, there has been very limited investment in infrastructure roll-out during the past three years, with the majority focused on small extensions at a localised level.

7.18 BT therefore remains by far the largest wholesale supplier of leased lines in the UK. For illustrative purposes, if we consider all wholesale circuits, we estimate that BT has a share of 82% of volumes. Even in areas where there is competing infrastructure, BT will retain a number of competitive advantages not shared by other CPs because it usually has an existing physical connection to sites (or is closer than other CPs) and it benefits from economies of scale and scope and switching costs which reduce customers' willingness to change to a rival. The cost of extending a network is particularly relevant here, as civil engineering accounts for a significant proportion of these costs. BT's advantage is further entrenched in markets with declining volumes, as other CPs are unlikely to consider the financial incentive sufficient to warrant investing in such markets.

7.19 Nevertheless, although BT is clearly the predominant supplier of leased lines in aggregate, we recognise that for some products and in certain geographic areas, it faces more competition than the overarching picture illustrated above suggests. Our analysis has shown that these tend to be higher value products – where BT's cost advantage in respect of physical access links represents a smaller portion of the overall cost of the product – and/or supply in regions where past construction of rival infrastructure has been particularly expansive.

7.20 At a high level then, the purpose of our SMP assessment is to measure and quantify the extent of competition in the provision of leased line products in a number of geographic areas and to determine whether any CP, in particular BT, enjoys a position equivalent to dominance, that is to say a position of economic strength affording it the power to behave to an appreciable extent independently of competitors, customers and ultimately consumers.[681]

7.21 However, our SMP assessment is not an abstract exercise. It is the second step in our market review where, having first identified and defined the relevant markets, we then assess whether competition in any of those markets is effective – an assessment which, as just noted above, involves assessing whether in any of the markets a CP, in particular BT, has SMP.[682]

7.22 In the previous Sections we identified and defined a set of relevant markets (as listed in Figure 7.1 above). Consistent with the SMP Guidelines, our SMP assessment is

[681] See, for example, paragraph 70 of the SMP Guidelines.

[682] See, in this respect, paragraph 19 of the SMP Guidelines which states: "In respect of each of [the] relevant markets, NRAs will assess whether the competition is effective. A finding of effective competition exists on a relevant market is equivalent to a finding that no [CP] enjoys a single or joint dominant position on that market. Therefore, for the purposes of applying the new regulatory framework, effective competition means that there is no [CP] in the relevant market which holds alone or together with other [CPs] a single or collective dominant position." We would add that, in accordance with the Framework Directive, our subsequent conclusion that competition is ineffective in any of the relevant markets, as per Recital 27 of the Framework Directive, is based not only on a finding of SMP, but also on our conclusion that national and Community competition law remedies are not sufficient to address the competition problems we have identified in the relevant market.

carried out in each of these markets. Before setting out these SMP assessments, it is necessary to highlight a number of important, and interrelated, points, all of which have influenced our approach to the SMP assessment.

Assessing competition in the relevant markets

7.23 First, whilst already noted in the previous Sections, it is necessary to emphasise that competitive conditions in any one of the markets are not perfectly homogeneous and that variations in competitive conditions exist.[683] Equally, though, our duty to carry out an SMP assessment obliges us to assess SMP at 'the market level' – i.e. not at a more granular level, for example in one or more geographic areas within the relevant market. To do otherwise would be inconsistent both with our duties under the Act and with the terms of the Framework Directive.[684] However, we stress that, having defined the relevant markets, we do not then ignore variations in competitive conditions within any of those markets – variations in competitive conditions are also relevant to, and taken into account in, the third step in our market review which is an assessment of the appropriate remedies.[685]

7.24 Secondly, as noted in the SMP Guidelines, "a finding of [SMP] does not preclude some competition in the market. It only enables the [CP] that enjoys such a position, if not to determine, at least to have an appreciable effect on the conditions under which that competition will develop, and in any case to act in disregard of any such competitive constraint so long as such conduct does not operate to its detriment".[686] This means a finding of SMP is not predicated on the absence of competition but instead is based on an overall assessment, the conclusion of which is that the operator – in particular BT – enjoys a position of economic strength affording it the power, amongst other things, to behave to an appreciable extent over the course of the review period independently of the competition in the relevant market.

7.25 Thirdly, if a CP has already been subject to regulatory obligations[687] – as is the case for BT – competition may have been restored in the relevant market as a result precisely of the obligations thus imposed. However, this does not mean that that CP is no longer in a dominant position and that it should no longer continue being designated as having SMP.[688] As a result, our approach to SMP assessment includes the application of the modified Greenfield approach – i.e. the presumption that:

- no SMP regulation exits in the relevant market; and
- either SMP regulation applies in any related upstream market(s) where an SMP finding has been made or, if not, that competition in the related upstream market(s) is effective.[689]

[683] See also, in this respect, paragraph 56 of the SMP Guidelines.

[684] See, for example, section 78 of the Act and Articles 14 to 16 of the Framework Directive.

[685] See, in this respect, the EC's Explanatory Note, Section 2.4, and the ERG Common Position, Section 5.

[686] See paragraph 72.

[687] i.e. remedies in the form of SMP conditions.

[688] See, in this respect, footnote 74 to the SMP Guidelines.

[689] See, in this respect, the EC's Explanatory Note, Section 2.5.

We apply a number of criteria to assess whether SMP exists in the relevant markets

7.26 What it is important – and what we have ensured our approach has allowed us to do – is that our approach to SMP assessment allows us to properly take into account all relevant constraints on competition in the relevant market, which can be both inside, and outside of, that market.[690]

7.27 In order to do this, and as set out in more detail further below in this Section, we apply cumulatively a number of criteria in our SMP assessment. One such criterion – indeed the criterion with which we start our SMP assessment for each market – is an assessment, or measurement, of market shares.[691]

7.28 Market shares are an important criterion. We disagree with BT that our approach to SMP assessment has placed too much emphasis on this criterion. The weight we have accorded market shares in reaching our conclusions on SMP reflects the weight accorded them in the SMP Guidelines. In this respect, we regard the following from the SMP Guidelines of particular relevance:

- "the existence of high market shares...means that the [CP] concerned might be in a dominant position"[692];
- "[m]arket shares are often used as a proxy for market power"[693];
- "very large market shares – in excess of 50% – are in themselves, save in exceptional circumstances, evidence of a dominant position"[694];
- "single dominance concerns normally arise in the case of [CPs] with market shares of over 40%"[695];
- "[a CP] with a large market share may be presumed to have SMP, that is, to be in a dominant position, if its market share has remained stable over time[696]

7.29 We recognise, though, that despite our extensive efforts to measure market shares accurately there will always remain a degree of uncertainty regarding any particular precise percentage share estimate we have arrived at. We elaborate on this further below.

7.30 Importantly, and consistent with our approach set out in the June BCMR Consultation, we also recognise that the existence of a dominant position cannot be established on the sole basis of large market shares.[697] Consequently, we apply a

[690] E.g. potential entry (see, in this respect, paragraph 38 of the SMP Guidelines).

[691] A full explanation as to how we have calculated market shares is set out in Annex 5

[692] See paragraph 78.

[693] See paragraph 75.

[694] See paragraph 75.

[695] See paragraph 75.

[696] See paragraph 75.

[697] For example, we note the SMP Guidelines expressly state "[i]t is important to stress that the existence of a dominant position cannot be established on the sole basis of large market shares" (see paragraph 78). See also paragraph 80 where the SMP Guidelines state that "[a] finding of dominance depends on an assessment of ease of market entry. In fact, the absence of barriers to entry deters, in principle, independent anti-competitive behaviour by [a CP] with a significant market share".

number of criteria to assess whether SMP exists in the relevant markets noting that, individually, each criterion is not necessarily determinative.[698] They are the following:

- market shares and market share trends;
- profitability;
- control of infrastructure not easily duplicated;
- economies of scale and scope;
- barriers to entry and expansion;
- countervailing buyer power;
- prospects for competition; and
- impact of vertical integration.[699]

We also assess whether the relevant market is prospectively competitive

7.31 In applying cumulatively all the relevant criteria, we also reflect the requirement under the terms of Article 16 of the Framework Directive for our market analysis to involve a forward-looking, structural evaluation of the relevant market, based on existing market conditions. We need to determine whether the market is prospectively competitive, and thus whether any lack of effective competition is durable, by taking into account expected or foreseeable market developments over the course of a reasonable period.[700]

We exercise our regulatory judgment in interpreting all the evidence in the round

7.32 We noted above that there will always remain a degree of uncertainty regarding any particular precise percentage share estimate we have arrived at. We set out further below in this Section what we have done, taking into account BT's response to the June BCMR Consultation, to ensure our market share estimates are as accurate as possible. This includes conducting a range of sensitivity tests.[701]

7.33 However, given that we are required to determine whether a CP – in particular BT – will enjoy a dominant position in any of the relevant markets over the course of the next three years, it is important to bear in mind that a degree of uncertainty may be present in the SMP assessment as a whole. This is expressly recognised, and provided for, in the SMP Guidelines from which we note, in particular, the following:

> "the application of the new definition of SMP, *ex ante*, calls for certain methodological adjustments to be made regarding the way market power is

[698] This is consistent with the SMP Guidelines (see paragraph 79). It is also consistent with our approach to SMP assessment in the June BCMR Consultation. We set out the criteria we apply again, and how we apply them, for our SMP assessments in the relevant wholesale and retail markets further below in this Section.

[699] This last criterion is relevant to our assessment of SMP in the relevant retail markets.

[700] See Recital 27 of the Framework Directive and paragraph 20 of the SMP Guidelines. The forward-looking period of this review is three years.

[701] We also set out our response to BT's detailed comments on our market share analysis and estimates in the June BCMR Consultation, at Annex 5.

> assessed. In particular, when assessing market power *ex ante* whether one or more [CPs] are in a dominant position in the relevant market, NRAs[702] are, in principle, relying on different sets of assumptions and expectations than those relied upon by a competition authority applying [Article 102 TFEU[703]], *ex post*, within a context of an alleged committed abuse. Often, the lack of evidence or of records of past behaviour or conduct will mean that the market analysis will have to be based mainly on a prospective assessment. The accuracy of the market analysis carried out by NRAs will thus be conditioned by information and data existing at the time of the adoption of the relevant decision.
>
> The fact that an NRA's initial market predictions do not finally materialise in a given case does not necessarily mean that its decision at the time of its adoption was inconsistent with the [Framework] Directive. In applying *ex ante* the concept of dominance, NRAs must be accorded discretionary powers correlative to the complex character of the economic, factual and legal situations that will need to be assessed".[704]

7.34 Accordingly, our ability to exercise our discretionary powers – or what we refer to as our regulatory judgment – is a necessary constituent of our approach to SMP assessment and, consistent with the SMP Guidelines, is exercised:

- appropriately for the complex character of the economic[705], factual and legal situations that we have had to assess; and
- in accordance with Articles 6[706] and 7[707] of the Framework Directive and having considered consultation responses.[708]

7.35 One such situation is our view on the prospects for competition in the relevant markets. To assist us in reaching a view, and consistent with the SMP Guidelines,[709] we take past data into account in our analysis when such data are relevant to the developments in the relevant market over the course of the review period of three years.[710]

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[702] National regulatory authorities.

[703] Article 102 of the Treaty on the functioning of the European Union, formerly Article 82 of the Treaty Establishing the European Community.

[704] See paragraphs 70 and 71 of the SMP Guidelines. Indeed, the SMP Guidelines expressly recognise the ability of NRAs to exercise their discretionary powers throughout the market review process as a whole. In this respect see paragraph 20 where it states: "In the exercise of their regulatory tasks under Article 15 [Procedure for the identification and definition of markets] and 16 [Market analysis procedure] of the Framework Directive, NRAs enjoy discretionary powers which reflect the complexity of all the relevant factors which must be assessed (economic, factual and legal) when identifying the relevant market and determining the existence of [CPs] with SMP."

[705] For example, market share measurements.

[706] Consultation and transparency mechanism.

[707] Consolidating the internal market for electronic communications.

[708] See, in this respect, the last sentence of paragraph 22 of the SMP Guidelines.

[709] See paragraph 20.

[710] In particular whether our market analysis has shown that the relevant market has declined/has grown and whether our market analysis indicates that the trend can be expected to continue. Where the relevant market has grown and where we expect this growth to continue, we have (where available) interpreted past data showing market share trends as indicative of how market shares might develop as the relevant market grows over the course of the next three years.

7.36 In summary, it is by the cumulative application of a number of criteria, as referred to above, that we have been able to undertake a thorough and overall forward looking analysis of the economic characteristics of each relevant market, based on existing market conditions, before coming to conclusion as to the existence of SMP.

7.37 We consider, therefore, that our approach to SMP assessment is consistent with the approach set out in the SMP Guidelines.

7.38 We now turn to our SMP assessment in the relevant wholesale markets.

SMP assessment in the relevant wholesale markets

7.39 Consistent with our SMP assessment in the June BCMR Consultation, in order to undertake a thorough and overall forward-looking analysis of the economic characteristics of each relevant wholesale symmetric broadband origination market, based on existing market conditions, we have used the following criteria:

- market shares and market share trends;
- profitability;[711]
- control of infrastructure not easily duplicated;
- economies of scale and scope;
- barriers to entry and expansion;
- countervailing buyer power; and
- prospects for competition.

7.40 We conduct SMP assessments of 16 distinct wholesale symmetric broadband origination markets. Some of the most important characteristics affecting supply and demand are common to all of these markets.[712] As a result of these shared economic characteristics, the analysis of the SMP criteria is often the same – or sufficiently similar – between markets.

7.41 In the June BCMR Consultation we began with a discussion of how each of the SMP criteria applied in general, albeit to varying degrees, to all of the relevant wholesale markets. Then, where relevant, in order to avoid unnecessary repetition we referred back to this general assessment when carrying out each market specific SMP assessment.

7.42 We adopt the same approach in this decision document. Consequently, for each SMP criterion:

[711] Though as discussed below, we do not attach as much weight to the profitability criterion as others.

[712] For example, on the supply-side, entry into a wholesale TISBO, AISBO or wholesale trunk segment market requires significant investment in laying duct and fibre to customer premises. On the demand-side, retail leased line customers require an end to end connection between two or more sites in specific locations. These features mean that economic characteristics such as the importance of sunk costs and the need for an extensive network in order to connect customer sites in different locations are relevant to all the markets considered in this review.

- we set out consultation responses made in relation to our general assessment in the June BCMR Consultation of that SMP criterion, including, where relevant, reference to our general assessment of the particular criterion; and

- we then set out our general assessment for the purposes of this decision document, having taken those responses into account.

7.43 Again, as per the June BCMR Consultation, we refer back to this general SMP assessment in many of the market specific SMP assessments in order to avoid unnecessary repetition.

Market shares and market share trends

Consultation responses

7.44 A number of stakeholders expressed concerns about Ofcom's use of market shares, especially BT. In its response to the June BCMR Consultation, BT made two main arguments:

i) Ofcom's SMP assessment gives too much weight to market shares; and

ii) the market share estimates are not reliable.[713]

7.45 With regards to the latter, BT expressed a number of concerns about Ofcom's choice of metric, the circuit count methodology and Ofcom's interpretation of CP data. These, along with our response, are set out in more detail in Annex 5.

7.46 Other stakeholders also commented on Ofcom's market share estimates. A number of CPs expressed concern that BT had compiled its circuit data using a new methodology which significantly altered BT's market share, whilst other CPs did not alter their approach to compiling their information.[714] They suggested that this has the potential to underestimate BT's market share, particularly in the WECLA.[715]

7.47 Exponential-e asked Ofcom to verify that OCP circuits provisioned through BT Wholesale – and hence supplied using Openreach access products – are counted as BT market share.[716]

7.48 EE/MBNL expressed surprise at the estimates of BT's market share for various retail and wholesale TISBO services, which it considered extremely low in some cases, especially in the WECLA. It suggested Ofcom undertake a series of cross-checks using alternative methods to determine if there is a fundamental bias in the data that understates BT's share.[717]

7.49 UKCTA said that the estimates of BT's market shares in the WECLA conflicted with the experience of its members, many of whom do not believe that BT's market shares have reduced since the last market review. As discussed above, it is also

[713] See Part 1 of BT's response, in particular Sections 4.4 and 4.5.

[714] This is a comment on the fact that before the June BCMR Consultation, BT submitted a revised circuit inventory with different end-classifications. In their first submission, they identified network-ends based only on their (BT's) network sites. In their revised data, they included OCP network sites in their classification.

[715] See for example, Exponential-e response, page 6, UKCTA response, pages 15-16.

[716] Exponential-e response, page 3.

[717] EE/MBNL response, page 23.

concerned that BT's revised methodology for counting circuits bears no resemblance to the approach adopted by UKCTA members and that this has led to Ofcom underestimating BT's market share in the WECLA. Lastly, it has concerns over the reliability and comparability of self-supply data. It therefore requested the underlying data be made available or, in the absence of this, greater transparency of the methodology be provided.[718]

Ofcom's considerations of consultation responses

Weight attached to, and interpretation of, market shares

7.50 As explained above by reference to the SMP Guidelines, market shares are an important criterion to take into account when assessing SMP. Market shares and market share trends provide an indication of how competitive a market is now and has been in the past. If a CP has a persistently large market share it is frequently a sign that competition is not effective, with the implication that prices may be above competitive levels, resulting in harm to consumers. Market shares are also relevant to an assessment of prospective competition because, if market shares have been stable over time, this may indicate that impediments to competition are persistent.[719]

7.51 We recognise that competitive conditions can change over time and, as a result, that current market shares are not always a reliable indicator of future competitive conditions. Thus, a market share trend which shows that a CP has a high but declining share may suggest that competition might become effective within the time period over which the SMP assessment is being conducted.[720] Equally though, as stated in the SMP Guidelines, "the fact that an [operator] with a significant position on the market is gradually losing market share may well indicate that the market is becoming more competitive, but it does not preclude a finding of significant market power".[721]

7.52 However, contrary to the views expressed by BT, we do not rely solely on a large market share to establish SMP in any of our assessments. Market shares and market shares trends are just one criterion we apply in our SMP assessment and the weight we attach to this criterion is determined by the cumulative application of the other SMP criteria, for example, barriers to entry and expansion[722] and buyer power. In general, in a growing (declining) market CPs are more (less) willing to invest. As a result, barriers to entry and expansion tend to be less of an impediment to competition in rapidly growing markets.

7.53 As discussed below, in many of the wholesale markets BT (or KCOM in Hull) has important competitive advantages arising from its first mover advantage and its control of the only ubiquitous network in the UK. As a result, barriers to entry are generally high and buyer power is not pervasive. Where our SMP assessment in a

[718] UKCTA response, page 16.

[719] In this respect we regard market share trends as an example of past data that is relevant to the developments in the relevant markets over the course of the review period and is therefore taken into account in our SMP assessment. This is consistent with the SMP Guidelines (see paragraph 20).

[720] The forward-looking time period over which this market review has been conducted is three years.

[721] See paragraph 75.

[722] As noted in the SMP Guidelines (see paragraph 80). We consider the weight to be attached to market shares and market share trends can only be determined once a thorough and overall analysis of the economic characteristics of the relevant market has been undertaken – and this can only be done by the cumulative application of all of the relevant SMP criteria (see, in this respect, paragraph 78 of the SMP Guidelines).

relevant market has revealed this to be the case, this would lead us to place weight on a large market share as an important criterion, together with the other criteria, supporting the finding of SMP.

7.54 We also recognise that market shares across an aggregated market can sometimes disguise variation within segments of that market. Market shares, by their very definition, do not purport to represent shares of supply to particular customers or particular geographic segments within the market. Consequently, and as recognised by the ERG Common Position,[723] within a national market it could still be the case that there exist geographic differences in competitive conditions which do not vary so much that it undermines the finding of a national market but which may lead to differences in identified competition problems and hence differences in appropriate remedies. We assess the existence, and impact, of geographic differences in competitive conditions in any of the relevant markets in our assessment of the appropriate remedies.[724]

7.55 Another relevant consideration is the impact of BT's pricing decisions on its market share. Generally, if a firm sets prices above competitive levels we would expect the firm to lose substantial sales if the market is competitive, but fewer sales (such that the price increase is profitable) if the firm has market power.[725] The consequence is that we would expect firms in a competitive market to price competitively and firms with SMP to set high prices. However, there are three additional considerations:

- first, it is conceivable that a firm with SMP will find it profitable to sustain a price increase *even if it does lose substantial sales*.[726] Accordingly, where we observe a combination of very high prices and sizeable retained sales, this could indicate the presence of SMP;

- secondly, it may be that BT tends to set prices uniformly to a greater extent than it is required to by regulation, which prevents BT from reducing prices to selected customers.[727] This may result in BT losing sales in respect of some products but only because of the particular pricing structure it has adopted for reasons that are exogenous to conditions in the relevant market.[728] However, as noted above, in applying the modified Greenfield approach we would presume the absence of any existing SMP regulation. This means any constraint on BT arising from such SMP regulation to realise its incentive to engage in targeted pricing would be disregarded for the purposes of our SMP assessment;

[723] See Section 5.

[724] See, for example, our assessment of data centres in Annex 6.

[725] See, in this respect, paragraph 73 of the SMP Guidelines.

[726] For example, if the firm has "captive" customers with a high willingness to pay, the firm may find it more profitable to raise prices substantially and retain the captive customers than the alternative of pricing competitively and keeping a larger share of volumes. See, also, the ERG Common Position, Section 4.1, Pricing and price differences.

[727] BT is able to offer, for example, published geographic discounts in locations where it faces competition. However, it may not do this if, for example, it is concerned about potential accusations of undue discrimination.

[728] BT has large common costs to recover. In locations where BT does not face competition, it may well be efficient for BT to set prices in relation to differences in customers' willingness to pay, subject to an overall regulatory price constraint. However, in areas where BT faces some potential competition, this pricing structure may yield opportunities for rivals to undercut BT's prices to higher value customers. This will result in BT losing sales, but only because BT's prices for that group of customers have been set well in excess of incremental costs.

- thirdly[729], if high[730] pricing is observed that is not as a result of obligations imposed by existing SMP regulation – in particular where existing SMP regulation would actually allow for lower pricing – then the high pricing might be indicative of a pre-dominantly 'non-competitive market' even where BT has apparently ceded parts of the market to rivals by making the decision to maintain the level of its prices.[731]

7.56 These considerations therefore highlight the need, as already noted above, to apply criteria other than just market shares and market share trends in order to undertake a thorough and overall analysis of the economic characteristics of the relevant market before coming to a conclusion on the existence of SMP.

Our choice of metric for market shares remains volume

7.57 As the SMP Guidelines make clear, the choice of metric for measuring market shares will depend on the characteristics of the relevant markets, and it is for us, as the NRA[732] in the UK, to decide which metric is the most appropriate.[733] Our approach to the measurement of market shares in relevant markets is set out in detail in Annex 5. In summary, the metric we have used is the volume of leased line termination points.[734] We did seek to measure market shares based on leased lines revenues but this was not possible because many CPs were unable to present their revenue data at the required level of granularity. Consequently, and in response to the observation made in the SMP Guidelines,[735] this measurement exercise was more complicated to carry out than measuring market shares using the volume of leased line termination points.[736]

[729] An important distinction between this and the second consideration is that only in the second consideration would existing SMP regulation be acting as a constraint on BT's pricing policy. In the second consideration, BT's pricing policy would be determined by reasons that are exogenous to the competitive conditions in the relevant market. Conversely, in the third consideration, BT's pricing policy would be determined precisely by reference to the competitive conditions in the relevant market.

[730] i.e. higher than the price charged by BT's competitors.

[731] See, in this respect, the ERG Common Position, Section 4.1, Pricing and price differences, where it states: "When setting a national uniform price, a profit-maximizing incumbent operator faces a trade-off between setting the monopoly price in areas where it is the only operator and setting a lower (competitive) price in areas where it is competing with other operators. The result if likely to be a "compromise" between these two prices, where the price is lower the larger the competitive area is...If the competitive area is sufficiently large, the price of the incumbent operator as well as the differences in prices between the incumbent operator and the competitors will be low (close to the competitive level)...However, in cases where the competitive area is smaller, the monopoly price has more weight in the incumbent operator's price setting decision and there may be significant differences between the price of the incumbent and the price of alternative operators. This will likely lead to a situation where the incumbent operator has a low market share in the competitive area. Therefore, there may be significant differences in prices from a consumer perspective (in the "non-competitive area they can only buy from the "expensive" incumbent while a large share will buy from "cheaper" alternative operators in the "competitive" area)."

[732] National regulatory authority.

[733] See paragraph 77.

[734] This is recognised in the SMP Guidelines as one of the possible criteria for measuring a CP's relative strength on leased lines markets (see paragraph 77). Our approach to the measurement of market shares in relevant markets is set out in detail in Annex 5.

[735] The SMP Guidelines observe, at paragraph 77, that "leased lines revenues *may* be more transparent and less complicated to measure" (emphasis added).

[736] We use termination points rather than whole circuits because the two ends of a circuit are not always supplied by the same CP.

7.58 In our view, using volume of leased line termination points to measure market share is appropriate. Although the SMP Guidelines state that "the mere number of leased line termination points does not take into account the different types of leased lines that are available on the market"[737], this is of limited relevance to our market share measurements because the relevant wholesale markets include leased lines of only one interface type and a limited range of bandwidths. The main exceptions to this are the low bandwidth AISBO and TI trunk markets, where the range of bandwidths included are particularly large. In these cases, we calculate an alternative estimate of market shares that weights individual circuits by bandwidth.

7.59 Furthermore, we have assessed the development of market shares over time. Consequently, we consider our assessment of market shares and market share trends using volume of leased line termination points enables us to paint an accurate picture of the position and economic significance of CPs in the relevant wholesale markets.

Accuracy of market shares

7.60 We set out our response to BT's detailed comments on the market share analysis and estimates in Annex 5. In summary, where warranted we have adjusted the calculations having taken into account BT's comments. In particular, we have excluded imputed TAN ends from our service share estimates. For each leased line circuit, we impute a connection to a Tier 1 or Access Serving Node in order to analyse the trunk requirement for the circuit. This connection takes place at the TAN end of the circuit. In the June BCMR Consultation, we included these imputed ends in all of our service shares in order to be consistent with our approach in the 2007/8 Review. However, this approach introduced a bias against BT within the WECLA because some of its sales just outside this area were assumed to connect to a Tier 1 node or ASN within the WECLA. Whilst the impact of this bias is small, we have removed imputed TAN ends from our calculations. We still calculate the TAN ends, but only to allow the estimation of service shares for trunk markets.

7.61 Our revised market share estimates also reflect changes that were made following an internal and external review of the data and methodology. This review resulted in some changes to circuit classification (for example, as TI or AI) and the inclusion of some additional circuits (e.g. a number of circuits supplied by COLT in the WECLA). We have also changed the way we classify circuit-ends as 'customer' or 'network' ends, which follows up one of the work streams identified in the June BCMR Consultation as requiring further development.[738] These and other issues are discussed in more detail in Annex 5. In summary, as noted above, we recognise that it is not possible to calculate service shares for each market with exact precision. This is because not all CPs are able to provide full descriptions of all their circuits, which results in some entries missing information, for example bandwidth and end-point postcodes. This necessitates the application of uplift factors to ensure that the total number of circuits is correctly recorded and reflected in our analysis.

7.62 We also recognise that our market share figures are estimates, and accordingly we have conducted a range of sensitivity tests as part of our assessment. For each SMP assessment, we therefore present several market share estimates, in addition to our 'base case' estimate. Our base case represents our preferred estimate and it rests on the following assumptions:

[737] See paragraph 77.

[738] See paragraph 7.218 in the June BCMR Consultation.

- Only customer circuit-ends are used to calculate market shares. This ensures that the results are not biased due to different network topologies but it also excludes a number of backhaul circuits.

- 'Network-ends' are identified from the details of network sites provided by CPs (including MNO switching sites). In aggregate, this list of sites corresponds to more than 7,000 postcodes. Any circuit-end that has the same postcode as one of these network sites is therefore considered a network-end. As discussed above, this approach to distinguishing network and customer ends addresses the concerns, stated in the June BCMR Consultation, that our previous methodology required further development. Previously we had identified network-ends based on the classification by CPs for each individual circuit. However, many of these entries were blank, in which case we generally assumed they were customer-ends.[739] CPs had different levels of ability to identify the network sites of other operators, and this difference resulted in a bias in the service share estimates.[740] We therefore consider this revised approach to be more robust.

- We apply an uplift for missing geographic and bandwidth data, which means that for the sub-set of circuits with no information on postcodes or bandwidth we assume that the ratios calculated for the circuits with full information apply to those with missing information.[741]

- We do not count imputed TAN ends. Each circuit-end is linked to the nearest Tier 1 node or OHP in order to carry out analysis for the trunk market but, unlike in the June BCMR Consultation, we do not include these imputed ends in our wholesale service shares because they introduce a bias.

- We do not apply uplifts to account for potentially missing data from OCPs (as opposed to incomplete data, where we do apply an uplift). It is possible that we are missing a small proportion of circuits, either because we have not issued a s135 request to small niche providers[742] or because the CPs that have responded to our data request may not have been able to disclose all their circuits. In the base case, we do not apply an uplift to take account of this, but instead take it into account through the use of sensitivities.

- We exclude broadcast access and CCTV circuits where they have been identified, as they are not in the market.

- ATM, Frame Relay and X25 circuits are included in the TISBO market share estimates. This is explained in further detail in the SMP assessment for the TISBO markets (see paragraph 7.253).

[739] The main exception to this rule was where the circuit was used as a VPN or internet access tail, in which case one end was assumed to be a network-end.

[740] In theory, one approach to solving this problem would have been to pro-rate the blank entries based on the entries for which we had full information. However, this would not always have been possible or practical due to the number of blank entries where both ends of a circuit are not classified, as there is no robust way to allocate them under the customer/network definition.

[741] So, for example, if one CP provides full information on 100 circuits in addition to 10 circuits with missing postcode data, we calculate the proportion of the 100 circuits that are in the WECLA (e.g. 20) and assume that the same proportion applies to the missing circuits (e.g. 2).

[742] As part of our data gathering exercise, we have researched all CP that have Code Powers in addition to a number of CPs listed in BT's consultation response. For those CPs that we considered may supply a material number of circuits, we issued a s135 request. We did not request data from the other CPs as it would have been disproportionate in terms of the impact on our analysis.

7.63 In order to test the sensitivity of the results, we compare our estimates with scenarios that adjust some of the above assumptions. These are as follows:

- Scenario 1: No bandwidth or geographic uplift is applied to account for incomplete or missing data from stakeholder submissions. This means that we only calculate market shares using data for which we have complete information (but at the expense of excluding some circuits).

- Scenario 2: Network-ends are identified based on CP classification for each individual circuit. This is the classification we used in the June Consultation, which means that any blank entries are assumed to be customer-ends.[743]

- Scenario 3: An upper-bound estimate of the number of network-ends based on CPs' own classifications of ends in the circuit data. This means that if a circuit in a specific postcode is classified as a network-end at least once by any CP, then all other circuits in that postcode are considered network-ends. We consider the list of sites provided by CPs (used in the base case) to be the most robust, but it is possible that a small number have been missed out. This approach ensures that such a potential error is removed and that all CPs are treated alike[744], though it is likely to understate the number of customer-ends.

- Scenario 4: We apply an uplift for missing OCP circuits. As discussed in Annex 5, we are aware that we may be missing data from [✂], [✂] and some other OCPs. We therefore apply an uplift of [✂]% for [✂], [✂]% for [✂] and [✂]% for the remaining OCPs. We consider these to be extreme assumptions regarding the proportion of missing circuits because having spoken with [✂] and [✂] about the data they have submitted, we consider that the proportion of missing circuits are no more than [✂]% for [✂] and [✂]% for [✂].

- Scenario 5: We include both circuit and network ends in the calculation, which accounts for all sales and purchases for which we have been given information. This includes leased lines that are used for backhaul, but at the expense of potential biases introduced by network topology. This approach is potentially most appropriate in the MISBO markets, where the distinction between a 'network' and 'customer' site is less clear (for example data centres).

7.64 We have also calculated market shares for low bandwidth AISBO to give more weight to higher-bandwidth circuits. The rationale for this sensitivity test is that bandwidth is a proxy for revenue and so we can use this verify the volume-based market shares.[745] We consider this to be more appropriate in low bandwidth AISBO than other markets because the range of bandwidths is much greater. We use two bandwidth weights, the first are based on BT's average revenues in Figure 7.3 below and the second are BT's annual rental for EAD circuits. Annex 5 also presents some additional scenarios around the classification of ends and the uplift of potential missing data.

7.65 We consider that the above sensitivity tests should reassure stakeholders who asked Ofcom to carry out cross-checks of the market shares analysis. In relation to the concern of UKCTA members about BT's revised methodology for counting circuits,

[743] As in the June BCMR Consultation, the exception to this rule is where the circuit is clearly used as a VPN or internet access tail.

[744] i.e. although there may be errors in the circuit-end allocations, the allocations will be unbiased.

[745] This proposal was suggested by BT in its consultation response.

this is mainly relevant to the classification of circuit-ends as 'network' or 'customer'. BT's revised submission was based on a more accurate classification of circuit-ends. Ofcom carried out a number of checks and follow-up work with OCPs regarding their data but we did not obtain revised submissions because they were not able to identify the network sites of their competitors. As discussed above, we have produced several estimates for market shares to account for this missing information.

7.66 In relation to Exponential-e's comment about OCP circuits provisioned through BT Wholesale (hence supplied using Openreach access products), we confirm that they are included in BT's market share.

Profitability

Consultation responses

7.67 BT was the only stakeholder to comment specifically on Ofcom's use of profitability in the SMP assessment. It argued that the criterion was used with a significant degree of asymmetry, with high profitability regarded as supportive of BT having market power and low profitability disregarded as an indicator of the absence of market power.

7.68 BT also expressed a number of reservations on the use of adjusted ROCE values, particularly for TI services that are coming to the end of their lifecycle. It argued that this could result in questionable figures, particularly where the assets are significantly written off because these attract lower overhead costs from the cost attribution methodology. More generally, BT said that the return on capital should be over the asset lifecycle relative to what the anticipated return would be at the time of investment, whereas it considered Ofcom to have compared outturn numbers with the currently regulated cost of capital, which has fallen consistently since BT was privatised and regulated.[746]

Ofcom's considerations of consultation responses

7.69 The SMP Guidelines refer to the importance, when assessing market power, of considering the power of CPs to profitably raise prices without incurring a significant loss of sales or revenue.[747] If a CP has SMP then it will be earn economic rents by raising prices above the competitive level, which may emerge as 'excess' profits.[748] Firms without SMP are constrained by the market, and therefore cannot sustain profits which are substantially above the cost of capital. Persistently high profits – i.e. profits substantially above the cost of capital – can therefore be an indicator of market power

7.70 The reverse is not true: consistently low profits – i.e. profits at or below the cost of capital – cannot be taken as evidence of an absence of market power. It may simply be evidence of inefficiency. In addition, price regulation exists in many of the wholesale markets considered, and therefore low profits may simply be the result of regulation rather than a reflection of the underlying competitive conditions. We therefore consider that using profitability asymmetrically is appropriate and is consistent with the SMP guidelines.

[746] See Part 1 of BT's response, in particular Section 4.4

[747] See paragraph 73.

[748] A firm with SMP may take the benefits in other ways – e.g. by sustaining excessive costs.

We use ROCE as a profitability measure

7.71 Return on capital employed (ROCE), benchmarked against the weighted average cost of capital (WACC) is often used to assess profitability. This is the approach Ofcom used in the June BCMR Consultation and our primary source of data was BT's regulatory financial statements. We follow the same approach in this Statement.

7.72 Our primary source of profitability data is BT's regulatory financial statements. These are Current Cost Accounts (CCA) prepared under the Financial Capital Maintenance (FCM) convention. Under the FCM convention, changes in asset values over time are recognised as 'holding gains' if the asset price increases, or 'holding losses', if the asset price falls. Holding gains and losses are treated in the accounts as a cost (a negative cost in the case of holding gains). We would expect holding gains and losses to be reflected in average prices over the lifetime of an asset, because this is necessary for overall cost recovery. However, CCA asset values and consequently the associated holding gains and losses can fluctuate from one year to the next due to changes in the market values of assets. These fluctuations can be sizeable.[749] The presence of holding gains and losses in annual profit figures can then obscure the underlying level of profitability and its trend from year to year.

7.73 Due to this volatility in CCA measures of profitability, we used two sets of data[750] when considering profitability:

i) CCA figures from BT's regulatory financial statements, in order to reflect BT's reported ROCE; and

ii) adjusted figures based on the data from BT's regulatory accounts, but excluding all holding gains and losses and other one-off adjustments which result from changes in accounting methodology. This provides a more useful indicator of the trend in profitability which is unaffected by the volatility caused by holding gains and losses.

7.74 We noted in the June BCMR Consultation, that there are limitations with the accounting data, in particular the high proportion of common costs in many of the markets considered in this review. This means that the accounting measures of profitability may reflect the way BT chooses to allocate common costs. To some degree, these choices are a matter of judgement. Equally, price regulation in many of the wholesale markets under review means that profitability may also reflect the design of the regulatory regime. In addition, the data often relate to products which do not match our market definitions precisely, and therefore may not represent a close approximation of the economic profits we wish to understand.

7.75 We also accept BT's argument that services that make use of depreciated assets are likely to have high accounting returns that may not be reflective of the competition conditions of the market. For this reason, we do not consider a ROCE that is only marginally above BT's cost of capital to be a strong indicator of SMP. However, we would regard a return that is materially above the current cost of capital as one criterion which together with other criteria would cumulatively support a finding of SMP.

[749] For example, BT recently changed some of the assumptions used in assessing the value of its duct network assets. This resulted in a substantial holding gain which significantly increased the reported profitability in the accounts for the year ending April 2010.

[750] All of our analysis of profitability is conducted on nominal values.

7.76 Therefore, as in the June BCMR Consultation, we interpret profitability data in the following manner:

- Minimal weight is attached to low levels of profitability in markets where there is price regulation. That is, we do not infer anything about competitive conditions in these circumstances.

- Some weight is attached to high levels of profitability. That is, in markets where we find persistent high levels of profitability, we consider that this provides some evidence that the relevant CP could have market power. However, we do not regard it as a necessary criterion for finding SMP.[751]

Control of infrastructure not easily duplicated

7.77 In summary, in the June BCMR Consultation, we noted that:

- BT has the necessary physical infrastructure in place to supply symmetric broadband origination services to almost any site in the UK excluding the Hull area within a relatively short period of time and without incurring substantial costs.

- with regard to OCPs, we noted the following;

  - we did not consider that OCPs have the ability or incentive to duplicate BT's network infrastructure;

  - if a CP is not already connected to a customer site, it can build its own physical infrastructure or try to lease access to duct or fibre owned by a third party. The route length of network is one of the primary drivers of costs. In general, therefore, only short build distances can be justified to connect a single customer. We noted the concern raised by CPs that the costs of network extensions are often high relative to the value of the services being provided. If a CP attempts to pass on these one-off costs to the customer, they are unlikely to be competitive relative to BT who will likely either already be connected to the customer site, or have network infrastructure closer to the site.

7.78 We considered a number of other reasons why BT benefits from its network coverage. These were as follows

- BT will, on average, be able to serve new customers faster than other CPs;

- a ubiquitous network avoids the need to rely on third party services. This reduces the possibility of technical limitations on a service due to interoperability issues. Similarly, greater levels of control of network equipment are possible (such as the ability to set quality of service parameters) within a network which is managed end-to-end. These controls will not necessarily be accessible through a wholesale interface.[752] In this scenario, a CP using wholesale access inputs to

[751] This is consistent with the ERG Revised SMP Paper (see Section 3, paragraph 20).

[752] For example, it may be possible to run diagnostic tests on a line remotely by controlling the active equipment at either end of a terminating segment. Access to these functions is often provided via a separate network management port on the equipment, and a separate connectivity service is needed to access these controls remotely. When developing a wholesale access service for third party CPs, the network owner can choose the level of access that the third party gets to these network management functions. At one extreme, the network owner could provide direct access to the network management port and thus provide full access to all controls.

reach a customer site would be restricted in terms of the downstream services it could offer;

- a corollary of the previous point is that by avoiding the need to expose any network control parameters to third parties, a CP who owns and manages the network end-to-end can make a claim to greater network security;[753]

- the costs of sale are lower for a CP with ubiquitous network coverage to the extent that it is more likely that they will be invited to tender to provide connectivity services, and are less likely to have to turn down the invitation due to lack of network coverage; and

- the amount of network infrastructure also creates technical advantages in terms of building diverse physical routes, which can be beneficial in developing services with high availability. For fixed networks, some of the most serious faults are location specific - for example, someone digs through a duct or a cable. This type of accidental damage is unavoidable and it can take time to locate and repair, with the result that customers may suffer a significant outage. Physically separate routes are required to create a service which is resilient to these types of fault. This reduces risk in the event which damaged the network affects both routes. The greater the separation distance, the lower the risk. The need for diverse routings in order to provide resilience increases the investment and the extent of sunk costs required to enter the market.

Consultation responses

7.79 BT made a number of comments on this criterion in its consultation response.[754] It argued that there is considerable overlap with economies of scale and scope and barriers to entry and expansion. This is because each factor relates to the underlying trade-offs between site value (lower value raises the benefits to BT of ubiquity), customer density (higher density reduces the benefits of BT infrastructure) and market trends (the combination of growth and likelihood of switching to alternative technologies).[755] BT therefore said that this criterion added little in practice to the assessment of economies of scale/scope and barriers to entry. It also said that Ofcom's assessments were based primarily on qualitative and conceptual arguments and that we presented little evidence.

7.80 In relation to network infrastructure, BT said that the UK is highly competitive, with Virgin claiming to be able to reach 85% of businesses and other CPs focused on larger companies. It also said that Ofcom's analysis of the number of businesses served by CPs is a very poor representation of the value of business served because it attaches equal weight to UK businesses with more than 250 employees. BT believes that this provides a misleading picture of the underlying extent of

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However, if the terminal equipment is shared with other customers this would present a security issue. In this case, they could develop an overlay system which gives the wholesale customer *indirect* access to the network management controls via, for example, an online interface. In this way, the network owner can maintain security and integrity of the network by limiting the level of control that the wholesale customer has over the shared components in the network.

[753] It should be noted, however, that these technical advantages of a ubiquitous network are a function of the active equipment. They can, therefore, be replicated if a CP extends its network using passive infrastructure elements from a third party such as duct or dark-fibre. In this way, a CP can install its own network equipment and maintain full control and offer the fullest feature set offered by the underlying technology.

[754] See part 1 of BT's response, in particular Section 3, Section 4.4 and Annexes 1 and 2.

[755] See part 1 of BT's response, in particular Section 4.4.

competition in the UK because Ofcom is likely to have understated actual and potential competition for sites at higher values/bandwidths.

7.81 BT also argued that Ofcom's network reach analysis underestimates the proportion of businesses that are within reach of at least two OCPs because the networks of several OCPs have been under recorded.

7.82 In relation to the other reasons for which we considered BT benefits from its network coverage, BT argued that it did not materially benefit from any of them. Its responses are summarised below:[756]

- Speed of service – there is no reason why new customers will be served faster by BT. If BT is able to serve the customer more quickly because a CP relies on BT for access, then this point is not independent of a prior designation of SMP (and so is incompatible with the modified Greenfield assumption).

- Reliance on third parties – there are no material drawbacks given the presence of a third party merchant market. According to BT, "technical interoperability issues are rare in Ethernet as the majority of customers currently purchase Ethernet interfaces and connect solutions using layer 2 devices. If customers do not want to do this, they will purchase OTU interfaces, which are available from BT Openreach if they want to route native client services optically in the BT Openreach domain. Openreach allow this currently on the interface options they offer for both OSA and OSEA".

- Network security – this is an issue of network management and is not material because network operators will develop systems of fault reporting. It is a function of both active and passive equipment. BT also disagreed that an end-to-end network means greater levels of control of network equipment, for three reasons: (i) standard Ethernet is universal; (ii) the use of OTU interfaces enables the customer to send management information through the service;[757] and (iii) using wholesale access inputs has little impact on the features offered by a retail service.

- Cost of sales and tendering – this may be relevant to smaller customers outside the main metropolitan areas but it is readily apparent that Virgin is actively targeting these customers and has network well designed for them. In general, the cost of sales will be spread across a wider set of services than just inter-site connectivity. There are also many other CPs targeting the lower end of the market.[758]

- Resilience – there are few instances of somebody accidently digging through a duct or cable as to cause difficulties in the marketplace. CPs and BT have systems in place to ensure that equipment is backed up and resilience is offered to end-users (the latter is also not directly a function of the amount of network infrastructure). In fact, BT is disadvantaged with respect to legacy networks and modern networks with ring-type architectures that are inherently resilient.

[756] See part 1 of BT's response, in particular Section 3

[757] BT noted that as yet no customers have purchased these interfaces from Openreach.

[758] See part 1 of BT's response, in particular Annex 2

Ofcom's considerations of consultation responses

We maintain three distinct criteria

7.83 We disagree with BT's general comment that the three criteria are effectively one and the same and have concluded it is necessary to maintain three distinct criteria – i.e. we assess the impact of control of infrastructure, of economies of scale and of scope, and of barriers to entry respectively in the relevant markets. This approach is consistent with the SMP Guidelines,[759] but more importantly this approach has been informed by our market analysis which has shown that, whilst there are interactions between these criteria,[760] each criterion has its respective impact in the relevant markets warranting a separate assessment. Consequently, to amalgamate all three into one would not enable us to undertake a thorough and overall analysis of the economic characteristics of each relevant market before coming to a conclusion as to the existence of SMP.[761]

Importance of controlling infrastructure that is not easily duplicated

7.84 As the former monopolist, BT's trench and duct network is effectively ubiquitous outside the Hull area. In some cases, BT can and does use the existing PSTN copper infrastructure to provide low bandwidth business connectivity services. Where copper is not appropriate, BT is still likely to have duct infrastructure in which it can install fibre. BT therefore has the necessary physical infrastructure in place to supply symmetric broadband origination services to almost any site in the UK excluding the Hull area within a relatively short period of time and without incurring the substantial costs of digging new ducts.

7.85 We do not consider that OCPs have the ability or incentive to duplicate BT's entire network infrastructure. As discussed in Section 2, the provision of leased line services usually requires a physical connection – via fibre or copper in a duct. The civil engineering costs associated with building this passive physical infrastructure are largely sunk, common to most fixed telecommunications services, and represent a significant proportion of total costs. In most cases, they will significantly outweigh other connection costs such as equipment and installation. Estimates for the cost of building small additions to fixed network infrastructure are in the region of £100 per metre – more in urban areas and where network needs to cross a main road and less in rural areas and for duct underneath the footway.[762]

7.86 Of BT's competitors Virgin has the most extensive access network infrastructure.[763] It was designed to serve residential areas with cable TV, and therefore is not always in the right location to provide business connectivity services. In many cases though, the network infrastructure will be relatively close to business customer sites.

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[759] See paragraph 78 where each of the three criteria is listed separately. See also the ERG SMP Paper, Section 3.

[760] For example, one of the key barriers to entry is the sunk cost of building or extending a network, which is inextricably linked to an assessment of the competitive advantages deriving from control of infrastructure not easily duplicated.

[761] We emphasise, though, that these are just three of the criteria we have applied cumulatively.

[762] See, for example, table 31 in the CSMG report, 'Economics of Shared Infrastructure Access'", prepared for Ofcom in 2010. This shows the range and distribution of estimates for the costs of trenching in different geographic areas. http://stakeholders.ofcom.org.uk/binaries/consultations/wla/annexes/csmg.pdf

[763] Our network reach analysis is discussed further in Section 5.

7.87 It may still be profitable for other CPs to extend their networks to connect new customers in some cases. If a CP is not already connected to a customer site, it can build its own physical infrastructure or try to lease access to duct or fibre owned by a third party. The route length of network is one of the primary drivers of cost. In general, therefore, only short build distances can be justified to connect a single customer. Where the network extension costs represent a sizeable proportion of the overall costs of supply, CP's will face a significant cost disadvantage to BT (since BT will typically already have a physical connection).

7.88 In relation to BT's argument that Ofcom has underestimated the scale of other CP networks, our revised network reach analysis has incorporated updated network information from Geo and COLT. We have also obtained new information from EU Networks, Surf and MS3 Communications (this CP is relevant to the Hull area). As discussed in Annex 5, we also researched and contacted a number of other CPs, including providers that BT identified as being active in the business connectivity market, in order to ensure our information is as comprehensive as possible. Where we did not obtain network data, this was because we did not believe it would have a material impact on our analysis. Lastly, we noted BT's reference to Virgin's marketing material, which claimed to be able to reach 85% of businesses in the UK. Virgin has since explained to Ofcom the basis for this figure. [✂]. We are therefore of the view that our network reach analysis based on flex point data is more suitable for our purposes.

7.89 BT's comments on our network reach analysis are addressed in detail in Section 5. BT's claim that Ofcom has understated actual and potential competition for higher value business is also considered in the market-specific SMP assessments.

7.90 We do not accept BT's argument that our assessments are based primarily on qualitative and conceptual arguments. We have undertaken extensive quantitative analysis in our network reach analysis, which informs both the geographic market definition and the SMP assessment. However, we believe it is important to complement this with qualitative assessments that draw on internal and external expertise as well as the views of stakeholders, particularly in areas where quantitative analysis has not been possible. This applies to the technical advantages that Ofcom identified in the consultation, to which we provide a point-by-point response in Figure 7.2 below.

Figure 7.2: Ofcom response to BT comments on advantages deriving from the control of infrastructure

Potential Advantage	BT comment	Ofcom response
Speed of service	No reason why new customers will be served faster by BT. Also, this point is not independent of a prior designation of SMP.	BT clearly has an advantage where it has a physical connection to premises but rivals do not. In respect of new customers, in many cases BT will have network that is closer to the new premises than its rivals, suggesting that it would be able to make connections more quickly.
Reliance on third parties	Not an issue given the presence of a merchant market. Also, technical interoperability issues are rare in Ethernet and an end-to-end network does not give greater levels of control of network equipment.	It is a necessary condition for the existence of an active third party merchant market that there should be competing infrastructure providers with available capacity (as, for example, in the WECLA). Furthermore, the existence of such a market does not negate any potential advantage from controlling network equipment. We consider it a reasonable presumption that, in the absence of regulation, a CP requiring a wholesale input to fulfil a retail contract may face a higher price if the wholesale supplier is competing for the same contract. We recognise BT's argument that long-term interoperability issues are unlikely to limit end-to-end service capability, both in Ethernet and SDH. We note, however, that [✂]. Therefore, we consider that interoperability issues do affect time to market because a greater number of players have to be co-ordinated and share similar business interests and targets.

		We also note that in research carried out by CSMG on Very High Bandwidth Connectivity,[764] three end-users of services greater than 1Gbit/s experienced problems in having faults resolved quickly, or suffered poorer network service quality as a result of a poor working relationship between their primary supplier and a third party service provider that supplies some of the underlying infrastructure. Also, several interviewees preferred to only contract the owner of the underlying fibre, partly because it avoids handover problems between the two providers. Whilst we accept that such issues may not be widespread across all of the markets considered in this review, we believe that the findings in this research represent evidence that reliance on third parties can (and does) result in problems for service quality. This means that BT gains an advantage from its control of a near-ubiquitous network.
Network security	This is an issue of network management and is not material.	Whilst CPs and Openreach do develop means for the CPs to monitor terminating segments whilst not exposing critical control parameters, this often requires additional equipment at the customer and network ends to facilitate terminating segment and/or end-to-end service monitoring and control. This can be more costly and complex for OCPs that rely on wholesale access from BT (and conversely this is not a cost that BT, as the provider of the wholesale access, incurs).
Cost of sales and tendering	May be relevant to smaller customers outside the main metropolitan areas but Virgin is actively targeting these customers. Also, cost of sales are spread across a wide set of services.	We recognise that the cost of sales and tendering advantage deriving from a ubiquitous network is more likely to be relevant to smaller customers outside of large urban centres. For these businesses, we consider that BT is more likely to be invited to tender than other CPs given their size and brand in the UK. Moreover, even though Virgin may actively target some of these customers, if Virgin is the only rival to BT the intensity of competition to serve customers will not be as strong as where BT faces multiple rivals. Within large urban areas, such as the WECLA, we accept that BT's advantage is comparatively more limited.

[764] CSMG, 'Research on Very High Bandwidth Connectivity' (February 2013). This consisted of 25 in-depth interviews with very high bandwidth (greater than 1Gbit/s) end-users and resellers in the UK.

Resilience	Few instances of accidental digs through duct or cable causing difficulties. OCPs have systems to back-up equipment. Resilience is not a function of the amount of infrastructure and, in fact, BT is disadvantaged due to its legacy networks.	We consider that BT's geographic presence gives it an advantage in terms of resilience at the access drop, which is an important requirement for the majority of leased line users.[765] Such resilience is costly due to extra redundant equipment and because standby routes tend to be longer than main routes. Compared to OCPs, it is easier for BT to connect a customer site to two separate access points and to find diverse routes from these to the destination.

[765] For example, the survey evidence gathered by Jigsaw showed that more than half of business users consider resilience to be a 'business critical' feature. See Jigsaw Research, 'Business Connectivity Services Review (2011), page 46

7.91 In conclusion, we consider that BT gains a significant competitive advantage from its ubiquitous network. This network is unlikely to be duplicated given the extent of sunk costs which would need to be incurred. We also believe that BT derives material advantages with respect to cost of sales and its ability to offer resilience and a quicker service.

7.92 In terms of BT's network reach advantage, we set out a simple calculation that illustrates why we consider the number of existing connections to be so significant. Our current estimates for the cost of digging duct are around £100 per metre, increasing to about £130 per metre in urban areas.[766] Therefore, for example, the cost of digging 200 metres is approximately £20,000 (£26,000 in urban areas). The total cost of connecting a site will be greater than this as it does not include installation, equipment and so on. Based on estimates from s135 submissions and BT's regulatory statements, it is likely that these would add at least [✂][767] in the case of an Ethernet line.

7.93 Given that BT is usually already connected to a site, it will have a significant cost advantage.[768] To illustrate the significance of this advantage, we have constructed a simple analysis of whether a CP could be able to cover the incremental costs of connecting a site, assuming that it matches BT's price (taken from the average prices in Figure 7.3 below) and that the customer is prepared to agree a 3 year contract to the CP.[769] Under this simple exercise, providing a circuit that requires significant digging is only potentially profitable for a CP in the medium and high/very high bandwidth TISBO and MISBO markets. In some cases, it may also be worthwhile for 1Gbit/s AISBO connections.[770]

Economies of scale and scope

Consultation responses

7.94 BT raised several issues in relation to economies of scale and scope in its response to the June BCMR Consultation. From a legacy angle, it argued that in some ways BT is disadvantaged because entrants can construct networks that take advantage of more efficient handling of traffic and do not face restrictions which are imposed on BT from having to supply legacy services across a multitude of networks.

7.95 It also said that regulation has given rise to dis-benefits to BT in both upstream and downstream markets where rivals are able to utilise more efficient designs without any regulatory constraints on the nature of their offerings or the replicability of the

[766] These figures are based on the CSMG report referenced in paragraph 7.85 but they are also consistent with some of the consultation responses that Ofcom has received.

[767] [✂]

[768] Data from BT regarding excess construction charges for Ethernet services suggests that BT only requires new ductwork in less than [✂]% of cases. All these services require a fibre connection, whereas analogue and some digital low bandwidth TI services are provided over copper. Given the existence of copper for PSTN services, it is likely that the equivalent percentage is much lower in the low bandwidth TISBO market.

[769] This is the average contract length of a business connectivity contract, based on our market research. See Jigsaw Research, 'Business Connectivity Services Review (2011), pages 55-56

[770] Naturally different assumptions will give different answers. If the CP is assumed to be able to serve additional new customers from the connection or the customer is prepared to commit to a longer contract period, building may be more profitable. Conversely, if customers are reluctant to sign a long run contract or the CP needs to undercut BT's price by a substantial margin to obtain the sale (e.g. because of customer inertia, reluctance to switch away from BT's known brand without a clear financial incentives, or switching costs) building the connection will be less profitable than assumed.

interfaces they use. Furthermore, OCPs are able to enjoy the benefits of scope in ways that are not open to BT.[771] Even without regulation, BT believes that it would be difficult for it to replicate these economies in its own infrastructure, at least in a short time period.

7.96 BT also argued that Ofcom provided no quantitative assessment of the alleged benefits of scope economies in access which may play a relevant role in a market power assessment. It claimed the benefit was alleged and judgemental.[772]

Ofcom's considerations of consultation responses

7.97 Economies of scale and scope are characteristic features of fixed telecoms networks, and are often a significant determinant of competitive conditions in connectivity markets. If there are economies of scale (or increasing returns to scale), then the average cost of a service will fall as production volume increases. Economies of scope arise if total costs are lower when two services are produced together than when they are produced by different firms.

7.98 For the purposes of SMP analysis, it is useful to draw a clear distinction between scale and scope economies in order to assess the independent influence of each characteristic on a market. Therefore, in the analysis which follows, we use the term economies of scale to refer to circumstances in which the average cost of supplying a service in a specific economic market falls as the volume of services sold by the same firm within that market increases.[773]

7.99 Scope economies are caused by the presence of costs which need to be incurred in order to provide any of a group of services, but which do not then need to be incurred again in order to supply additional services. The existence of such costs (which we refer to as common costs) means that the total costs which need to be recovered from a given service fall as the production of another service increases because fixed common costs can then be recovered from a greater total volume of output.[774]

7.100 Both economies of scale and scope may arise in TISBO and AISBO wholesale markets where these services are provided over network infrastructure which is used to supply:

- more than one service to a single customer (resulting in scope economies); or
- a single service to more than one customer (resulting in scale economies).

7.101 The ability to spread the fixed costs of network infrastructure, either over additional units of a single service, or over a large number of different services, is key. Whether

[771] On this point, BT suggested that some CPs have chosen to 'daisy chain' equipment from one building to the next down a main street or business park, which is different to BT's network topology of having an access link that runs back to a centre node of an access catchment area (see Part 1 of BT's response, in particular Section 4.5). The implication BT suggests appears to be that, because some OCPs do not have a separate access service with a separate physical interface, they can deliver services at a lower cost than BT.

[772] See part 1 of BT's response, in particular Section 4.4.

[773] See, in this respect, the ERG SMP Paper, paragraph 14.

[774] This is true on the reasonable assumption that common costs need to be recovered through charges and that both services are charged at more than their incremental costs. We can make a further distinction between two types of such costs: fixed costs and common costs. Fixed costs are those which do not vary as output increases, and therefore give rise to economies of scale. Common costs are those which are incurred in the production a number of different services, and therefore give rise to economies of scope.

economies of scale or scope are important in any particular case, and which is more important, then depends on the extent to which network facilities can be used to supply additional units of services in the same market or in different markets. The general discussions of scale and scope below explain why these characteristics are likely to arise, and why this criterion is relevant to our SMP assessment, in wholesale symmetric broadband origination markets.

Scale

7.102 Economies of scale are likely to be greatest where traffic from large numbers of customers can be aggregated. However, a proportion of the cost associated with symmetric broadband origination lies in dedicated access links. This is the network infrastructure which is, to a large degree, incremental to each customer. Consequently, the costs of dedicated access links do not give rise to economies of scale as the number of customers connected increases. By contrast, there are very substantial economies of scale in the networks to which these access links are connected. For this reason, CPs will only be able to profitably build network in new areas if they expect to sign up a large number of customers.

7.103 The costs of an access link are however largely invariant to the capacity of the link and so, as the capacity of a given link is increased, its average cost per unit of capacity (in kbit/s, Mbit/s or Gbit/s) will decline. Furthermore, BT has an advantage compared to OCPs because its larger network means that it is likely to require a shorter access link for a new customer. We therefore consider BT's primary advantage arises from the fact that it has existing links to a larger number of premises in the UK than OCPs, which means it is less costly to supply the sites with a symmetric broadband origination service.

7.104 Economies of scale can therefore give a large incumbent a cost advantage over smaller rivals but they are not *necessarily* an important source of market power by themselves. The most significant returns to scale are driven by costs which are both fixed and common and which relate to the underlying physical network infrastructure, and these also generate scope economies. Therefore, a CP may be able to benefit from a relatively low average cost despite a low market share if it can realise significant economies of scope.

Scope

7.105 A large proportion of costs of providing wholesale connectivity services are common to all connectivity services – both residential and business. The same physical infrastructure and network services support virtually all downstream communications services. This generates economies of scope which CPs may be able to realise if they can sell other services to their customers.

7.106 There are also costs which may be incremental to the provision of business connectivity services, and common to all of these services (regardless of technology). For example, the costs of maintaining a national optical fibre network are, at least in part, independent of transmission technology, so a company selling both Ethernet and SDH will be able to share these costs between these two sets of services. This implies that CPs providing a full spectrum of business connectivity services will tend to have lower average costs.

7.107 Similarly, there are costs which are common to the provision of business connectivity services of a particular technology. For example, the costs of core SDH switches are shared between all SDH services regardless of bandwidth (but will not usually be

shared by Ethernet services). This creates scope economies which benefit CPs who have scale across the set of markets which use SDH technology.

7.108 The scope of BT's operations in the UK is greater than all of its competitors – across TISBO and AISBO markets individually, across all business connectivity markets, and perhaps even more importantly, across all fixed telecoms markets. BT's closest competitor in this regard is Virgin, but Virgin's access network only covers about half the population, and traditionally Virgin's business focus has been on sales of services to residential customers.[775] Therefore, we consider that BT benefits from the ability to share infrastructure costs across a range of TISBO and AISBO services to a greater extent than its rivals.

7.109 BT also benefits from the fact that the same trenches and ducts are used to serve customers across the full range of fixed telecom service markets. A number of OCPs also benefit from scale and scope across fixed telecoms in general and in the provision of leased lines services in particular – but not to the same significant extent as BT. In particular, BT's relative scale in wholesale local access markets,[776] in the low bandwidth TISBO market and in call conveyance[777] markets, means that it can recover a significant proportion of its common costs from each of these markets, reducing the amount needing to be recovered from any single customer, service or market.

Quantifying economies of scale and scope

7.110 We disagree with BT that our assessment of economies of scale and scope is "alleged and judgemental". It is supported by evidence and reasoning. We consider the scale of BT's network and the scope of BT's operations across all fixed telecom service markets, as referred to above, warrants the inclusion of economies of scale and scope in the criteria for our SMP assessments. However, consistent with the guidance set out in ERG SMP Paper,[778] our assessment of whether BT derives a competitive advantage from economies of scale and scope is a cumulative one, taking into account the other SMP criteria, that enables us to determine, amongst other things, the existence of asymmetry between BT and existing and potential competitors.

7.111 In addition, a form of quantification of the extent of economies of scale is made as part of the financial modelling undertaken for the charge control remedy we have decided to impose.[779] We have produced estimates of BT's cost volume elasticities (CVEs) and asset volume elasticities (AVEs) across a range of cost categories which show how operating costs and (gross) assets respectively vary as the volume of output changes. Where there are economies of scale, these elasticities will be less than 1, which means that a 1% increase in volume results in a smaller-than-1% increase in costs or assets. Specifically, we have calculated the weighted average

[775] The Virgin cable broadband network passed 44% of households in the UK in May 2012, though this figure is under-stated because it excludes homes where Virgin is not also able to provide fixed voice and pay-TV services (Ofcom Communications Market Report, July 2012).

[776] See "Review of the wholesale local access market", October 2010 http://stakeholders.ofcom.org.uk/binaries/consultations/wla/statement/WLA_statement.pdf

[777] See "Review of the fixed narrowband services wholesale markets", September 2009 http://stakeholders.ofcom.org.uk/binaries/consultations/wnmr_statement_consultation/summary/main.pdf and "Fixed Narrowband Market Review and Network Charge Control – Call for inputs", May 2012, http://stakeholders.ofcom.org.uk/consultations/narrowband-market-review-call/

[778] See paragraphs 14 and 15.

[779] See Annex 12.

AVE to be 0.53, which is consistent with the existence of significant economies of scale. We also note that the AVE for duct, where we consider BT to hold a significant cost advantage, is particularly low at 0.08 (that is, a 1% increase in volumes increases BT's duct costs by only 0.08%). We consider that this means that BT benefits from significant economies of scale in most of the UK relative to OCPs, particularly outside the WECLA.

7.112 Furthermore, even if the benefits of having more duct already in place are put to one side, the fact that BT's AVEs for transmission, network equipment and other cost categories are all lower than 1 shows that it benefits from other economies of scale as a result of its extensive network. We note that this point was acknowledged in the SPC report commissioned by BT, which said "We recognise that BT has the most extensive network of nodes...and has the economies of scale in the Access market, outside of WECLA".[780]

Disadvantages to BT

7.113 In relation to BT's arguments that it is, in some ways, disadvantaged by regulation and less efficient handling of traffic, we do not accept the argument that BT does not benefit from economies of scale and scope relative to OCPs. Regulation is only imposed where necessary and, although it may sometimes require some additional costs to be incurred, BT will normally be allowed to recover these through regulated charges.[781] Even if the regulations place restrictions on the prices BT is able to charge in order to promote competition by preventing undue discrimination and anti-competitive pricing, the fact that BT has far more connections and a far bigger network than its rivals gives it an advantage from scale and scope most of the time.[782]

7.114 We also do not accept BT's argument that its rivals' use of efficient network designs gives them a competitive advantage. BT could build a new network using the same up-to-date technology as an entrant. The reason it does not do so is that, because it has already sunk the costs needed to create it, the forward-looking costs of its existing network are lower, particularly in relation to its access duct network. It may be the case that were the network to be built from scratch today it would feature a different topology but this hypothetical scenario does not alter the fact that the extent of BT's existing network gives it a significant competitive advantage and is a major entry barrier.

7.115 We therefore consider BT to benefit from economies of scale and scope to a much greater extent than other CPs across the UK as a whole. However, we recognise that in areas where there is extensive competing infrastructure, for example the WECLA, the advantages are reduced. This is reflected in our SMP assessments.

Barriers to entry and expansion

7.116 In the June BCMR Consultation, we set out two factors that contributed to barriers to entry and expansion in the wholesale symmetric broadband origination markets:

- sunk costs; and

[780] See Part 3 of BT's response

[781] See, in this respect, section 88(2) of the Act.

[782] Furthermore, as noted above, any restrictions placed on the prices BT is able to charge as a result of regulations would be disregarded for the purposes of our SMP assessment as a result of the application of the modified Greenfield approach.

- switching costs.

7.117 With regard to switching costs, we noted that switching supplier can require significant investment by both customer and supplier and that the process generally requires physical changes in the network and a temporary loss of service for the downstream customer. [783] We also said that incompatibility of technology can be a significant barrier to switching, particularly in relation to IT systems and customer equipment. Specifically, we said that:

- Wholesale customers may develop IT systems and processes to help automate and manage transactions with their supplier. The initial investment to develop systems and processes to interface with BT are usually justified on the basis of expected transaction volumes, or the fact that a CP will necessarily have to transact with BT in order to gain coverage in areas where they are the only provider with network infrastructure. In order to persuade a customer to develop a second set of IT systems and processes, the expected transaction volume with the new supplier must be significant. We consider this creates barriers to entry and expansion for suppliers with relatively limited network coverage.

- The second compatibility issue relates to customer equipment. Although network technologies are usually based on international standards, compatibility is not guaranteed. Although compatibility issues are unlikely to be insurmountable from an engineering perspective, concerns about a lack of compatibility, perhaps resulting in lower service quality or additional costs, are likely to make customers more reluctant to switch supplier, and therefore we consider they add to barriers to entry and expansion.

Consultation responses

7.118 In its response to the June BCMR Consultation, BT argued that changeover of supplier does not usually involve loss of service because the customer would typically start a service with a new supplier before ceasing service with their old supplier. It therefore considered this to be an incidental issue.

7.119 Regarding IT systems and processes and customer equipment, BT said that its competitors are associated with large organisations well capable of replicating BT systems. It accepts that it could be an issue for a CP with limited network coverage but, in practice, most have extensive networks and are capable of setting up effective IT systems and processes. [784]

Ofcom's considerations of consultation responses

Sunk costs

7.120 Significant investment is needed to build the network infrastructure to supply wholesale symmetric broadband origination services. To a large degree, the costs associated with this investment are sunk and therefore, in our view, give rise to entry barriers.

7.121 Sunk costs are fixed costs that have already been irretrievably incurred. In the context of charge-setting, for which a long-run definition of costs is appropriate, we

[783] Barriers to switching are discussed further in Section 3.

[784] See Part 1 of BT's response, in particular Section 3

define a sunk cost as one which has been paid in the past, is not recoverable on exit from the market and does not need to be paid again in order to remain in the market over the period under consideration.[785]

7.122 Sunk costs also tend to be common across a large number of markets and largely fixed with respect to volumes within a single market.[786] This generates economies of scale and scope as discussed in the previous section. However, it may be that the costs are not entirely sunk in the context of an individual product market – for example, it may be possible for a CP to exit a TISBO market, but re-use some assets to provide services in an AISBO market.

7.123 In this respect, whilst noting that "barriers to entry exist where entry into the relevant market requires large investments",[787] equally we note that "high barriers to entry may become less relevant with regard to markets characterised by ongoing technological progress".[788] Consequently, our assessment of whether BT derives a competitive advantage from the existence of barriers to entry is a cumulative one, taking into account the other SMP criteria, in particular, prospects for competition in the relevant market.[789]

Switching costs

7.124 We disagree with BT that switching costs are immaterial. Our general assessment of switching costs is supported by evidence and is consistent with the guidance provided in the ERG SMP Paper.[790] When a customer changes supplier, they can either accept a break in service and save on cost, or they can employ both providers and switch off the old supplier when the new service is operational. The latter option guarantees service continuity but is likely to cost more, if not for the customer then for the new supplier (if it agrees to bear the cost), in which case it would add to the CP's cost disadvantage. Therefore, either scenario involves switching costs. This is supported by our survey evidence which showed that more than half of respondents considered 'hassle', 'high installation costs' and 'risk the new service will not work' as barriers to switching.[791]

7.125 In relation to IT systems and network equipment, whilst we agree that some of BT's competitors have reasonably extensive network coverage and are part of large international organisations, there is still a cost to the end-customer when switching to a new supplier. This is supported by evidence from our survey, which showed that 42% of respondents consider 'high internal costs' to be a barrier to switching.[792] It is also borne out in the qualitative research that CSMG carried out on Very High Bandwidth Connectivity (i.e. services greater than 1Gbit/s).[793] Of the 25 end-users that were interviewed, eight expressed reluctance to switch providers due to high switching costs, the effort involved in setting up a new contractual framework and/or

[785] See, in this respect, the ERG SMP Paper, paragraph 21.

[786] An important exception is customer connection costs.

[787] See paragraph 80 of the SMP Guidelines.

[788] See paragraph 80 of the SMP Guidelines.

[789] See paragraph 80 of the SMP Guidelines.

[790] See paragraph 22.

[791] See Jigsaw Research, 'Business Connectivity Services Review (2011), pages 60-61.

[792] See Jigsaw Research, 'Business Connectivity Services Review (2011), pages 60-61.

[793] CSMG, 'Research on Very High Bandwidth Connectivity' (February 2013).

the administrative burden of a fresh procurement process. One end-user also expressed reservations about switching to a different fibre network due to concerns about the risk of service interruptions. Although this research only focused on end-users and resellers of services greater than 1Gbit/s, the responses are consistent with the survey evidence presented above, which captures end-users of all bandwidths and interfaces. We therefore still consider switching costs to constitute a barrier to entry and expansion, even if the perceived costs are greater than in practice.

7.126 Furthermore, switching costs tend to be more important in markets which are static or declining than in growing markets. One reason is that, to gain market share in a static or declining market, CPs must win the existing customers of other CPs. This can make it difficult for a CP to gain sufficient sales and hence scale within a sufficient timescale, which may mean its costs stay higher than the incumbent's for longer where there are economies of scale.[794]

7.127 It should, however, be noted that a barrier to entry and expansion need not be insurmountable to result in an impediment to competition. With regard to switching costs, the emphasis is on whether the process involved serves, together with the sunk costs needed to build the necessary network infrastructure, to affect to a sufficiently adverse degree the timeliness, likelihood and sufficiency of OCPs' ability to enter, and expand, in the relevant market.

7.128 The fact that switching can and does take place shows switching costs are not insurmountable, particularly as customers generally adopt tried-and-tested proprietary standards through purchasing specific vendor equipment. However, for many end-customers, the combination of switching costs and technical benefits from using BT – for example those associated with its network – will constitute a significant disadvantage to an OCP that must be overcome, and will make it difficult to gain sufficient sales and scale within a sufficient timescale. This will act as an even stronger barrier to entry or expansion in those areas where rival CPs would need to incur significant sunk costs to offer an effective alternative to BT.

Countervailing buyer power

Consultation responses

7.129 In its response to the June BCMR Consultation, BT argued that Ofcom gave too little weight to countervailing buyer power, which BT considers to be very strong when due account is given to the distribution of businesses by value and the position of CPs purchasing wholesale products where alternative technologies are feasible (such as for mobile backhaul).

7.130 BT also said that the fact that BT's downstream divisions are Openreach's largest 'customer', is not a sufficient condition to conclude that there is no countervailing buyer power. It said that wherever there is actual or potential competition in access, all businesses of any reasonable size will put out to tender their entire telecoms requirements. BT provided several examples of CPs winning such business.[795]

[794] We regard this as an example of interactions between the SMP criteria reinforcing their cumulative effect.

[795] See Part 1 of BT's response, in particular Section 3 and Section 4.4.

7.131 BT also said that the size of a customer should not be a determining factor for countervailing buyer power. Instead, the two factors that should be considered are a customer's ability to self-supply and its knowledge of other sources of supply.

7.132 In addition to these general points, BT put forward a number of arguments to suggest that mobile backhaul is competitive throughout the UK outside Hull. These points have been addressed in more detail in Section 4, and are considered further below in the context of our buyer power assessment.

7.133 BT also commissioned a report by Analysys Mason[796] that supported its argument that MNOs have strong countervailing buyer power and an ability to self-supply using microwave links. The report argued that MNOs are planning to make use of small-cell solutions to reduce the costs of radio access network infrastructure. Although this increases the demand for backhaul links, Analysys Mason conclude that fixed networks will be insufficiently dense and so the proportion of backhaul accounted by wireless will increase, particularly as this can be deployed more quickly and cheaply than fibre. They estimate that by 2014-15, wireless will account for 70% of mobile backhaul, compared to a current share of 55%.

7.134 Furthermore, an increasing number of microwave bands are becoming available and capacity is also growing (now up to 100Mbit/s). Analysys Mason refer to Everything Everywhere creating its own microwave network and also argue that MNOs are exploring the option of building their own backhaul transmission network, rather than leasing capacity. They note that Vodafone claims to own over 75% of its backhaul network in Europe.

7.135 In contrast to BT's submission, various MNOs responding to the June BCMR Consultation argued that mobile backhaul is *less* competitive than other wholesale leased lines. MBNL argued that there was a separate market for mobile backhaul and that, at the very least, Ofcom's SMP conditions should reflect the differing conditions of competition.[797] In particular, they noted that they do not purchase individual leased lines, but rather a package of leased line connections in order to provide capacity from a site to MSCs (they currently do this through BT's MEAS product). MBNL said that this enables traffic to be carried across BT's network efficiently, [✂].

7.136 It noted that other operators can only provide mobile backhaul in certain geographic areas, most notably Virgin in the areas where Virgin has network. However, it considers that no operator other than BT has the ubiquity provided by BT's 21CN infrastructure. [✂], it believes that BT will almost inevitably be one of the required backhaul providers for any UK mobile network.

7.137 [✂].

7.138 The implication of this, according to MBNL, is that purchasing backhaul solutions from multiple providers introduces additional overheads through increasing operational complexity. This means that, in MBNL's view, there is a natural limit to the number of backhaul providers which it makes sense to use. BT's ubiquity means that it is very likely to be one of those providers, which reduces the competitive constraints on BT as a provider of mobile backhaul products.

7.139 MBNL does purchase backhaul from Virgin [✂].

[796] See Part 2 of BT's response.

[797] MBNL/EE response, pages 3-8.

7.140 Furthermore, [✂].

7.141 In terms of microwave backhaul, MBNL said that although it provides some capacity, it has limitations because it can only deliver traffic over line of sight. Therefore, in order to provide the capacity required at a very large number of radio sites, there will be an increasing need for fibre and Ethernet connectivity.[798] MBNL also said that microwave has relatively low operating costs but involves capital expenditure on radio equipment and spectrum licences. [✂].

7.142 MBNL, therefore, accepted that there is an incentive for MNOs to use alternative providers and microwave wherever feasible, but argued there is a limit to this due to the ubiquity of BT's network, which allows it to provide 'any radio site to any core site' connectivity. In particular, developing alternatives to BT MEAS for an MNO involves significant costs and initial investment, leading to additional on-going costs of managing the solution. It also requires the MNO to provide some of the functionality which BT provides for itself.

7.143 Telefónica also argued in its response to the June BCMR Consultation that Openreach remains dominant, with competition from Virgin and microwave links limited in practice.[799] [✂].

7.144 Telefónica also noted that the MNOs have invested significantly in BT's access network outside the footprint required by the majority of other customers and that BT has obtained and uses its own wayleaves. With regards to microwave links, it notes that an MNO would not be likely to switch to microwave because [✂].[800]

7.145 Lastly, on microwave links, Vodafone acknowledged that advances in the technology will offer alternatives to BT and other CPs (for example it can currently reach up to 400Mbit/s throughput) but that there are still capacity and distance limitations ([✂]), meaning that in many cases it will be an ineffective and impractical substitute for fibre. In this regard, Vodafone noted that high capacity fibre is the strategic long-term solution for mobile backhaul.[801] In terms of overall mobile backhaul capacity, Vodafone argued that Ofcom had underestimated future demand.[802]

Ofcom's considerations of consultation responses

7.146 We recognise that buyer power is a potential constraint on suppliers, which needs to be taken into account in the SMP assessment. We agree with BT that a necessary condition of countervailing buyer power is the ability to use an alternative source of supply, which might be either self-supply or a credible threat to switch to other CPs. The size of a customer is also an important factor in our assessment. As stated in the ERG SMP Paper, "the higher the amount of purchase of services by customers or the higher the proportion of the producer's total output that is bought by a certain customer, the stronger the countervailing power might be".[803] Other factors include the proportion of costs for a service in relation to a customer's total expenditure, as well as the scale of a seller's locked-in investment in specific customers (asset

[798] MBNL/EE response, page 5

[799] Telefónica response, page 9.

[800] Telefónica response, page 13.

[801] Vodafone response, pages 9-10.

[802] Vodafone response, page 4.

[803] See paragraph 11.

specificity). We also note that the ERG SMP Paper state that this criterion is more meaningful in wholesale markets, where providers are more visible and powerful compared to retail customers.

7.147 As set out in the June BCMR Consultation, in many of the relevant wholesale markets, BT's largest customer is its downstream retail division.[804] In addition, as discussed above, wholesale leased lines markets are often characterised by both barriers to entry and expansion and economies of scale and scope driven by the costs of building an alternative fixed access network infrastructure, and by the fact that BT already has this infrastructure in place. The same underlying reasons imply that alternative sources of supply, including self-build, are likely to be limited.

7.148 We therefore still consider that OCPs generally lack significant countervailing buyer power outside of areas where they do not have an extensive network (ability to self-supply), or where there is no other infrastructure competing with BT (ability to switch). In such areas, the costs that need to be incurred to avoid using BT are too large to justify the investment in network extension. By contrast, in areas where OCPs are better placed to self-supply or switch to an alternative supplier, they are likely to exercise greater constraint on BT.

7.149 We also note that, even if some customers in a market exercise buyer power, it remains the case that others do not. If BT is able to selectively discount to those customers with buyer power, that will not protect other customers from the exertion of market power. If BT is not able to selectively discount, then as discussed above, it will be necessary for those customers with buyer power to account for a large share of the customer base in order to discipline BT's pricing. This is not the case in the wholesale markets considered in this review.

7.150 In relation to mobile backhaul, we set out in Section 4 the reasons why we do not consider mobile backhaul to be a distinct market and why microwave backhaul is not in the market. In this Section, where relevant, we discuss the extent of MNO purchases in certain markets in our specific SMP assessments. However, in general, we do not consider MNOs to have sufficient countervailing buyer power to offset BT's SMP, nor do we consider that mobile backhaul is more competitive than other types of leased lines. In order for this to be the case, MNOs must have a credible alternative to using BT for their connectivity. This involves either switching to another CPs and/or self-supplying its requirement.

7.151 As discussed in Section 4, analysis of data provided by MNOs suggests that BT accounts for [✂]% of circuits purchased from other providers. We also note that across the UK, only 20% of mobile sites are within reach of at least two OCPs (see Figure 5.19 in Section 5) and less than half (45%) are within reach of at least one OCP. This suggests that MNOs are unlikely to be able to switch to alternative providers in much of the country.

7.152 In terms of self-supply, we accept that, in some cases, MNOs have the option to do this using both fixed wireless technology (at least before the topology of the network is decided) and fibre or copper links. This is highlighted in the circuit data we received from MNOs, which suggests that around [✂] of total ends are self-supplied. However, in terms of self-supplied fibre networks, the data provided from MNOs shows that this much more prevalent in core networks, [✂], than access networks [✂].

[804] The same is true for KCOM in relation to wholesale symmetric broadband origination markets in the Hull area.

7.153 We also do not consider that the evidence presented by Analysys Mason in their report for BT provides sufficient evidence to show that microwave links will represent a credible alternative to fibre. Its use of evidence from European markets is not informative given the differences in network topologies. Furthermore, we consider only limited weight can be attached to the forecast of how backhaul will be split between microwave, fibre and copper because it based on information from only one industry source. In any case, even if the use of microwave backhaul is likely to increase during the next three years, it does not follow that it is a substitute for fixed connections at the margin. As discussed in Section 4, radio links are most useful at the 'edges' of MNO networks, particularly where traffic can be delivered over the line of sight. Furthermore, once the topology of a network has been fixed, MNOs have limited incentive to change it due to the sunk costs incurred in investing in a particular network configuration. We therefore agree with the MNO consultation responses that there is a limit to extent that they can use microwave links in place of fibre connections.

7.154 One feature of the market that could be consistent with the MNOs having some buyer power is that there are a small number of large and sophisticated purchasers (there are four MNOs, two of which have formed a joint venture). However, this is unlikely to lead to effective countervailing buyer power if there is no threat of self-supply or of the MNO switching provider. As discussed above, we do not believe that either option is credible across the network.

7.155 We also do not agree with MBNL's argument that BT's market power is more pronounced for mobile backhaul compared to other wholesale leased line customers. Whilst we accept that MNOs are unlikely to purchase leased lines on an individual or site-by-site basis, they are still able to source supply from operators other than BT where the OCPs have infrastructure. This is particularly relevant in the WECLA, where 93% of mobile sites are within reach of at least 2 OCPs. Furthermore, MBNL's decision to purchase backhaul products from Virgin shows that they have options other than BT in certain areas, [✂]. We also consider that CWW is likely to become more active in the supply of mobile backhaul following its recent purchase by Vodafone.[805] [✂]. Whilst there is a theoretical possibility that CWW might only supply mobile backhaul to Vodafone, we note that in its approval of the merger, the EC said the following with respect to wholesale leased lines:

> "Vodafone's and CWW's networks joined together will create additional capacity. CWW would still have sufficient capacity to continue to supply Vodafone's competitors".[806]

7.156 We therefore do not consider MNOs to be in a worse position than other CPs in areas where there are alternative networks to BT. We accept that there are switching costs and that there may be an upper limit to the number of suppliers MNOs can use due to the complexities in management and operations. However, given the developments discussed in the previous paragraph, it is clear that MNOs are not restricted to one supplier and that they can switch to alternatives to BT in areas where other CPs have networks. [✂].

7.157 We also note that a number of MBNL's comments about competition in mobile backhaul are relevant to products that are downstream of symmetric broadband origination, in particular BT's MEAS product. The latter is a BT Wholesale service

[805] http://cw.com/news-and-views/press-releases/latest/recommended-cash-offer-for-cable-wireless-worldwide-plc-by-vodafone-europe-b-v-publication-of-scheme-document/

[806] EC, Case No COMP/M.6584 – Vodafone/Cable & Wireless, paragraph 90

that uses inputs from BT Openreach. OCPs (and MNOs) currently have access to EOI inputs including EAD/EADLA links from base station sites to ASNs. CPs can also purchase backhaul links to their own core networks (either using EBD services to Openreach's OHPs or backhaul links to other locations using EAD or OSA links). On this basis, provided OCPs have built their own core networks they should be able to replicate a MEAS solution without having additional access and backhaul infrastructure. Furthermore, it is likely that ASN locations where OCPs would be providing backhaul services cover a significant proportion of the population and will include the main LLU exchanges and leased lines traffic. Therefore, providers such as CWW and Virgin should be able to combine traffic over high capacity backhaul links and achieve economies of scale and scope, even if they have not built capacity to those locations. This means that, in the presence of upstream regulated Ethernet services, there should not be barriers to OCPs replicating a MEAS solution. Therefore, we would expect BT Wholesale to be constrained in its pricing of these downstream services, either due to threat of competition or rivals entering to provide similar managed services.

Prospects for competition

7.158 In the June BCMR Consultation, we set out how our SMP assessments are concerned with the prospects for competition over the review period of three years. Ultimately, we want to understand how the markets are likely to develop, and whether competition is likely to be, or become, effective during this review period. We considered the prospects for competition as a separate criterion to account for the fact that the threat of *potential* entry and *potential* competition can act as a constraint on firms' pricing behaviour. For example, even a firm with a very high market share will consider the risk of inducing entry when setting prices.

7.159 We identified the potential revenues associated with different services as a key factor in assessing the prospects for competition. The reason was that, for CPs other than BT, a significant proportion of the incremental costs to supply a leased line usually relate to the construction of physical network infrastructure. Therefore, CPs are generally better able to compete with BT where the physical links account for a relatively small share of the supply costs. As a result, the prospects for competition tend to be greater in markets with relatively higher value services.

7.160 We therefore assessed the relative differences between the average revenues across a range of different leased lines services. Ideally, we would use market-wide average revenues but, due to the level of granularity in the data supplied by a number of CPs, it was not possible to reconcile revenues to a consistent set of wholesale leased line volumes and therefore calculate averages. We therefore used BT's average revenues as a proxy for the market-wide averages. Figure 7.3 below presents the figures for a range of services in the relevant wholesale markets.

7.161 The figure shows the average revenue per circuit end for various TISBO and AISBO services. For MISBO services we have calculated the average revenue per connected site.[807] The figures suggest that TISBO services generate much higher revenues per unit of bandwidth relative to AISBO. In particular, even 1Gbit/s AISBO services generate less revenue than 34/45Mbit/s TISBO services. In addition, there is a significant difference in value between low bandwidth TISBO services and medium

[807] Ideally, we would have calculated the average revenue per connected site for TISBO and AISBO. However, this was not practical given the size and complexity of the underlying data sets for these markets.

and high bandwidth services.[808] Finally, MISBO services attract significantly higher revenues than other services, although it should be noted that these figures include one-off connection revenues.

Figure 7.3: Average wholesale revenue per circuit end or per site

Product market	Product	Approximate average annual revenue*	Index of value relative to a 2Mbit/s service	Units
Low bandwidth TISBO (<=8Mbit/s)	Analogue	✂**	✂	Per half-circuit
	64 Kbit/s	✂	✂	Per circuit end
	2 Mbit/s	✂	✂	Per circuit end
Medium bandwidth TISBO (>8Mbit/s, <=45Mbit/s)	34/45 Mbit/s	✂	✂	Per circuit end
High bandwidth TISBO (>45Mbit/s, <=155Mbit/s)	140/155 Mbit/s	✂	✂	Per circuit end
Low bandwidth AISBO (<=1Gbit/s)	10 Mbit/s	✂	✂	Per circuit end
	100 Mbit/s	✂	✂	Per circuit end
	1 Gbit/s	✂	✂	Per circuit end
	Whole market	✂	✂	Per circuit end
MISBO (WDM at all bandwidths and AI services>1Gbit/s)	single 2.5 Gbit/s Ethernet	✂	✂	Per circuit end
	single 10 Gbit/s Ethernet	✂	✂	Per circuit end
	Whole market	✂	✂	Per connected site

** This includes revenues from both recurring and one-off charges.*

** * The figure for analogue refers to retail revenue, and represents half the total circuit revenue.*

Consultation responses

7.162 In its response to the June BCMR Consultation, BT argued that an assessment of BT's regulated prices cannot form a suitable basis for an assessment of prospective competition. It also said that Ofcom's assessment of prospective competition is largely driven by market growth and the current state of competition, with the latter driven by market shares.[809]

7.163 [✂].

[808] We do not have price / revenue data for very high bandwidth TISBO services (i.e. 622Mbit/s services and higher bandwidths delivered without WDM). As non-SMP services, these are not subject to the same reporting requirements as the others, but we believe that these attract even higher revenues than 155Mbit/s.

[809] See part 1 of BT's response, in particular Section 3 and Section 4.4.

Ofcom's considerations of consultation responses

7.164 We consider the supply decision for OCPs is likely to reflect a comparison between the potential revenues from a customer, and the costs of the physical network connection to the customer site(s). BT's regulated prices are likely to form part of that assessment, since those are the prices that rival CPs are likely to have to undercut if they are to win business.

7.165 For the reasons given above, we also disagree with BT that our assessment of the prospects for competition place inappropriate weight on market shares. Furthermore, whilst market shares do form part of our assessment, in as much as they inform our understanding about the current level of competition in the market, consistent with the SMP Guidelines we also take into account market share trends[810] to inform our view of developments in the relevant market over the course of the three year review period, as well as expected future demand and the revenues available. Where relevant, we also consider whether our assessment of the other criteria (particularly barriers to entry, control of infrastructure and countervailing buyer power) is likely to change during the next three years.

7.166 It is worth noting that the average revenues presented in Figure 7.3 show that prices vary considerably by service type, with higher bandwidth services earning higher revenues. To the extent that these average revenue differences are correlated with differences in the underlying costs of providing the services, all other things being equal, the prospects for competition tend to be greater in markets with relatively higher value services. In particular, it is notable that the only relevant markets which were found to be effectively competitive in the 2007/8 Review relate to higher value services: the medium and high bandwidth TISBO markets in the CELA. The main caveat to this general rule is that demand for TISBO services is declining rapidly. As a result, the prospects for competitive investment are weak despite services attracting relatively high revenues.

7.167 [✂].[811]

External constraints

7.168 As discussed above, our SMP assessments take into account all relevant competitive constraints, which can be inside and outside of the scope of the defined market. Following BT's criticism that we did not give sufficient weight to external constraints in the June BCMR Consultation, for each SMP assessment we explicitly identify relevant competitive constraints outside the market and explain how we have taken them into account in our analysis of market power.

7.169 At a general level, it is important to note that the way in which firms buy and use leased lines is crucial when considering competitive constraints. If they demand particular technologies, or service characteristics which only certain technologies possess, and bandwidths (e.g. low bandwidth TI), then there are unlikely to be any competitive constraints from other products. At the other extreme, if businesses are only interested in the final service and do not have any particular quality of service requirements, then there is greater scope in the possible types of connection. For example, if a business only requires basic internet access then asymmetric broadband is potentially a viable option and such a business would probably already

[810] See paragraph 20.

[811] [✂].

be using asymmetric broadband rather than a substitute for TI leased lines. However, if the business requires a service that relies on a dedicated and synchronous service, for example because it is involved in financial trading, then this is not the case and such a business might not switch away from a TI leased line even in response to a very large price differential. In between, other businesses might be prepared to sacrifice some service quality in return for a large enough saving, though that might need to be significantly more than the value of a SSNIP.

SMP assessment of each relevant wholesale symmetric broadband origination market

7.170 We now set out our SMP assessments for each of wholesale symmetric broadband origination markets. Our SMP conclusions are based on an overall forward-looking analysis of the economic characteristics in each relevant market, based on existing market conditions. Each market assessment is presented in the same format:

- first, we summarise our conclusions as to the existence, or not, of SMP – i.e. whether in the relevant market we have found the existence of SMP or whether we have found effective competition;
- secondly, we present our assessment in the June BCMR Consultation of each SMP criterion;
- thirdly, we set out consultation responses; and
- finally, we set out our considerations of consultation responses for each SMP criterion and our conclusions as to the existence, or not, of SMP.

7.171 Much of our analysis takes into account the general assessment of the SMP criteria set out above, and so should be read in conjunction with that general assessment.

Wholesale markets for TISBO in the UK excluding the Hull area

7.172 In this section, we set out our SMP assessment in six wholesale TISBO markets outside of Hull.

7.173 In the following markets we have concluded that BT has SMP:

- Low bandwidth TISBO (<=8Mbit/s) in the UK excluding the Hull area;
- Medium bandwidth TISBO (>8Mbit/s, <=45Mbit/s) in the UK excluding the Hull area and the WECLA; and
- High bandwidth TISBO (>45Mbit/s, <155Mbit/s) in the UK excluding the Hull area and the WECLA.

7.174 In the following three markets we have concluded that no operator has SMP and that competition is effective:

- Medium bandwidth TISBO (>8Mbit/s, <=45Mbit/s) in the WECLA;
- High bandwidth TISBO (>45Mbit/s, <155Mbit/s) in the WECLA; and
- Very high bandwidth TISBO (622Mbit/s) in the UK excluding the Hull area.

7.175 These conclusions are the same as our proposals in the June BCMR Consultation. Our conclusions are based on a thorough and overall forward-looking analysis of the economic characteristics of these markets over the course of the three year review period, based on existing market conditions. In our SMP assessment, we have had particular regard to the SMP criteria summarised in Figure 7.4 below in assessing BT's power to behave to an appreciable extent independently of its competitors, customers and consumers.

Figure 7.4: Summary of SMP determinations for the wholesale markets for TISBO in the UK excluding the Hull area

Product market	Geographic market	Results criteria applied for SMP assessment	Proposed SMP designation
Low bandwidth	UK excl. Hull	- BT's market share is 88% - Revenues are not large enough for OCPs to justify investments. BT has already sunk its infrastructure costs. - BT's gains a competitive advantage from its scale and scope across all TISBO markets and its PSTN access network - Presence of switching costs	BT
Medium bandwidth	UK excl. Hull and the WECLA	- BT's market share is 77% - BT's ubiquitous network means that, on average, it can provide services faster and at lower cost than its rivals - BT's gains a competitive advantage from its scale and scope across all TISBO markets and other fixed telecoms services - Lack of countervailing buyer power	BT
	WECLA	- BT's market share is 13% - OCPs have network at or near the majority of end-users - BT's economies of scale and scope provide limited benefit - Barriers to entry and switching expected to have limited impact on competition, which is already effective	No SMP
High bandwidth	UK excl. Hull and the WECLA	- BT's market share is 40-55% - ROCE significantly above cost of capital for the past 3 years - Declining market means that CPs are unlikely to invest or compete - BT is more likely to be connected or closer to relevant sites - BT is better able to engineer resilience services - Lack of countervailing buyer power	BT
	WECLA	- BT's market share is 8% - OCPs have network at or near the majority of end-user - BT's economies of scale and scope provide limited benefit - Barriers to entry and switching expected to have limited impact on competition, which is already effective	No SMP
Very high bandwidth	UK excl. Hull	- BT's market share is 15% - High value of services encourages deployment of alternative infrastructure - BT's economies of scale and scope provide limited benefit	No SMP

Assessment in the June BCMR Consultation

Market share and market share trends

7.176 Figure 7.5 below summarises some key metrics from the June BCMR Consultation. It should be noted that our analysis of markets within the WECLA area did not encompass the postcode sectors in Slough which, as set out in Section 5, we have now concluded are part of the same geographic market.

Figure 7.5: Summary of quantitative analysis for the wholesale market for TISBO in the UK excluding the Hull area in the June BCMR Consultation

Product market	Geographic Market	Volume growth since 2006/07	Market shares 2007	Market shares 2011
Low bandwidth	UK	-31%	BT: 89% CWW: 3% Virgin: 3%	BT: 86% CWW: 3% Virgin: 3%
Medium bandwidth	UK excl. WECLA	-48%*	BT: 45%** CWW: 29%** KCOM: 19%**	BT: 74% CWW: 8% Virgin: 7%
	WECLA	-48%*	BT: 22% CWW: 21% COLT: 42%	BT: 17% CWW: 31% COLT: 27%
High bandwidth	UK excl. WECLA	-52%*	BT: 57%** CWW: 35%** Verizon: 2%**	BT: 49% CWW: 28% Virgin: 19%
	WECLA	-52%*	BT: 18% CWW: 16% COLT: 52%	BT: 12% CWW: 31% COLT: 28%
Very high bandwidth	UK	-76%	BT: 7%** CWW: 33%** KCOM: 40%**	BT: 5% CWW: 22% Virgin: 24%

* This refers to the change in volume throughout the UK

** We did not place significant weight on these market share trends because a review of the data from the 2007/8 Review suggested that they were likely to be driven by inconsistencies in the data supplied by CPs when carrying out the 2007/8 Review.

7.177 With the exception of high bandwidth TISBO outside the WECLA, the markets where BT was designated with SMP were found to be highly concentrated and BT's share of volume was well above the threshold for the presumption of dominance. There was also a significant decline in volumes across all markets, which we expect to continue. This particularly applies to medium, high and very high bandwidths, with a number of customers migrating to AISBO services to take advantage of much lower prices for equivalent bandwidths.[812] To a large degree, many customers who remain are those using the circuits to support downstream services with very exacting requirements for low and consistent latency, such as carrying switched voice traffic.

7.178 We considered that the customers who continue to demand a TI interface for medium, high and very high bandwidth services (i.e. for bandwidths above 8Mbit/s), and continue to pay relatively high charges, do so because they need the higher

[812] As shown in Figure 7.3, the average revenue for a 34/45Mbit/s service is higher than a 1Gbit/s Ethernet circuit.

quality of service offered by TI technologies (for example, TDM voice services), or because they have sunk costs in customer premise equipment which requires the traditional interface.

Low bandwidth

7.179 We estimated BT's share of volume in this market to be 86%, which was little changed from our estimate of 89% in 2007. This is well above the threshold for the presumption of dominance.

7.180 Although the market has shrunk and is likely to continue to decline, we found it to be the largest of the relevant wholesale markets by some margin, with more than three times the number of customer circuit-ends compared to the next largest market (low bandwidth AISBO in the UK excluding Hull and the WECLA). We therefore expected a significant number of customers to continue to demand low bandwidth TISBO services during the review period of three years.[813]

Medium bandwidth outside the WECLA

7.181 Although we estimated BT's share to be higher than in 2007, we did not rely on this market share trend as an indication of market power because, having reviewed some of the data from the 2007/8 Review, we considered that a number of Ethernet circuits supplied by OCPs were mistakenly included in this market. As a result, OCP shares were overstated and BT's share understated, which exaggerated the trend.

7.182 More importantly, BT's market share of 74% was well above the threshold for the presumption of dominance.

High bandwidth outside the WECLA

7.183 We estimated that over half of the circuits supplied in this market are used by MNOs to provide connectivity between various sites within their networks. MNOs are in the process of migrating to AI services, and so we said that the overall downward trend in volume is likely to continue over the course of the review period of three years.

7.184 BT's market share was very close to the 50% threshold for creating a presumption of dominance. We also noted the apparent downward trend in BT's share. However, we considered this apparent trend was due in part to circuits which were missing from Virgin's data submitted when carrying out the 2007/8 Review. We found that Virgin's share rose from 0% to 19% in four years. According to the trend data supplied to us for the purpose of this market review, Virgin's sales of 45Mbit/s and 155Mbit/s have fallen by over 40%, which is consistent with the downward trend we see across all suppliers in the market. Therefore, we concluded that Virgin's share was likely understated in the 2007/8 Review, and consequently BT's share overstated. Based on the evidence available to us, we considered BT's share to be both high and stable in a declining market.

Medium and high bandwidths in the WECLA

7.185 We considered BT's low market share and the low concentration of supply from OCPs, in addition to fluctuations observed in the shares, indicated that no CP has

[813] This is discussed further in Sections 3 and 4, where we conclude that AI and TI circuits are not sufficiently close substitutes to be in the same economic market.

SMP in these markets. Our data showed that almost all CPs have experienced a significant reduction in circuit volumes in these markets.

Very high bandwidth

7.186 We noted that these services are used to carry highly aggregated traffic streams, and as such are often used in core networks and for long distance links. Similar to medium and high bandwidth TISBO, services in this market have historically been used to support a wide range of downstream services. Many downstream services, such as internet access or data traffic on an internal corporate network, do not require the very low latency and low jitter that TI services offer. As a result, many customers have migrated to Ethernet and WDM based services where they benefit from lower costs per unit of bandwidth.

7.187 The very high bandwidth market includes all wholesale TISBO services in the UK excluding the Hull area at bandwidths of 622Mbit/s. SDH services at higher bandwidths, such as STM16 and STM64, are included in the MISBO market for reasons explained in Sections 3 and 4. However, as market definition is a means to an end, we considered whether our SMP finding could be affected if higher bandwidth services (delivered without using WDM equipment at the customer premises) were included in the very high bandwidth TISBO market. We noted that BT only offers these higher bandwidth TISBO services using WDM, although some other operators may provide similar circuits using "native" SDH infrastructure. Therefore, we considered that the inclusion, or otherwise, of SDH circuits delivered without WDM equipment at the customer premises was not material to our SMP assessment as it would not increase BT's market share.

7.188 Overall, we considered that the share data for this market indicated that no CP has SMP.[814] As with high bandwidth TISBO, we did not attach any weight to market share trends due to inconsistencies in the data supplied by CPs when carrying out the 2007/8 Review. However, a large number of CPs supply services in this market, with five large OCPs having a share above 10%, and BT having just 5% of the market.

Profitability

7.189 Figure 7.6 below shows trends in BT's profitability across three of the wholesale TISBO markets. We did not have comparable information for the very high bandwidth market, nor did we have data disaggregated by geography (so we could not present estimates for the WECLA).

[814] In this respect we note the SMP Guidelines which state that CPs with market shares of no more than 25% are not likely to enjoy a (single) dominant position (see paragraph 75).

Figure 7.6: BT profitability in the wholesale TISBO markets

Year	Low bandwidth		Medium bandwidth		High bandwidth		Very high bandwidth	
	Reported ROCE	Adjusted ROCE	Reported ROCE	Adjusted ROCE	Reported ROCE	Adjusted ROCE	Reported ROCE	Adjusted ROCE
2010/11	13.7%	19.9%	(1.9%)	7.2%	30.8%	38%	N/A	
2009/10	19.8%	9.3%	6.6%	(1.4%)	49%	40.7%		
2008/09	8.1%	6.2%	(3.8%)	(6.3%)	22.3%	21.3%		
2007/08	8.8%	6.6%	8.4%*	5.9%*	8.4%*	5.9%*		
2006/07	-0.3%	4.1%	14%*	16.8%*	14%*	16.8%*		

Source: BT regulatory financial statements, Ofcom analysis

* Figures for 2006/07 and 2007/08 include both medium and high bandwidth services, and therefore are not directly comparable to the other years.

7.190 For low bandwidth TISBO, BT's reported ROCE increased after the 2007/8 Review, but is not significantly above BT's cost of capital.[815] However, the adjusted ROCE, which excludes holding gains/losses and other one-off adjustments[816], is somewhat higher at 20%. Furthermore, both the reported and adjusted profit figures appear to be increasing over time

7.191 For medium bandwidth TISBO, BT's reported profitability has been either low or negative on sales since 2008/09. According to the adjusted profitability data, the profits appear to be increasing, but remain well below BT's cost of capital. These figures relate to products sold throughout the UK.

7.192 For high bandwidth TISBO, BT's profitability has increased since 2008/09, and currently stands at a level which is substantially in excess of its cost of capital. Although we did not have geographically disaggregated data for profitability, our circuit data showed that the majority of BT's 155Mbit/s circuits are outside the WECLA and the Hull area.

7.193 Following the approach set out in the general assessment at paragraph 7.76 above, we regarded profits which are persistently and significantly above the cost of capital as an indicator of the existence of SMP even in the presence of *ex ante* regulation in this market, although we did not consider it to be a necessary condition for finding SMP.

7.194 However, we noted a number of caveats associated with the use of profitability to assess market power. A high proportion of the costs to supply services are common to all wholesale TISBO services. In addition, BT is price regulated in a number of the wholesale TISBO markets. It is required to provide the services on a cost orientated basis and is subject to a charge control. The trends we see in the accounting profit

[815] We considered that there are two relevant levels for the cost of capital for different parts of BT Group – one for Openreach and another for the 'rest of BT'. TISBO services are provided by the rest of BT, and the relevant cost of capital for this part of BT was 11% in 2010/11.

[816] As discussed in our general assessment of profitability, holding losses/gains reflect reductions/increases in asset values over time. We also exclude costs that fall under 'Other adjustments' (these can include a variety of product-specific adjustments, for example asset write-downs)

data may therefore reflect the effects of the choice of common cost allocation which is embedded in the price regulation more than the effects of underlying competitive conditions.[817]

7.195 Overall, we considered that BT's increasing profitability provided some evidence to support our proposed market power determination for low bandwidth TISBO and high bandwidth TISBO outside the WECLA. However, given BT's market share and the other indicators of SMP in these markets, we did not consider that the profitability evidence was necessary to reach a robust conclusion regarding SMP.

Control of infrastructure not easily duplicated

7.196 In the June BCMR Consultation, we considered that BT gains a material competitive advantage in wholesale TISBO markets outside the WECLA resulting from its extensive network infrastructure. The reasons why BT benefits in this way are explained in the general assessment of this criterion above.

Low bandwidth

7.197 The relatively low value of services in the market means that it will not always be economic for other CPs to extend their physical network to connect new sites on a case-by-case basis. It may be justified in some cases, but we considered these are likely to be where there is an expectation of increased demand and therefore higher revenues, or if this service is just one part of a higher value contract for multiple circuits and/or multiple services. Given that demand for leased lines services in this market is declining rapidly, CPs are likely to be less willing to invest to serve new customers.

Medium bandwidth outside the WECLA

7.198 As with low bandwidth circuits, we said BT's infrastructure means that, on average, it can provide service faster and at a lower cost than its competitors. As a result, we did not consider CPs in this market would be able to constrain BT's pricing behaviour.

High bandwidth outside the WECLA

7.199 This is a market of relatively high value services. As shown in Figure 7.3, the average revenue for a 155Mbit/s terminating segment is more than 20 times that of a 2Mbit/s segment. The costs associated with building network extensions are largely invariant to the bandwidth of the service provided. OCPs are therefore much more likely to duplicate BT's infrastructure on a customer-by-customer basis in this market compared to the low bandwidth TISBO market.

7.200 However, this is a mature market which is now in decline. We considered that, to a large degree, OCPs will already have replicated BT's infrastructure where this has been economic to do so. BT's high market share suggested there continue to be areas where it has not been economic to replicate the BT infrastructure – in particular, outside the WECLA. Only 24% of business sites throughout the UK have two or more alternative OCPs to BT within 200m.[818] While it is possible that CPs would be prepared to build further to supply services in this market, we considered these circumstances will become increasingly rare over the course of the review

[817] This is discussed further in the general discussion of profitability.

[818] In the June BCMR Consultation, we gave a figure of 22% but have since updated our network reach analysis. If we consider the area outside the WECLA, then 20% of business sites are with 200m of at least two OCPs.

period of three years as the market continues to decline and CPs focus their network investment on serving AISBO and MISBO markets.[819]

Medium and high bandwidths in the WECLA

7.201 Our network reach analysis suggested that the amount of alternative network infrastructure in the WECLA is significantly greater than in other parts of the UK. 96% of business sites are within 200m of at least two CP network flexibility points in addition to BT.[820] The relatively high value of the downstream services supported by the products in these markets has helped OCPs to justify the investments required to reach new customer sites. To a sufficient degree, therefore, OCPs have duplicated BT's access network infrastructure.

7.202 However, even within the WECLA, BT's trench and duct network is more extensive than both any individual OCP network and all of the OCPs combined. As a consequence, it is possible that BT would derive a competitive advantage in supplying new customers during the review period of three years. Given the declining volumes in the markets, though, we did not expect any material new demand, and so did not consider that this will have a significant bearing on competition.

7.203 In order to supply a circuit which spans the WECLA boundary, a CP will need access to infrastructure in both areas. In the absence of regulation, BT's SMP outside the WECLA could enable it to leverage its market power into the WECLA. However, given that we proposed *ex ante* regulation in adjacent relevant markets in which we said BT has SMP, we decided that this *ex ante* regulation should act to prevent leverage of market power into the present market.

7.204 Overall, therefore, we considered that BT's control of infrastructure does not give it SMP in these markets.

Very high bandwidth

7.205 The high value of the services in this market means that OCPs are generally willing to invest in the high fixed costs that are necessary to reach new customer sites. Although we did not have directly comparable data to calculate an average revenue per circuit end – as shown in Figure 7.3 for other services – we assessed the relative prices of some 622Mbit/s services relative to 155Mbit/s services. This analysis suggested that the average revenue for a 622Mbit/s service is in the region of two thirds higher than for a 155Mbit/s service. This high value implied that BT's control of infrastructure is less likely to be a source of SMP in comparison with other TISBO markets.

Economies of scale and scope

7.206 BT's scale across all TISBO markets is of particular importance. It means that BT is likely to benefit from better average equipment utilisation on its SDH network. It also means that BT is in a position to negotiate better prices from vendors. It is important

[819] A similar point was made by a number of stakeholders in response to early consultations during the 2007/8 Review. For example, in paragraph 5.25 of the July 2008 Consultation, we noted evidence of the inability for customers to find alternative suppliers outside major metropolitan areas, and unwillingness on the part of CPs to extend network coverage to reach these regions. Given the declining nature of this market, we consider it is now even less likely that CPs would be prepared to undertake these investments.

[820] In the June BCMR Consultation, we gave a figure of 92% but have since updated our network reach analysis. Our analysis of WECLA now also includes the relevant postcode sectors in Slough.

to note that these effects are driven by the scale and extent of BT's SDH network, which therefore relate to the scale and extent of BT's operation across all the TISBO markets rather than its scale within any specific relevant market. In this regard BT also benefits from additional scale driven by its internal demand for SDH circuits for use in its voice network.

Low bandwidth

7.207 The fact that BT is the former monopolist of PSTN services is of particular importance in this market. BT has by far the most extensive PSTN access network infrastructure and the largest PSTN customer base. Many of the same network assets, such as the access duct and copper cable, can be used to provide low bandwidth TISBO services. For example, all analogue and SDSL circuits and the majority of sub-2Mbit/s digital leased lines are provided using copper, as are a small proportion of 2Mbit/s tails. Overall, we considered that BT is likely to have a significant advantage over its competitors both in terms of cost and service delivery times as a result of the scope of its operations.

7.208 The costs associated with the shared part of the network may be quite significant for low bandwidth TISBO services. For example, dedicated customer access links often connect to network nodes. The equipment and infrastructure required in network nodes, and required to provide connectivity between nodes, is shared by many symmetric broadband origination services. This is particularly true of low bandwidth TISBO services which can be carried over aggregate bearer circuits. As a result, average costs may fall sharply as volumes increase.

7.209 On a local level, these economies of scale may be exhausted relatively quickly. For example, an STM1 aggregate bearer can carry up to 63 2Mbit/s circuits. Once the CP has close to this level of volume, they will have a relatively low average cost per 2Mbit/s circuit.

7.210 Overall, whilst we considered that economies of scale are relatively less important than scope in the low bandwidth TISBO market, we did consider that scale economies exist and, given the difference between BT's share of the market (86%) and the next largest CP (3%), our view was that BT is also likely to benefit from a material cost advantage over its competitors due to economies of scale.

Medium bandwidth outside the WECLA

7.211 In the June BCMR Consultation, we considered that BT has a significant cost advantage over its competitors due to its scale within this market, and more importantly because of its scale and scope across all TISBO markets, across all the relevant wholesale markets, and across all fixed telecoms markets.

High bandwidth outside the WECLA

7.212 155Mbit/s symmetric broadband origination services require a fibre connection. Although BT will not always have fibre connected to a customer site, in many cases its duct network will already be connected to provide copper based services. By contrast, OCPs are much less likely to be connected to the site, and will therefore need to dig new trenches, install ducts and gain the necessary wayleaves. In these circumstances, BT will be in a much stronger position than competitors, first by having significantly lower incremental costs for connecting to the customer site, and second, by being able to offer the connection faster than its competitors.

7.213 Furthermore, even if BT's duct network does not already reach the customer site, they are still likely to have a cost advantage since they are likely to have existing network infrastructure physically closer to the site.

7.214 Another benefit which is of particular importance to this market, is the fact that BT's extensive physical network infrastructure means that it is in a better position to engineer resilient services through physical redundancy in the network.[821]

7.215 Overall, we considered BT is likely to enjoy greater economies of scope, and will benefit from greater scale across all the TISBO markets, relative to OCPs. This leads to a cost advantage over its competitors in the supply of 155Mbit/s symmetric broadband origination services which is likely to strengthen BT's position in this market.

Medium and high bandwidths in the WECLA

7.216 BT is by far the largest provider of wholesale leased lines services as a whole, and has greater scope across fixed communications markets than its competitors. We therefore expected BT to derive some competitive advantage from the scope of its operations outside these specific markets.

7.217 However, this benefit appears to be limited, with the majority of the market having been found to be effectively competitive in the 2007/8 Review. This led us to consider that BT's scale and scope were unlikely to create a competitive advantage which allows it to act independently of competitors, customers and ultimately of consumers in this market over the course of the review period of three years.

Very high bandwidth

7.218 Although BT is likely to benefit from greater scope economies, much as in other TISBO markets, we concluded these potential benefits have not had a material impact on competition. Equally, BT's scale in this market is unlikely to generate a competitive advantage since BT has a much smaller share than a number of the OCPs.

Barriers to entry and expansion

7.219 A potential new entrant, or an existing entrant wishing to expand, will need to justify the network investment required to reach customers. For the reasons explained in the general assessment above of this criterion, there are a number of risks associated with this investment:

- BT has already made the necessary investments to serve these markets, and so potential competitors face the risk that the post-entry/post-expansion price will fall to a level which does not allow full recovery of the investment costs;
- the markets are declining rapidly, and therefore there is no guarantee that the demand will remain long enough to fully recover the costs of entry or expansion; and
- switching costs can be significant in TISBO markets. In particular, there may be compatibility issues where circuits are used in downstream markets for legacy services which rely on very old customer equipment.

[821] This point is discussed in more detail in paragraph 7.78.

7.220 We noted, however, that a significant proportion of the costs associated with entry and expansion relate to physical infrastructure which is common to all symmetric broadband origination markets. Therefore, to the extent that this infrastructure can be re-used outside the low/medium/high/very high bandwidth TISBO markets, the relevant costs are not wholly sunk.

Low bandwidth

7.221 The factors set out above imply that CPs are unlikely to contest this market as they will be unwilling to undertake the investments necessary to reach customer sites. Overall, therefore, we considered that BT is unlikely to be sufficiently constrained by other CPs, both actual and potential.

Medium bandwidth outside the WECLA

7.222 The high value of services in this market implies that these barriers are less important in comparison to the low bandwidth TISBO market. However, as shown by our network reach analysis, OCP network coverage outside the WECLA is limited. Therefore, OCPs would often need to incur substantial costs to reach new customer sites.

High bandwidth outside the WECLA

7.223 Relative to the low bandwidth market, the barriers to entry and expansion are offset to some degree by the high value of the services in this market. However, we considered that they remain significant and sufficient to impede the competitive process. In particular, the declining nature of this market led us to consider that existing and potential entrants will be less likely to invest and overcome the various barriers discussed.

Medium and high bandwidths in the WECLA

7.224 Whereas outside the WECLA the network reach analysis showed that OCPs have generally not overcome the above barriers to entry, within the WECLA the reverse is true. The main reason for this is, in our view, the higher density of customers for high bandwidth leased lines in the London area.

7.225 While the declining nature of these markets means that entry is unlikely in the WECLA, we considered that supply is already competitive.

Very high bandwidth

7.226 Entry to all wholesale TISBO markets requires significant investment in network infrastructure. However, these largely sunk costs have not deterred entry in this market. We suggested that this is because the high value of the services has allowed CPs to justify incremental investments needed to reach new customer sites.

7.227 We did not expect any material switching or new demand in this market over the course of the review period of three years, and therefore said that barriers to entry or expansion are unlikely to have a significant impact on competitive conditions.

Countervailing buyer power

Low bandwidth

7.228 Given the various impediments to competition in this market discussed above, and their relative scale, we considered that none of the fixed network CPs were likely to have any material buyer power. The only possible source of buyer power we identified in this market was from mobile network operators (MNOs). MNOs currently self-supply a large number of low bandwidth TI circuits. The majority of these circuits use fixed wireless technology. As discussed in Section 4, fixed wireless circuits fall outside the market because they are not a sufficiently close substitute, at the margin, for services provided over fixed telecoms networks. If the MNOs were able to move circuits currently bought from BT to self-supply, it is possible that this would create some buyer power. With the exception of [✂], each of the MNOs buys a significant proportion of the services supplied by BT in this market. For example, [✂]. Network sharing deals between the MNOs increase the possibility of meaningful buyer power.

7.229 The use of fixed wireless links in the radio access network varies considerably between the MNOs. For example, [✂].

7.230 However, the MNOs are in the process of changing their network architectures to cater for the rapid growth in demand for mobile data services. This is a very significant undertaking, requiring a fundamental change in the design of the network. In the future, high bandwidth Ethernet circuits will be used to backhaul traffic from radio base stations rather than multiple 2Mbit/s links. In these circumstances, it is extremely unlikely that an MNO would invest in the infrastructure required to self-supply TISBO services when the future network architecture is to be based on Ethernet. As a result, we considered that the MNOs are not in a position to make a credible threat to switch supplier of low bandwidth TISBO services over the course of the three year review period, and therefore do not possess countervailing buyer power.

Medium bandwidth outside the WECLA

7.231 Wholesale customers may have a degree of buyer power if they can make a credible threat to switch supplier. The limited extent of competing networks outside the WECLA led us to consider that any such threat would not be credible for many customers: BT's ubiquitous network, economies of scale and scope, and the barriers to entry and expansion all indicate that BT's average costs are likely to be lower than any alternative supplier. Furthermore, this market is declining rapidly, which makes it less likely that CPs will be willing to undertake the investments necessary to provide an alternative source of supply to BT.

High bandwidth outside the WECLA

7.232 We considered BT is likely to be the only commercially viable option for supply in large parts of the UK outside the WECLA. This is driven by:

- the cost of the network infrastructure investment required to serve customers;
- the fact that BT has a more extensive network infrastructure already in place;
- economies of scale and scope enjoyed by BT;
- switching costs; and

- the fact that the market is in decline.

7.233 As a result, despite the fact that BT's existing supply of wholesale 155Mbit/s symmetric broadband origination is concentrated with a small number of customers, they will often have few, if any, alternatives to BT. Therefore, we considered there to be an absence of, or low, countervailing buyer power in this market.

Medium and high bandwidths in the WECLA and very high bandwidth

7.234 Given the relatively low concentration of supply in these three markets, we did not consider an assessment of countervailing buyer power affected our proposed market power determination.

Prospects for competition

Low bandwidth

7.235 The figures presented in Figure 7.3 above indicate that low bandwidth TISBO services are unlikely to generate sufficient margin on revenues to justify more than a relatively short network extension. Similarly, these conditions are unlikely to attract new entrants.

7.236 In addition, the fact that this market is in decline makes it even less likely that CPs will invest. As a result, we did not expect this market to become more competitive over the course of the three year review period, and we did not consider there to be a credible threat of entry which would act as a constraint on BT's behaviour.

Medium and high bandwidths outside the WECLA

7.237 Demand in these markets is falling fast, and we expected this trend to continue. This decline in demand makes investment for OCPs much less commercially attractive. In addition, we did not expect any fundamental change in the costs of supply which would reduce barriers to entry and expansion. As a result, we did not foresee any substantial increase in competition over the course of the three year review period. Nor did we expect prospective competition to act as a constraint on BT's behaviour.

Medium and high bandwidths in the WECLA

7.238 We considered that demand for these services would continue to fall over the course of the three year review period. As a result, it is unlikely that there will be any new supply. However, the markets already appeared to be competitive, and we did not expect any of the larger CPs to exit the market. Therefore, we considered it unlikely that competition would deteriorate to the extent that it is no longer effective and that one, or more, CPs would hold a position of SMP.

Very high bandwidth

7.239 In the June BCMR Consultation, we said that demand for these services is likely to continue to fall over the course of the three year review period as customers switch to services using WDM and Ethernet interfaces. We did not expect to see a material volume of new supply. However, given the number of CPs present in this market, we concluded that competition both for existing supply and for any future supply will continue to be effective.

Consultation responses

7.240 In the June BCMR Consultation, we asked the following:

> *Question 7: Do you agree with our assessment of SMP for the wholesale TISBO markets in the UK excluding the Hull area?*

Low bandwidth

7.241 None of the stakeholders that responded disagreed with our SMP assessment in this market.

Medium bandwidth outside the WECLA

7.242 BT argued that no confidence can be placed on Ofcom's market share estimate of 74%, given the miscounting of circuits in 2007 and the rapid change in the market. Regarding the latter point, BT said that market shares are not a reliable indicator of market power, though it did acknowledge that if the 74% market share is accurate then it would be reasonable to find SMP.[822]

7.243 BT also said that Ofcom failed to consider the impact of alternative technologies available, noting that the volumes of TISBO services are decreasing rapidly as customers migrate to alternatives such as broadband and Ethernet.[823]

7.244 All other stakeholders that responded either agreed with our SMP assessment or made no comment.

High bandwidth outside the WECLA

7.245 BT did not agree with Ofcom's market share estimate, suggesting that it is likely to be unreliable given the low volumes. It argued that the latter makes market shares sensitive to small errors, which may have arisen due to Ofcom's processes in obtaining information from CPs.[824] BT also argued that the market is not large enough to justify regulation given that there are now of the order of only 100 external circuits.[825] Furthermore, given the small number of external circuits, BT considered that CPs are probably able to supply most of their circuits without input from BT.

7.246 BT also expressed concern that Ofcom failed to consider the impact of alternative technologies available, particularly Ethernet. It said that in a rapidly declining market, the speed of migration of remaining customers to other technologies and suppliers means that market shares are likely to be unreliable and unstable, particularly given the low volumes.

Medium and high bandwidths in the WECLA

7.247 A number of CPs disagreed with Ofcom's proposal to expand the CELA into West London, indicating that they consider BT to have SMP in the Western Extension.[826]

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[822] See Part 1 of BT's response, in particular Section 3.

[823] See Part 1 of BT's response, in particular Section 3 and Section 4.4.

[824] See Part 1 of BT's response, in particular Section 4.4.

[825] These are circuits sold by BT to other CPs (i.e. excluding internal self-supply).

[826] See responses from Colt, MBNL, UKCTA, Verizon, Virgin.

They believe the extent of alternative infrastructure in this area is much less than CELA and have requested that the Western Extension is assessed on its own merits. This is addressed in detail in Section 5.

7.248 For MNOs, MBNL noted difficulties in applying separate geographic markets to mobile backhaul, which tends to be national in nature and so is underpinned by fundamentally weaker competitive conditions than those present for business enterprise sites (as discussed above, MBNL argued that mobile backhaul is purchased from base station site to core network and not on the basis of individual network tails to individual radio sites). It also said that [✂]. For this reason, it considered that BT has SMP for medium and high bandwidth TISBO leased lines used for mobile backhaul in the WECLA.[827]

Very high bandwidth

7.249 All stakeholders that responded either agreed with our SMP assessment in this market, or made no comment.

Ofcom's considerations of consultation responses

7.250 In this sub-section, we present our final assessment for each criterion and, where necessary, explain how we have taken the consultation responses into account. We then conclude on our overall assessment.

Market shares

7.251 As discussed in paragraphs 7.60-7.63 above, we have re-estimated market shares following an internal review of the data and methodology and in light of the comments received from stakeholders. The revised shares are presented in Figure 7.7 below as our 'base case'. In addition, we present sensitivities to our estimates for BT's market share that are based on different assumptions to assess the robustness of the results. The scenarios are as follows:

- Scenario 1: No bandwidth or geographic uplift is applied.
- Scenario 2: Network-ends are identified based on CP classification for each individual circuit.
- Scenario 3: An upper-bound estimate of the number of network-ends based on CP's own classification of ends in the circuit data.
- Scenario 4: We apply an uplift for missing OCP data.
- Scenario 5: We include both circuit and network ends in the calculation.

7.252 As discussed in Section 5, the geographic market WECLA is slightly different to the WECLA area that was assessed in the June BCMR Consultation as it now encompasses additional postcodes in Slough. In this Section, we use the term 'WECLA+' when presenting service share or network reach analysis for the final set of postcodes, in order to distinguish the results from the previous WECLA area that was defined in the June BCMR Consultation. We retain the term 'WECLA' when referring to the geographic market in general.

[827] MBNL/EE response, pages 10 and 24.

7.253 Furthermore, as set in out Annex 5, for the purposes of calculating market shares we include ATM, Frame Relay and X25 interfaces as being in the TISBO product markets. In the June BCMR Consultation, these were excluded from the wholesale markets but not in a consistent manner. Having now identified the relevant services consistently, we consider it appropriate to include these services in the TISBO wholesale markets, though they are excluded from the retail TI markets. In practice, the most material volumes come from BT's CellStream and SiteConnect services. In order to test whether including these services has a material impact, we ran an additional sensitivity test that excluded these services from the market share estimates. These are presented under Scenario 6.

Figure 7.7: Revised market shares for TISBO in the UK excluding the Hull area

Product market	Geographic Market	Market shares						
		Base case	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
Low bandwidth	UK	BT: 88% COLT: 3% CWW: 2%	BT: 91%	BT: 83%	BT: 91%	BT: 85%	BT: 87%	BT: 88%
Medium bandwidth	UK excl. WECLA+	BT: 77% CWW: 12% Virgin: 4%	BT: 84%	BT: 70%	BT: 76%	BT: 71%	BT: 81%	BT: 70%
	WECLA+	BT: 13% COLT: 46% Verizon: 19%	BT: 17%	BT: 8%	BT: 16%	BT: 11%	BT: 16%	BT: 11%
High bandwidth	UK excl. WECLA+	BT: 51% CWW: 25% Virgin: 16%	BT: 64%	BT: 42%	BT: 47%	BT: 43%	BT: 54%	BT: 47%
	WECLA+	BT: 8% COLT: 45% Verizon: 21%	BT: 11%	BT: 5%	BT: 12%	BT: 6%	BT: 10%	BT: 6%
Very high bandwidth	UK	BT: 15% Level 3: 26% Verizon: 22%	BT: 22%	BT: 13%	BT: 16%	BT: 12%	BT: 23%	BT: 13%

Low bandwidth

7.254 We estimate BT's share of volume in this market to be 88%, which is two percentage points higher than our estimate in the June BCMR Consultation. The share remains well above the threshold for the presumption of dominance across all our sensitivities.

Medium bandwidth outside the WECLA

7.255 Under our base case, BT's market share is 77%, which is slightly higher than our estimate in the June BCMR Consultation and significantly above the threshold for the

presumption of dominance. Our calculations also show that this finding is robust to a range of sensitivity tests.

High bandwidth outside the WECLA

7.256 Our market shares have been slightly revised upwards since the June BCMR Consultation. Given the relatively small number of circuit-ends, we cannot conclude that our base case estimate is precise. However, in light of our sensitivity tests we are confident that BT's share is above 40%. BT's lowest share in our sensitivity tests is 42% and we consider this to be materially biased against OCPs because Scenario 2 is likely to overstate the number of OCP customer ends, due to the assumption that all blank entries for end-classification are customer-ends (see paragraphs 7.61-7.63).

7.257 We also note that, even if we apply an extreme uplift to account for missing OCP circuits under Scenario 4, BT's share remains above the 40% threshold where single dominance concerns normally arise. Furthermore, our base case excludes some CP supply of MNO backhaul (i.e. the network-to-network connections which form part of the market). If we include network ends in our estimates, BT's market share is 54%. We are therefore confident that BT's share lies within a range of 40-55% which is above the threshold where single dominance concerns normally arise.

7.258 We do not agree with BT's argument that this market is not large enough to justify regulation. Whilst BT said that there are only around 100 external circuits in the market, this only takes into account PPCs and excludes certain MNO purchases of high bandwidth services. We acknowledge that this is a relatively smaller market compared to low and medium bandwidth TISBO but this comparative analysis does not mean, in and of itself, that the market is not large enough to warrant regulation. As shown in Figure 7.8 below, BT's revenues in this market were £50 million in 2011/12. Although this figure encompasses sales across the UK, the majority of BT's sales are outside of the WECLA and so this market remains significant in financial and economic terms. Furthermore, even if BT's external sales rapidly decline its internal sales are still relevant because, in the absence of regulatory remedies, end-users remain vulnerable to a CP with SMP in the wholesale market.[828]

Medium and high bandwidths in the WECLA

7.259 Our revised market share calculations show that COLT has a market share in both medium and high bandwidth TISBO above the threshold where single dominance concerns normally arise. However, we do not consider that this is suggestive of SMP, given the presence of competing infrastructure (including BT's ubiquitous network) and multiple operators. COLT has also not benefitted from a first-mover advantage in these markets – its current position is the result of investing in infrastructure and successfully competing with BT, which initially held an incumbency advantage. Finally, we note that many medium and high bandwidth TISBO services in the WECLA have been deregulated since 2008, when we found that no CP had SMP in the CELA in the TISBO markets at bandwidths above 8Mbit/s. We have not had any complaints regarding COLT's conduct since then, and no responses to our June BCMR Consultation suggested that COLT has SMP.

[828] In particular, there is a risk of adverse effects arising from pricing distortions as a result of BT fixing and maintaining some or all of its prices in this market at an excessively high level. We consider that in the absence of SMP regulation, this risk for end-users would increase.

7.260 We note that a number of OCPs disagreed with our proposal to include West London and Slough in the WECLA. We explain why we have included these postcode sectors in the WECLA in Section 5.

Very high bandwidth

7.261 We estimate BT's share of volume in this market to be 15%, which is higher than our estimate in the June BCMR Consultation. However, we still consider the estimates to be consistent with no CP having SMP.[829] There are a large number of CPs supplying services in this market and no OCP has a market share greater than 30 percent.

External Constraints

7.262 As discussed in paragraph 7.168, for each of our SMP assessments we explicitly address competitive constraints outside the market and whether we consider them be important in our analysis of market power.

7.263 For the low, medium and high bandwidth TISBO markets, we do not consider external constraints from higher bandwidth TISBO or MISBO services will have a significant impact for two main reasons:

- price differences (discussed in Section 3) inhibit switching; and
- given that we find BT has SMP outside Hull and the WECLA in medium and high bandwidth TISBO and MISBO markets, the respective competitive constraint posed by these markets assessed as an external constraint will, by definition, be limited.

7.264 It is possible that MISBO providers could constrain CPs in the very high bandwidth TISBO market, given that price differences are not as significant and it is possible to achieve TI functionality using WDM technology. However, given that we do not consider BT to have SMP in the very high bandwidth TISBO market outside the Hull area, this constraint does not play a significant role in our analysis.

7.265 Low bandwidth AISBO is likely to be an alternative to medium and high bandwidth TISBO circuits where the end-user does not have strict service requirements. This is illustrated by the observed levels of migration during the past three years, in addition to our survey evidence which shows that 29% of leased line users are quite or very likely to switch to Ethernet.[830] AISBO is likely to be a more limited alternative for low bandwidth TISBO given the differences in price, though we note that EFM may represent a reasonable substitute for some users that do not have strict requirements. However, given that we find BT to have SMP in the low bandwidth AISBO market (both within and outside of WECLA), a limited degree of substitutability to these products is unlikely to offer a significant additional constraint in practice.[831] The switching costs for an end-user described in paragraphs 7.124-7.128 are also relevant when they are migrating from TI to AI leased lines.

[829] In this respect we note the SMP Guidelines which state that CPs with market shares of no more than 25% are not likely to enjoy a (single) dominant position (see paragraph 75).

[830] See Jigsaw Research, 'Business Connectivity Services Review (2011), page 62.

[831] Another way of considering the issue is that even if the TISBO and AISBO markets outside the WECLA were considered to represent a single market, we would still find BT to have SMP.

7.266 Some customers – for example those who need only internet access – may regard asymmetric broadband as a substitute for low bandwidth TISBO. Our survey evidence showed that 14% of end-users were either quite or very likely to replace leased lines with ADSL (though no time frame was specified in the question).[832] In some cases, therefore, a CP using a wholesale product from BT could switch the customer to broadband. However, we consider this constraint to be limited for the market as a whole because broadband is unlikely to provide the level of service most end-users require. This is supported by the fact that the majority of low bandwidth customers have not migrated to broadband, even though it is substantially cheaper than a leased line, and our survey evidence which shows that the majority of end-users have several concerns about ADSL, including contention, reliability and bandwidths. The latter will become less of an issue with the roll out of Next Generation Access, which is particularly relevant to low bandwidth and (to a lesser extent) medium bandwidth TI.[833] However, the remaining issues around functionality will continue to pose a significant barrier to switching for a number of TI users and it will not be possible for CPs (including MNOs) to use broadband technology for their backhaul solutions.[834]

7.267 We therefore conclude that products outside the TISBO markets are likely to exert only a limited constraint on any market power that a CP may possess. This is supported by the fact that the observed price differentials between TI and AI and broadband are generally much larger and more persistent than a SSNIP, yet there remain a substantial number of customers with TI circuits.

Profitability

7.268 Since the June BCMR Consultation, BT also published its 2011/12 regulatory financial statements. Figure 7.8 below presents the most recent data on profitability and revenues on the three TISBO markets for which there is data. It is not possible to distinguish between geographic areas.

[832] See Jigsaw Research, 'Business Connectivity Services Review (2011), page 62

[833] The Jigsaw survey showed that more than half of business respondents would be interested in switching to superfast broadband in the future, though it is worth noting that no time limit was set on the survey question. Furthermore, no information was given on the wider set of service features of superfast broadband and these are likely to have an impact on the switching decision.

[834] Furthermore, NGA and VULA specifically are at an early stage of development. The effectiveness of VULA is currently being considered in the Wholesale Local Access Market Review and its potential impact on business connectivity markets is uncertain. In addition, as discussed in Section 3, even if a single downstream market including NGA and leased lines were defined, it is unlikely that this would result in a different set of remedies being imposed. For example, as part of Wholesale Local Access remedies, BT is required to provide both LLU and VULA to ensure that competition can occur across the full extent of the market. Similarly, a requirement to provide Symmetric Broadband Origination (SBO) services on regulated terms could still be appropriate to support competitive provision of retail leased lines within the broader market.

Figure 7.8: BT profitability in the wholesale TISBO markets

Market	Low bandwidth			Medium bandwidth			High bandwidth		
	R ROCE	A ROCE	Rev (£m)	R ROCE	A ROCE	Rev (£m)	R ROCE	A ROCE	Rev (£m)
2011/12	18.5%	20.0%	554	9.1%	13.3%	37	34.5%	36.1%	50
2010/11	13.7%	19.9%	672	(1.9%)	7.2%	42	30.8%	38%	68
2009/10	19.8%	9.3%	654	6.6%	(1.4%)	47	49%	40.7%	77
2008/09	8.1%	6.2%	633	(3.8%)	(6.3%)	56	22.3%	21.3%	104
2007/08	8.8%	6.6%	636	8.4%*	5.9%*	161	8.4%*	5.9%*	161
2006/07	-0.3%	4.1%	641	14%*	16.8%*	159	14%*	16.8%*	159

Source: BT regulatory financial statements, Ofcom analysis. 'R ROCE' refers to reported ROCE and 'A ROCE' refers to adjusted ROCE.

* Figures for 2006/07 and 2007/08 include both medium and high bandwidth services, and therefore are not directly comparable to the other years.

7.269 The figures show that the adjusted ROCE has remained at a similar level for the low and high bandwidth TISBO markets and, therefore, above BT's cost of capital. We also see an increase in both ROCE calculations for the medium bandwidth market.

7.270 As in the June BCMR Consultation, we consider that BT's profitability in low bandwidth TISBO and high bandwidth TISBO outside the WECLA is consistent with BT having SMP in these markets, particularly given the low levels of technological innovation. However, as stated above, we do not regard the existence of profits persistently and significantly above the competitive level as a necessary criterion for finding SMP.

Control of infrastructure not easily duplicated

7.271 We consider our assessment in the June BCMR Consultation remains valid. By having connections to the majority of premises in the UK excluding the Hull area, BT has an incumbency advantage because it has already made sunk investments across the country and no other CP is able to achieve the same cost advantage.

7.272 In the WECLA, however, OCPs have largely duplicated BT's access network in areas where businesses are using medium, high and very high bandwidth TI circuits. Given the declining volumes in these markets, we do not expect BT's network to give it a significant advantage.

Economies of scale and scope

7.273 We consider our assessment in the June BCMR Consultation remains valid, in addition to the general assessment of this criterion as set out in paragraphs 7.97-7.115 above. BT's scale and scope across all TISBO and other fixed telecoms markets provides it with a significant cost advantage outside the WECLA. Within the WECLA, however, the benefit appears to be limited.

Barriers to entry and expansion

7.274 We consider our assessment in the June BCMR Consultation remains valid, in addition to the general assessment of this criterion as set out in paragraphs 7.120-7.128 above.

7.275 For high bandwidth TISBO outside Hull and the WECLA, given that the per-circuit revenues available are significantly higher (see Figure 7.3) than at lower bandwidths, we recognise this means that sunk costs associated with digging new ducts are unlikely to represent as significant a barrier to entry as for lower cost products.[835]

7.276 However, we do not consider that these factors are sufficient to constrain BT's behaviour. The main reason is that this is a mature market which is in decline. Based on discussions Ofcom has previously held with CPs, it is clear that they are focusing their network investment on serving AISBO and MISBO markets. Therefore, as stated in the June BCMR Consultation, we consider that OCPs have already replicated BT's infrastructure where it has been economic to do so.

7.277 Furthermore, whilst the presence of sunk costs associated with extending rival networks may not represent as significant a barrier to entry as for lower cost products, the scale of BT's network still confers a number of advantages, both in terms of duct and its average utilisation equipment across its SDH network. As discussed in the June BCMR Consultation, we consider that BT is in a better position to engineer resilient services through its ubiquitous network compared to OCPs. This is likely to be particularly important in this market, as the majority of circuits are purchased by MNOs, all of whom have resilience requirements.

Countervailing buyer power

7.278 We consider our assessment in the June BCMR Consultation remains valid. In the high bandwidth TISBO market outside Hull and the WECLA, we still consider that there is insufficient countervailing buyer power to constrain BT's ability to act independently of its customers. Although purchases of high bandwidth TISBO are concentrated with a small number of customers, they are only likely to have effective buyer power if they have a credible threat of switching or self-supply. As discussed in paragraphs 7.150-7.154, we do not believe that MNOs have the capability to self-supply their access network, whether using fixed wireless or other technologies, nor do they have credible alternatives to BT where there is no alternative infrastructure. Their main alternative is to therefore switch to mobile Ethernet backhaul, which they are currently in the process of doing, prompted by increased demand for bandwidth resulting from technological change in the mobile industry. However, we expect this process to continue beyond the next three years, meaning that MNOs will remain partially dependant on high bandwidth TISBO backhaul at least until the next market review. We also note that, as discussed later in this Section, we find BT to have SMP in the low bandwidth AISBO market outside Hull and the WECLA, meaning that the external constraint is limited in practice.

7.279 Within the WECLA, we disagree with MBNL that we should treat mobile backhaul differently. As discussed in paragraphs 7.155-7.156, MNOs are able to purchase from CPs other than BT in areas where there is sufficient competing infrastructure, which is the case in the WECLA. MBNL's contract with Virgin and CWW's expected

[835] Because OCPs are more likely to find it profitable to duplicate BT's infrastructure in areas where there is demand.

expansion in the supply of mobile backhaul show that MNOs are beginning to exercise this option.

Prospects for competition

7.280 We consider our assessment in the June BCMR Consultation remains valid, in addition to the arguments we set out in paragraphs 7.158-7.166.

Conclusions on Low Bandwidth TISBO (<=8Mbit/s) in the UK excluding Hull

7.281 Having undertaken a thorough and overall analysis of the economic characteristics of this market by applying cumulatively the SMP criteria, and having considered consultation responses, we have concluded that BT has SMP and will maintain this SMP over the course of the three year review period.

7.282 Based on our revised market share estimates, BT's 88% share is well above the 50% threshold for a presumption of dominance across a range of sensitivities. Furthermore, as discussed in paragraphs 7.92-7.93, the magnitude of sunk costs is very large relative to the available revenues in this market, which means that BT's ubiquitous network gives it a large competitive advantage.

7.283 We have also taken into account that this is a declining market, with volumes falling by around 10% per year. This means that OCPs are unlikely to make the necessary investments to compete with BT. Some constraint on BT's market power is likely to come from further migration, particularly to AI and broadband. However, as discussed above, we consider that this constraint on prices will be limited over the next three years in the context of the whole market, which remains by far the largest of the wholesale TISBO markets covered in this review in terms of both and volume and revenue.

7.284 Overall, we therefore consider that BT's cost advantages due to its network assets and its scale and scope, the high barriers to entry and expansion, the declining demand, and BT's very large share of the market, lead us to conclude that BT will have the ability to act to an appreciable extent independently of its competitors, customers and consumers over the course of the three year review period.

Conclusions on Medium Bandwidth TISBO (>8Mbit/s and <=45Mbit/s) in the UK excluding Hull and the WECLA

7.285 Having undertaken a thorough and overall analysis of the economic characteristics of this market by applying cumulatively the SMP criteria, and having considered consultation responses, we have concluded that BT has SMP and will maintain this SMP over the course of the three year review period.

7.286 Our market shares show that BT's share is above the 50% threshold for a presumption of dominance across a range of sensitivities. In addition to the evidence on market shares, we also consider that BT's access network infrastructure creates a considerable competitive advantage. As in the low bandwidth market, other CPs will not be able to achieve the same scale and scope economies and they will also face the need to incur significant sunk costs whenever civil engineering work is required to provide a service. In the past, CPs would incur these costs where the downstream service was of sufficiently high value. However, given the rapidly declining demand in this market, we consider that, in all but exceptional circumstances, OCPs and customers will not be prepared to make the necessary investments to contest either BT's current supply or potential future supply to any material degree.

7.287 Overall, we therefore consider that BT's cost advantages due to its network assets and its scale and scope, the high barriers to entry and expansion, the declining demand, and BT's large share of the market, lead us to conclude that BT will have the ability to act to an appreciable extent independently of its competitors, customers and consumers over the course of the three year review period.

Conclusions on High Bandwidth TISBO (>45bit/s and <=155Mbit/s) in the UK excluding Hull and the WECLA

7.288 Having undertaken a thorough and overall analysis of the economic characteristics of this market by applying cumulatively the SMP criteria, and having considered consultation responses, we have concluded that BT has SMP and will maintain this SMP over the course of the three year review period.

7.289 Our market share estimate indicates that BT's share lies within a range of 40-55% which is above the threshold where single dominance concerns normally arise. Furthermore, the declining nature of the market means that OCPs and end-users are less willing to make the investments necessary to contest BT's supply, which also results in limited countervailing buyer power. These competition problems are reinforced by BT's scale and scope advantages. We also note the fact that BT's reported and adjusted ROCE has been substantially higher than its cost of capital for the past four years, which is consistent with SMP (particularly as this is not a market characterised by high levels of innovation).

7.290 Overall, we therefore conclude that BT will have the ability to act to an appreciable extent independently of its competitors, customers and consumers over the course of the three year review period.

Conclusions on Medium and High Bandwidth TISBO in the WECLA

7.291 Having undertaken a thorough and overall analysis of the economic characteristics of these markets by applying cumulatively the SMP criteria, and having considered consultation responses, we have concluded that no operator enjoys a position of SMP, and that no operator will enjoy a position of SMP over the course of the three year review period.

7.292 We rely on the reasoning set out in the June BCMR Consultation, and set out above, to support our conclusions. In this respect the only significant change is that the market shares now include a number of postcode sectors in Slough.

7.293 Although we consider the prospects for additional entry to be poor given the declining demand, the evidence we have gathered shows that no individual competitor has a material advantage over others. Therefore, we conclude that competition in these markets is effective, and will continue to be effective over the course of the three year review period.

Conclusions on Very High Bandwidth TISBO (622Mbit/s) in the UK excluding Hull

7.294 Having undertaken a thorough and overall analysis of the economic characteristics of this market by applying cumulatively the SMP criteria, and having considered consultation responses, we have concluded that no operator enjoys a position of SMP, and that no operator will enjoy a position of SMP over the course of the three year review period.

7.295 The potential revenues available from supplying these services are much higher than in other TISBO markets, which has incentivised OCPs to make the incremental investments to reach new customer sites. This is reflected in our revised market shares, which show that no CP has a market share above 40%.

7.296 Consistent with the direction of travel expected in the other TISBO markets, we expect the number of 622Mbit/s circuits to decline over the course of the three year review period and so it is unlikely that there will be any significantly new supply in the market. Therefore, we conclude that competition in this market is effective, and will continue to be effective over the course of the three year review period.

Wholesale market for AISBO in the UK excluding the Hull area

7.297 In this sub-section, we set out our SMP assessments for the two low bandwidth AISBO (<=1Gbit/s) markets outside Hull:

- the UK excluding the WECLA; and
- WECLA.

7.298 Consistent with our proposals in the June BCMR Consultation, we conclude that BT has SMP in both markets, but we also continue to consider that the prospects for increased competition in the WECLA are better than those in the other wholesale markets in which we have concluded BT has SMP.

7.299 Our conclusions are based on a thorough and overall analysis of the economic characteristics of these markets over the course of the three year review period, based on existing market conditions. In our SMP assessment, we have had particular regard to the SMP criteria summarised in Figure 7.9 below in assessing BT's power to behave to an appreciable extent independently of its competitors, customers and consumers.

Figure 7.9: Summary of SMP determinations for the wholesale markets for low bandwidth AISBO in the UK excluding the Hull area

Geographic market	Results criteria applied for SMP assessment	Proposed SMP designation
UK excl. Hull and the WECLA	- BT's market share is 74% - Revenues are not large enough for OCPs to justify investments. BT has already sunk its infrastructure costs. - BT gains a competitive advantage from its scale and scope in other communications services - Presence of switching costs - Lack of countervailing buyer power as majority of BT's sales are internal	BT
WECLA	- BT's market share is 45-55% - BT remains the dominant supplier of CP backhaul - BT requires, on average, fewer and shorter network extensions to reach new customers - Presence of switching costs - Lack of countervailing buyer power - BT has maintained its position since 2007/8	BT

Assessment in the June BCMR Consultation

Market share and market share trends

7.300 Figure 7.10 below summarises some key metrics from the June BCMR Consultation. It should be noted that our analysis of markets within the WECLA area did not encompass the postcode sectors in Slough which, as set out in Section 5, we have now concluded are part of the same geographic market.

Figure 7.10: Summary of quantitative analysis for the wholesale market for AISBO in the UK excluding the Hull area in the June 2012 consultation

Geographic Market	Volume growth since 2006/07	Market shares 2007	Market shares 2011
UK excl. WECLA	78%	BT: 69% Virgin: 13% KCOM: 7%	BT: 67% Virgin: 26% KCOM: 2%
WECLA	86%	BT: 47% COLT: 31% Virgin: 7%	BT: 45-50% COLT: 22% Virgin: 15%

*2007 shares based on adjusted 2007 data. See discussion below for further details.

Source: CP data, Ofcom analysis

7.301 We estimated that volumes have grown substantially in the AISBO markets since 2006/07. We expected demand to continue to increase over the course of the three year review period, with the highest rates of growth for 1Gbit/s services. As discussed below in paragraphs 7.332-7.333, there is a considerable amount of potential demand from MNOs as they migrate from TI circuits to Ethernet. Equally, existing customers of lower bandwidth circuits are likely to upgrade to higher bandwidths as the use of data-intensive applications and services continues to rise.

AISBO outside the WECLA

7.302 We found that BT had maintained its position in the market with our estimates showing its share had not changed significantly during the previous four years. We also noted that in the 2007/8 Review, albeit in relation to the geographic area of the UK excluding the Hull area, we found that BT's volume share had not changed significantly since 2004.[836]

7.303 In terms of market share trends, we also considered the share of net additions. These showed that BT and Virgin supplied virtually all of the growth in demand in the market, with BT supplying about 50% more new services than Virgin. We regarded this past data as relevant to informing our view on how these markets could be expected to develop over the course of the three year review period. On the presumption this trend was to continue, it suggested that Virgin is likely to increase its share of the market, but that BT will continue to have a market share well above the 50% threshold for a presumption of dominance.

AISBO in the WECLA

7.304 The market shares included in the June BCMR Consultation reflected our classification, at the time, of ends as 'customer' or 'network' (a full discussion of this

[836] BT's share of AI circuits at all bandwidths was estimated to be 75% in 2004, falling to 73% in 2006.

can be found in Annex 5). We concluded that BT's share was unlikely to be below 45% or much above 50%. For the purposes of our SMP assessment, we interpreted the market share estimates in the following manner:

- we considered BT's true share of low bandwidth AISBO customer circuit-ends in the WECLA was likely to be within the range 45%-50%;
- in light of the test on a sample of OCP data, we considered that BT's true share could be as high as, but unlikely to be significantly higher than, 50%; and
- we did not discern a clear trend in BT's market share in the period since the 2007/8 Review, and therefore we considered that BT has, on the whole, maintained its position in the market.[837]

7.305 On this interpretation, it appeared that relatively successful OCPs, such as Virgin, have gained share not at BT's expense, but at the expense of other competitors to BT. BT has around twice the volume of the second largest competitor, and although OCP shares appeared to be more evenly distributed, the market remains highly concentrated.

Profitability

7.306 We noted that BT's regulatory financial statements do not provide geographically disaggregated data. For the UK as a whole, BT's reported ROCE for low bandwidth AISBO services was 4.5% in the financial year 2010/11 on revenues of £554m. However, we noted that the adjusted ROCE is somewhat higher at 12.4%. Both reported and adjusted profitability figures appear to be on a downward trend, but this may simply reflect the effect of existing price regulation rather than any increase in competitive intensity.

Figure 7.11: BT profitability on sales of wholesale low bandwidth AISBO services

Product	Year	Reported ROCE	Adjusted ROCE	Turnover (£m)	Reported profit (£m)	Adjusted profit (£m)	Mean Capital Employed (£m)
Wholesale low bandwidth AI services	2010/11	4.5%	12.4%	554	58	161	1,301
	2009/10	25.4%	14.5%	489	284	162	1,120
	2008/09	37.3%	33.8%	494	325	295	873
	2007/08*	31.1%	28.4%	439	266	245	862
	2006/07*	26.9%	31.3%	344	170	197	630

* Figures for 2006/07 and 2007/08 relate to all bandwidths of AI services, whereas data for subsequent years will exclude sales of services above 1Gbit/s.

[837] In the June BCMR consultation, we noted that CPs may have misclassified circuit ends because they were often unable to identify the network sites of other operators (see paragraphs 7.215-7.219 of the June BCMR consultation or paragraphs 7.61-7.63 and Annex 5 of this Statement). It is for this reason that BT submitted a revised circuit dataset during the current Review, as its original dataset only classified a circuit end as a network end if it was explicitly recorded on their systems. Our circuit end counts in the 2007/08 Review are likely to have suffered from a similar misclassification, which creates a problem in terms of assessing market share trends. Our estimates of market shares for 2007 in Figure 7.10 therefore resulted from an adjustment to account for differences in end-type classification and enable an approximate like-for-like comparison. Specifically, BT's volume in 2007 was deflated by the same proportion as the change in the number of low bandwidth AISBO circuit ends in the WECLA between the original and new BT submissions for this Review. Given the sensitivity of our share estimates to this adjustment, the trends identified provided an approximate picture of market developments since the 2007/08 Review.

Source: BT regulatory financial statements, Ofcom analysis

7.307 In the June BCMR Consultation, we did not place any weight on low profitability in our SMP assessment, and therefore did not consider that this criterion provided material evidence either for or against our market power determination.

Control of infrastructure not easily duplicated

7.308 To a large degree, wholesale AISBO services require the same physical fixed network infrastructure as wholesale TISBO services, and require the same sunk costs to reach and connect to customer sites. BT's extensive network infrastructure creates a significant competitive advantage – the network enables it to supply low bandwidth AISBO services at most locations more quickly than its competitors and without incurring substantial additional costs.

AISBO outside the WECLA

7.309 Our network reach analysis showed that OCP network infrastructure is quite limited outside the WECLA. However, we also considered that even within areas served by OCPs, BT still has a competitive advantage due to the extent of its network. Specifically, BT is likely to either have network infrastructure already connected to a site,[838] or to have infrastructure very close by.

7.310 By contrast, we expected that OCPs will generally require ductwork to reach new customer sites. Even if a CP's network runs along the same street as a customer site, the CP will still need to build a small amount of additional duct to reach the building unless it has already sold services to a customer in the same building.

7.311 In order to assess these inferences, we collected data from OCPs and BT regarding investments in network extensions to support new customer connections.[839] The BT data suggested that it requires new ductwork for less than [✂]% of new Ethernet connections, and these have a median build distance of [✂] and an average of [✂].

7.312 Although we did not have directly comparable data for OCPs,[840] we estimated that COLT and Virgin[841] require new ductwork for over [✂]% of new connections, which is around four times as many cases as BT. We also found that both the median and average build distances of these network extensions are approximately double those

[838] Given BT's scale and scope in other fixed telecoms markets, it is much more likely to have already sold to a customer in the same building, for example to provide voice telephony.

[839] Ofcom collected data from BT regarding the excess construction charges (ECCs) levied on Openreach sales in the six month period from April to September 2011. BT has also provided a detailed breakdown of the constituent elements of the ECCs in a sample period of a week. ECCs are raised by BT in addition to normal connection charges whenever new infrastructure is required to deliver a service (for details of these charges, and examples of the activities which result in these charges, see http://www.bt.com/pricing/current/Excess_Construction_boo/2-1319_d0e1.htm). We have also collected data from OCPs regarding network extensions built in the period since the 2007/8 Review.

[840] Whilst we have data regarding network extensions built by OCPs, we do not know precisely which of the circuits sold by an OCP are self-supplied. This is important because the production decision is different for an OCP due to the availability of regulated wholesale inputs from BT. When considering how to supply a new customer, an OCP can find out how much it is likely to cost using BT's infrastructure in addition to working out the costs of self-provision. If the customer site is a significant distance from its network, then an OCP is likely to buy inputs from BT (or possibly another supplier). As a result, the proportion of sales which result in new ductwork is likely to be biased downwards relative to BT who will almost always use its own network infrastructure."

[841] We believe that COLT and Virgin both self-supply a large proportion of low bandwidth AISBO services, and we also have data from both of these CPs regarding the network extensions completed since the last market review.

of BT. Therefore, we considered that this supported our view that BT benefits from a competitive advantage due to the extent of its network *even in areas where competitors have access network infrastructure.*[842]

7.313 Overall, we found that BT's control of a ubiquitous network infrastructure suitable for providing low bandwidth AISBO services gives BT a significant competitive advantage over its competitors.

AISBO in the WECLA

7.314 We noted that, as discussed in relation to the medium and high bandwidth TISBO markets in the WECLA, CPs have built significant access networks within this area. Any advantage which BT derives from the extent of its network infrastructure in the WECLA is likely to be smaller than in other areas. The question that remains is the extent to which BT continues to derive a material competitive advantage from the fact that the coverage of its network assets is more comprehensive than any of its competitors.

7.315 As discussed in relation to the low bandwidth market outside the WECLA, even in areas where OCPs have network infrastructure, they generally require ductwork to reach new customer sites. Unless a CP has already sold leased lines services to a customer in the same building, it will need to build some additional duct to reach the building. The same is true for BT. However, given BT's scale and scope across all fixed telecoms markets, our view was that BT is more likely to have already sold a fixed telecoms service to a customer in the same building, and therefore will have already established a physical connection to that site. Our view, therefore, was that OCPs will be less competitive relative to BT, particularly in relation to lower value sites and contracts.[843]

7.316 In the June BCMR Consultation, we put forward two pieces of evidence to support these views. First, the data on build distances and ECCs showed that OCPs require network extensions more often than BT, and have to build further on average to reach customer sites. Secondly, BT provides low bandwidth AISBO services to more than twice the number of sites in the WECLA relative to all the OCPs combined.[844] In light of our market share estimates, this suggested that OCPs sell relatively more to each site served. This is consistent with the idea that OCPs are less successful, or less interested, in serving relatively lower value sites/customers which require fewer services.

7.317 Consequently, we considered BT is likely to benefit from its large network which means that, on average, it can connect new customers at lower incremental cost and faster than its competitors.

[842] This analysis is based on services sold throughout the UK, and as noted, is heavily influenced by the presence of existing regulation of services within this market. However, we believe it provides some quantitative evidence in support of our position that BT derives a significant competitive advantage from the ubiquity of its network.

[843] For example, customers requiring a single circuit.

[844] We considered the postcodes of each low bandwidth AISBO circuit end provided by the five largest CPs in WECLA. These CPs account for 94% of the market, so we believe this analysis should be representative. In total, there are 4,631 unique postcodes representing the total number of sites served by these CPs in this market. BT provides services to 4,070 and the OCPs provide service to 1,875.

Economies of scale and scope

7.318 As with all the relevant wholesale symmetric broadband origination markets, the low bandwidth AISBO market is characterised by economies of scale and scope. However, in the June BCMR Consultation we said that BT's scale specifically within this market is less important, particularly for Ethernet services provided over point-to-point fibre. A proportion of the point-to-point infrastructure is incremental to an individual customer site and not shared and therefore is subject to economies of scale only to the extent that multiple services are provided to the same site.[845]

7.319 BT does, however, benefit from the ability to use the network infrastructure which has been deployed to provide services in other communications markets, in particular TISBO services and PSTN services. BT is often already connected to a customer site, which led us to consider that, on average, it can provide low bandwidth AISBO services more cheaply and quickly than OCPs.

Barriers to entry and expansion

AISBO outside the WECLA

7.320 We considered there to be considerable barriers to entry and expansion in this market. These stem primarily from the high sunk costs required to build network infrastructure and the associated economies of scale and scope. They also derive from switching costs, as discussed in the general assessment above.

7.321 EFM is an option for supplying lower bandwidth AI services. CPs can provide EFM services using regulated access to BT's copper infrastructure. This reduces the barriers to entry and expansion. However, EFM has a theoretical maximum bandwidth of 40Mbit/s using 8 bonded copper pairs, and more realistically will be used to provide services up to 20Mbit/s. These services are also limited by the fact that the service level guarantees for the underlying copper input do not match those offered on BT's fibre-based leased lines. Over the course of the review period of three years, with greater demand growth expected at higher bandwidths, we did not consider EFM would act as an effective constraint on AISBO prices across the market as a whole.

7.322 Consequently, we considered that barriers to entry and expansion are significant in this market and imply that competition is likely to be slow to develop and to erode BT's current market position.

AISBO in the WECLA

7.323 Relative to other geographic areas, we considered the barriers to entry and expansion are lower in WECLA due to the high density of businesses in this area and the number of sites with multiple occupants.

7.324 Significant sunk costs are still required to build the network infrastructure to compete in wholesale markets in the WECLA, but the high potential demand mitigates the risks associated with this investment. This is sometimes referred to as economies of density whereby the average cost per customer passed by the fixed network decreases as the density of customer sites increases. Barriers to entry and barriers to expansion are therefore lower in the WECLA compared to other areas in the UK.

[845] See discussion of this point, and the definitions of scale and scope economies, in paragraphs 7.97-7.115.

7.325 A large number of CPs have already entered the market and have built access network infrastructure in the WECLA. As a result, we did not consider that barriers to entry were likely to have a material impact on competition in this market. However, as discussed above, CPs still face significant costs extending their networks to reach customer sites, and we therefore noted barriers to expansion as a potential concern.

7.326 Our initial conclusion was that barriers to expansion remain a significant factor affecting competition in this market and will continue to do so over the course of the three year review period. BT continues to have a cost advantage over competitors due to the fact that its network infrastructure is already connected to most sites in the WECLA. This contributed to our view that the current level of competition in the market is unlikely to be able to provide an effective constraint on BT's behaviour.

Countervailing buyer power

7.327 In the June BCMR Consultation, we said that buyer power is unlikely to mitigate BT's SMP both outside and inside the WECLA. Wholesale purchasers need to be able to make a credible threat to switch supplier, or to meet their requirements through self-supply, for a significant proportion of their demand if buyer power is to have a material impact on competitive conditions.

7.328 However, the largest customers of BT's wholesale services are its own downstream businesses. Approximately 60% of low bandwidth AISBO services sold by Openreach are internal sales – both by volume and by revenue. In all but a handful of exceptional cases, BT's downstream businesses will not use alternative suppliers for wholesale symmetric broadband origination. Therefore, any countervailing buyer power would need to come from sales to external customers.

AISBO outside the WECLA

7.329 We estimated that BT's two largest external customers in this market account for approximately one quarter of external supply, with the remaining supply much less highly concentrated. Both CPs have relatively extensive network infrastructure. Consequently, we expected that they would use this infrastructure to provide services wherever it is financially viable. This means that although it may be economic for CPs to extend their networks in some areas, in those areas where they currently buy services from BT, it is likely that they do not have network infrastructure sufficiently close to the customer site to generate a credible threat to self-supply these services, and we did not expect this situation would change over the course of the three year review period.

7.330 In this regard, we noted that one of these two CPs provided us with a forecast for its sales of leased lines, and the proportion it expected to provide over BT's network. This suggested that 100% of 10Mbit/s, 86% of 100Mbit/s and 60% of 1Gbit/s services will be provided using BT wholesale inputs.

AISBO in the WECLA

7.331 In the WECLA, whilst further entry and competitive investment in the low bandwidth AISBO market will provide BT's customers with more viable options to which to switch, we did not consider that any were likely to become of sufficient size to exert material countervailing power over the course of the three year review period. Consequently, we did not consider the current low level of countervailing buyer power would change sufficiently over the course of the review period of three years.

Prospects for competition

AISBO outside the WECLA

7.332 We expected the demand for these services to continue to grow rapidly over the course of the three year review period. In particular, we considered it likely that MNOs will migrate existing TISBO services to AISBO. This potentially presents an opportunity for entry and expansion by CPs:

- bandwidth requirements are likely to continue growing rapidly as retail customers make greater use of mobile data services;
- the demand is highly concentrated in a small number of customers, which creates the prospect of very high value contracts; and
- the geographic location of the demand is stable, and supply contracts are likely to be long term.

7.333 These circumstances give CPs a very good opportunity to invest in extending their networks and to recover the costs over the expected life of the contract. We found some evidence of this effect with Virgin announcing a £100million deal to provide connectivity to MBNL (which manages the backhaul networks of Everything Everywhere and Three).[846]

7.334 However, we considered it likely that a substantial proportion of demand from MNOs will remain with BT. First and foremost, BT has already sunk costs in extending its network to reach a large proportion of MNO sites in providing TI-based connectivity. In most cases, the passive infrastructure currently used to provide TI circuits can simply be re-used to provide AI services. This puts BT at a significant cost advantage to its competitors.

7.335 More generally, given the high sunk costs associated with building networks, the economies of scale and scope, and the other barriers to entry and expansion discussed above, we did not consider that competition is likely to become sufficiently effective, and neither did we consider that the threat of increased competition would act as an effective constraint on BT's behaviour, over the course of the three year review period.

AISBO in the WECLA

7.336 We expected that demand will continue to grow quickly during the review period, with growth likely to be focused on higher value 100Mbit/s-1Gbit/s services. Also, our analysis showed that there is considerable alternative network infrastructure already in place within the WECLA. This will support both existing and potential new entrants. Equally, EFM can be used to provide lower bandwidth services, and potentially provides a cheaper entry point for customers migrating from low bandwidth TISBO services.

7.337 However, although competition is likely to increase, we did not consider that it would become effective over the course of the three year review period in the absence of regulation. On the one hand, competitors have already gained a significant share of this market but, on the other, some barriers to entry and expansion remain. Given the expectation of rapidly growing demand at the time of the 2007/8 Review, similar

[846] See http://www.virginmediabusiness.co.uk/News-and-events/News/News-archives/2011/MBNL/

prospects for competition existed at that time. Despite such positive prospects for competition[847], our proposed market power determination was that BT continues to have SMP.

Consultation responses

7.338 In the June BCMR Consultation, we asked the following:

> *Question 8: Do you agree with our assessment of SMP for the wholesale AISBO markets in the UK excluding the Hull area?*

AISBO outside the WECLA

7.339 All stakeholders, with the exception of BT[848], agreed with Ofcom's SMP assessment and proposed market power determination. BT's main criticisms were around geographic market definition – specifically, it did not disagree with the SMP finding throughout the UK but argued that Ofcom should redefine its specification of the WECLA and determine other metropolitan areas as competitive, particularly for 1Gbit/s services.

7.340 BT also said that Ofcom made various errors in its market share estimates. These issues are summarised and addressed separately in Annex 5. BT disagreed with our assertion that BT supplying 50% more new services than Virgin will mean that BT continues to have a market share above 50%[849], given the "acute difficulties of interpretation of Ofcom's information requests" and the fact that the market is rapidly expanding. It also noted Ofcom's acknowledgement in the June BCMR Consultation that we had understated the network coverage of Virgin.

7.341 BT acknowledged that barriers to entry and expansion, economies of scale and scope and control of infrastructure confer some limited competitive advantage to BT. However, it suggested that Ofcom acknowledge that 1Gbit/s services have a higher retail value than lower bandwidth services and that OCPs are likely to be more willing to invest to acquire new customers. BT argued that this reduces barriers to entry and implies that BT's network does not give it a significant competitive advantage. BT also suggested that Ofcom should provide empirical evidence on switching costs.

7.342 On countervailing buyer power, BT argued that purchasers can exert buyer power based on knowledge of alternatives, which is high in this market. In terms of prospects for competition, BT said that these are good in most areas where businesses are present, particularly the urban and suburban areas covered by Virgin.

7.343 BT also commissioned a report by DotEcon[850], which included an assessment of Ofcom's market share estimates. It noted that Ofcom's inability to look at revenues when assessing market shares would bias the results against BT because OCPs are

[847] In the June BCMR Consultation, we said that there were 'positive prospects for competition' in the sense that competition could become effective beyond the three year forward-look period. We explain this further in paragraphs 7.399-7.411.

[848] BT's detailed response on this market can be found in Part 1 of its response, in particular Section 3 and Section 4.4.

[849] In the June BCMR Consultation we found that BT and Virgin supplied virtually all of the growth in demand for AISBO services outside Hull and the WECLA, with BT supplying about 50% more new services than Virgin. We argued that this suggested that BT will continue to have a market share well above the 50% threshold for a presumption of dominance.

[850] See part 2 of BT's response.

likely to focus on fewer, high-value customer sites, whereas BT serves a larger number of small end-users. It noted that this is a particular concern for AI services because the market covers a wide range of bandwidths.

7.344 All other stakeholders either agreed with Ofcom's SMP assessment or did not comment.

7.345 Level 3 said they were surprised that only 60% of low bandwidth AISBO services sold by Openreach are internal sales, as previous discussions across industry indicated that it was closer to 90%. They asked that Ofcom confirm this data, perhaps by checking with the OTA.[851]

7.346 Sky agreed with Ofcom that competitive conditions for AISBO services outside the WECLA and Hull remain largely unaltered since the 2007/8 Review, which is considered to be a consequence of BT's extensive network advantages and high barriers to entry and expansion due to substantial sunk costs and significant economies of scale and scope.[852]

AISBO in the WECLA

7.347 BT did not agree with Ofcom's market power assessment.[853] Many of its criticisms relate to market shares, which BT believes to be less than 40%. The issues in market share calculations are addressed in Annex 5.[854] BT also said that Ofcom should not place much emphasis on market shares, given that this is a rapidly expanding market and barriers to entry are low.

7.348 With regards to profitability, BT said that low levels of profits should not be disregarded when assessing SMP.

7.349 In relation to control of infrastructure, BT argued that Ofcom should draw the same conclusion as it does in the medium and high bandwidth TISBO markets in the WECLA, namely that there is significantly more alternative network infrastructure than outside the WECLA. Given that the same network is used to provide TISBO and AISBO services, BT considered it illogical and inconsistent for Ofcom to reach different conclusions. BT also disagreed that OCPs will generally require ductwork to new customer sites, as in the June 2012 consultation Ofcom found that the incidence and average value of ECCs incurred by BT are slightly higher than for CPs.

7.350 In terms of economies of scale, BT agreed with Ofcom that scale is unlikely to be a significant factor in the access network because most services are provided point-to-point (so economies scope arise only if multiple services are provided to the same site). BT also said that it is misleading just to look at business connectivity services alone because OCPs will likely wish to offer the range of telecoms services to end-users, which could lower any benefit to BT from being present across all services.

[851] Level 3 response, page 15.

[852] See BSkyB response, page 3.

[853] BT's detailed response on this market can be found in Part 1 of its response, in particular Section 3 and Section 4.4.

[854] BT also said, in relation to AISBO services in the WECLA, that Ofcom should include relevant OCP-provided circuits using EFM and SDSL. In terms of the latter, BT said that the service interface is likely to meet the definition of AISBO rather than TISBO.

7.351 On barriers to expansion, BT disagreed with Ofcom's conclusions by suggesting that the same analysis for medium and high bandwidth TISBO markets in the WECLA should apply, namely the high percentage of businesses with an OCP network within 200m in the WECLA. Given the high density of customers in the WECLA and the number of businesses with multiple tenants and extensive CP networks, BT does not consider itself to have a material advantage.

7.352 Regarding countervailing buyer power, BT disagreed with Ofcom's focus on the size of the customer. Instead, it said we should focus on the ability to self-supply and customers' knowledge of other sources of supply. This would show that there are CPs who are able to exert buyer power on BT, particularly MNOs, though small firms are also able to learn from websites and trade associations about a wide range of telecom services. They are also likely to source all telecom products from one provider, including voice and internet access.

7.353 In terms of the prospects for competition, BT considered it contradictory for Ofcom to argue that the prospects for competition are strong but that they will not become effective over the course of the review period. The comparisons with the 2007/8 Review were not considered relevant by BT because Ofcom concluded there was only one national market. It also did not agree with our assertion that CPs find it difficult to pass on ECCs through increased connection charges in this market. In cases where the CP subsidises connection costs, BT said that they may recover ECCs through additional services to the customer once they are 'on-net'. This suggests that the prospects for competition are good in this market, as CPs are willing to absorb upfront costs on the basis they will be able to secure a return on their investment. BT considered that Ofcom should carry out further research before making conclusions about the commercial models adopted by CPs.

7.354 Lastly, BT argued that the competitive position for 1Gbit/s AISBO services is different to lower bandwidth services because they have comparatively high retail value and so greater competitive constraints. It estimated that its service share for 1Gbit/s services in the London area[855] is much lower than 40% and argued that Ofcom should consider either not regulating 1Gbit/s services or imposing less stringent remedies. It also said that Ofcom failed to take account of self-built networks, including those that use dark fibre. Although the latter is particularly relevant in the MISBO market, BT believes that it will have a significant impact in relation to 1Gbit/s within the WECLA.

7.355 All other stakeholders either agreed with Ofcom's SMP finding or had no comment, though some CPs disagreed with parts of the underlying analysis.

7.356 Exponential-e argued that there is no competitive market for access circuits to business premises in the area defined as WECLA. Their data showed that they have to use Openreach access products to reach its customers in the WECLA area around [✂]% of the time, which is very different to Ofcom's proposed market share for BT. Exponential-e also said that statistics presented by Openreach at the Ethernet Service Forum appeared to show BT increasing its share in the AISBO market. [856] [✂]. It also noted that BT has not lowered its price in the WECLA, even though current regulations do not prevent this. They say that this supports the fact that BT is not competitively constrained.[857]

[855] This is broader than Ofcom's proposed WECLA.

[856] Exponential-e response, pages 4-6.

[857] Exponential-e response, page 11.

7.357 Level 3 expressed concern about the data underpinning Ofcom's estimates of market shares, as the reductions between 2007/8 Review and the 2012 BCMR were not considered likely.[858]

7.358 MBNL/EE's concerns about mobile backhaul have been discussed above. In relation to this particular market, they noted the future roll-out of small-cell sites. [✂].

7.359 TalkTalk supported Ofcom's assessment in both low bandwidth AISBO markets, arguing that entry barriers remain very high such that the prospect for any competitive constraint developing over the market review period is considered very remote.[859]

Ofcom's considerations of consultation responses

7.360 In this sub-section, we present our final assessment for each SMP criterion and, where necessary, explain how we have taken the consultation responses into account. We also provide details of our assessment for 1Gbit/s AISBO services in the WECLA, which addresses BT's comments on this issue. We then conclude on our overall assessment.

Market shares

7.361 Following updates to our estimates of market shares, our revised calculations are presented in Figure 7.12 below. As with the market shares for the TISBO markets, the scenarios are as follows:

- Scenario 1: No bandwidth or geographic uplift is applied.
- Scenario 2: Network-ends are identified based on CP classification for each individual circuit.
- Scenario 3: An upper-bound estimate of the number of network-ends based on CP's own classification of ends in the circuit data.
- Scenario 4: We apply an uplift for missing OCP data.
- Scenario 5: We include both circuit and network ends in the calculation.

7.362 We also include an additional scenario that weights circuits by bandwidths, using the average revenues in Figure 7.3. This acts as a proxy for revenue and allows us to verify the volume-based market shares.[860] As discussed in Section 5, the geographic market WECLA+ is slightly different to the WECLA area that was assessed in the June BCMR Consultation as it now encompasses additional postcodes in Slough. We use the term 'WECLA+' when presenting service share or network reach analysis for the final set of postcodes, in order to distinguish the results from the previous WECLA area that was defined in the June BCMR Consultation. We retain the term 'WECLA' when referring to the geographic market in general.

7.363 In relation to BT's comment about Ofcom's exclusion of SDSL and EFM circuits, the latter are already included in the low bandwidth AISBO markets. Since the June

[858] Level 3 response, page 11.

[859] TalkTalk response, page 8.

[860] This proposal was suggested by BT in its consultation response.

BCMR Consultation, we have also requested updated EFM sales data from CPs to assess whether recent market developments would have a material impact on our analysis. Having received data from the largest EFM suppliers, we are satisfied that they do not have a significant impact on our market share calculations. Regarding BT's comment about SDSL services, we remain of the view that these are TISBO services, as explained in Section 3.

Figure 7.12: Revised market shares for AISBO in the UK excluding the Hull area

Geographic Market	Market shares						
	Base case	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6*
UK excl. WECLA+	BT: 74% Virgin: 22% CWW: 1%	BT: 77%	BT: 72%	BT: 74%	BT: 70%	BT: 76%	BT: 75%
WECLA+	BT: 51% COLT: 27% Verizon: 10%	BT: 52%	BT: 37%	BT: 60%	BT: 45%	BT: 49%	BT: 48%

* This scenario weights bandwidths by the average revenues in Figure 7.3. We also weighted bandwidths by BT's current rental charges for EAD circuits and the resulting BT shares outside and within the WECLA+ were 74% and 47% respectively.

AISBO outside the WECLA

7.364 We estimate BT's share of volume in this market to be 74%, which is a little higher than our estimate in the June BCMR Consultation. The share remains well above the threshold for the presumption of dominance across all our sensitivities, including if we weight circuits by bandwidth.

7.365 Regarding competition in the metropolitan areas outside London, we explained in Section 5 why we do not consider these areas to constitute a separate market.

7.366 With regards to 1Gbit/s services, we accept that these have a higher retail value than lower bandwidth services and that OCPs may be more willing to invest for new customers. However, these high values have been driven in part by BT's pricing structure for low bandwidth AISBO services. We discuss this in more detail in paragraphs 7.412-7.421 below, where we consider the 1Gbit/s sub-segment. It is worth noting, however, that despite the observed high price, our service share estimate indicates that BT's share of volume of 1Gbit/s AISBO services outside the WECLA+ is 69%. Across a range of sensitivities, we estimate that its service share is above 50% and, given our base case scenario, we are confident that its service share is above 60%.

AISBO in the WECLA

7.367 We estimate BT's share of volume in this market to be 51%, which is marginally above the range given in the June BCMR Consultation. The result is robust to sensitivity analysis, including the weighting of circuits by bandwidth. The only sensitivity that produces a market share of less than 40% is one in which we use the CP-classification of network and customer ends for each individual circuit. However, we consider this is systematically biased against OCPs because there are number of

circuits where the end is not classified, in which case it is identified as a customer-end.

7.368 We are therefore of the view that BT's market share is within a range of 45-55% and, as discussed in the June BCMR consultation, we consider that BT has, on the whole, maintained its position in the market.[861] This is consistent with responses we have received from other CPs, many of which have said that, based on their experience, they do not consider BT's share to have significantly fallen. We also consider that BT's comment about our market share comparisons with the 2007/8 Review not being relevant (see paragraph 7.353) does not undermine our assessment. This is because, although we found a national market in the 2007/8 Review, our analysis of 2007 market shares set out in the June BCMR Consultation took this into account and reflected the WECLA area only.

7.369 In relation to the specific comment from Exponential-e about BT's market share, we note that the statistics presented by Openreach at the Ethernet Service Forum are not comparable to those presented in this assessment because [✂].

External constraints

7.370 As discussed in paragraph 7.168, for each of our SMP assessments we explicitly address competitive constraints outside the market and whether we consider them to be important in our analysis of market power.

7.371 For low bandwidth AISBO services, we do not consider that any of the TISBO markets will have a significant impact as TISBO services tend to be significantly more expensive at each bandwidth (as discussed in Section 3). Similarly, switching to AISBO bandwidths greater than 1Gbit/s is also likely to be too expensive.

7.372 We also do not consider asymmetric broadband to pose a significant indirect constraint because even if the end-user does not require a dedicated connection, the majority of bandwidths in this market are too large to be delivered by broadband. For lower bandwidth customers, it is possible that Next Generation Access will pose a constraint for a segment of end-users though, as discussed above, we cannot yet say how competition in the provision of superfast broadband to businesses will develop over the next three years. Although some end-users may consider switching to NGA, we do not consider that BT's market power in the AISBO markets outside Hull will be eliminated by competition from superfast broadband services.

7.373 The other constraint that may be relevant is the use of dark fibre. This issue was raised by BT in its consultation response and we have since carried out a review of the dark fibre circuits for which we have information. In total, CPs have submitted dark fibre sales that cover approximately 1,800 distinct routes, of which approximately one third were sold to CPs that received our s135 information request. These sales have been taken into account in our service share analysis. For example, if CP 1 sells dark fibre to CP 2, and CP 2 uses this fibre to sell a leased line (either to an end-customer or another CP), this will be included in CP 2's market share.

7.374 Having reviewed the remaining data and reviewed the applications of the end-users that self-supply, it is probable that many of them use dark fibre to self-supply low-bandwidth AI services, for example [✂]. This is likely to be particularly relevant at higher bandwidths between 100Mbit/s and 1Gbit/s.

[861] See paragraph 7.304 of this Statement or paragraphs 7.215-7.220 of the June BCMR consultation.

7.375 However, we do not consider that self-supply using dark fibre currently represents a credible alternative for the majority of end-users. First, based on the data we have received, the number of dark fibre purchases is relatively small compared to total volumes in the market. Of the 1,200 dark fibre circuits purchased by end-users, we estimate that up to 700 of these are used for AISBO-type services (the rest are most likely used to deliver MISBO-equivalent services – i.e. greater than 1Gbit/s). This translates to 1,400 circuit-ends – in practice, this is likely to be an overestimate as some dark fibre may be used for non-AISBO services such as TISBO or other applications (e.g. CCTV). Given that our base case estimate includes over 100,000 ends, the impact of dark fibre is relatively small. For example, including 1,400 dark fibre ends in the base case service share estimate for AISBO outside the WECLA+ would reduce BT's market share by only 1%. If we allocate all the ends to the WECLA+, then our service share for AISBO in the WECLA+ would fall by 2%. This means that the actual impact of including dark fibre would be to reduce both service shares by *less* than 1% and 2% respectively because the routes are spread both within and outside the WECLA+.

7.376 Secondly, we do not consider dark fibre to be a credible option for the majority of AISBO end-users. In addition to having a fibre network near the relevant site(s), dark fibre users tend to be large and willing to engage with networking technology, with complex networking requirements, for example large education and financial organisations and utility companies. This is illustrated by the fact that the end users we identified in the dark fibre circuit data include organisations like [✂]. Therefore, whilst we acknowledge that dark fibre is used by some end-users to self-build and provide low bandwidth AISBO-equivalent services, we consider its constraint to be limited.

Profitability

7.377 Figure 7.13 below presents the most recent data on profitability and revenues on the low bandwidth wholesale AISBO market. It is not possible to distinguish between geographic areas.

Figure 7.13: BT profitability in the low bandwidth wholesale AISBO market

Year	Reported ROCE	Adjusted ROCE	Turnover (£m)	Reported profit (£m)	Adjusted profit (£m)	Mean Capital Employed (£m)
2011/12	14.3%	19.7%	725	195	268	1,357
2010/11	4.5%	12.4%	554	58	161	1,301
2009/10	25.4%	14.5%	489	284	162	1,120
2008/09	37.3%	33.8%	494	325	295	873
2007/08*	31.1%	28.4%	439	266	245	862
2006/07*	26.9%	31.3%	344	170	197	630

Source: BT regulatory financial statements, Ofcom analysis

* Figures for 2006/07 and 2007/08 relate to all bandwidths of AI services, whereas data for subsequent years will exclude sales of services above 1Gbit/s.

7.378 The figures show that both the reported and adjusted ROCE has increased from the previous year's levels and remains above BT's cost of capital. This is potentially consistent with BT having SMP both outside and within the WECLA though, as in the June BCMR Consultation, we do not consider that this criterion provides material evidence either for or against our conclusions as to the existence of SMP.

Control of infrastructure not easily duplicated

AISBO outside the WECLA

7.379 We consider our assessment in the June BCMR Consultation remains valid. By having connections to the majority of premises in the UK excluding the Hull area, BT has an incumbency advantage because it has already made sunk investments across the country and no other CP is able to achieve the same cost advantage.

7.380 In carrying out our assessment for this market, we have taken into account that this is a fast-growing market that has attracted OCP investment during the past three years. We expect this continue over the course of the three year review period, including the use of EFM, which is a credible solution at lower bandwidths for LLU operators and other CPs that have extensive copper access (including those that use BT's network[862]). This should make the market more susceptible to competition.

7.381 However, we note that BT's market share has not changed significantly since the 2007/8 Review. We consider this is due to the impediments identified above, in particular the sunk costs associated with building physical infrastructure to reach new customer sites. For most low bandwidth AISBO circuits, the potential revenues available are not high enough to incentivise OCPs to make such investments. BT therefore benefits from its extensive network infrastructure and economies of scale and scope which arises from its significant presence across business and residential telecoms markets. This allows BT to serve new customer sites faster and at a lower average cost than its competitors. The costs of digging trenches and building duct network are unlikely to reduce significantly over the three year review period, and therefore BT will continue to hold a competitive advantage.

AISBO in the WECLA

7.382 We consider that BT gains a significant competitive advantage from having a physical connection to more sites than OCPs. Our evidence shows that OCPs in the WECLA require network extensions to serve new connections more often than BT and have to build further on average to reach new customer sites remains valid. Although BT argued that this is inconsistent with the fact that the incidence and average value of ECCs incurred by BT are slightly higher than for OCPs[863], our analysis is based on network extensions by OCPs – i.e. cases where OCP dig to extend their own networks – and not just on cases where OCPs buy circuits from BT that require a construction charge. Our data therefore shows that when OCPs use their own networks to serve new customers, they are more likely to incur a civil engineering cost than when BT serves new customers. Furthermore, the average dig distance for OCPs when they extend their networks is greater than that for BT.

7.383 We have also analysed our revised circuit data for low bandwidth AISBO in the WECLA+ at the postcode level. This is similar to the analysis we carried out in the June BCMR Consultation. There are almost 30,000 customer-ends in the WECLA+ and these are spread over approximately 6,400 postcodes. As the postcode unit is the most granular approach we can take in our geographic analysis, we can interpret

[862] Although our SMP analysis is carried out under the modified Greenfield approach, this does not include ex-ante regulation arising from other market reviews. Therefore, the remedies under the Wholesale Local Access market review are assumed to be in effect.

[863] Suggesting that new BT connections are more likely to require digging than OCP connections and that their dig distances are longer on average.

this as representing specific sites in many instances, though in certain areas (particularly the City) there will be a number of sites within a postcode.

7.384 Of these postcodes, BT provides a low bandwidth AISBO circuit in around 79% of the 6,400 postcodes where there is at least one AISBO circuit. BT is the sole supplier in 45% of the postcodes in the WECLA+ with at least one low bandwidth customer AI circuit.

7.385 Therefore, our revised data shows that BT provides low bandwidth AISBO services to more sites in the WECLA+ than all the OCPs combined, though the number served by BT is just over 40% larger rather than more than double the OCP total as we stated in the June BMCR Consultation. This continues to suggest that BT's ubiquitous presence gives it an advantage in this market. Furthermore, more than one third of BT's sales are in postcodes where there is no OCP presence.

7.386 By contrast, if we consider the medium (or high) bandwidth TISBO market in the WECLA+, we find that BT is the sole supplier in only 12% (11%) of postcodes with a medium (high) bandwidth customer circuit-end. In addition, BT's market share for medium and high bandwidth TISBO services is significantly lower than it is for low bandwidth AISBO services.

7.387 We do recognise that competitive conditions within the WECLA are different to those outside the WECLA due to the network presence of OCPs. In response to comments from BT and DotEcon, we have carried out a network reach analysis using circuit-ends rather than businesses in the Experian dataset. This network reach analysis is useful in understanding the proportion of AISBO circuit-ends that are located in areas where BT is unlikely to be constrained by effective competition. The results are presented in Figure 7.14 below for 100 metre and 200 metre buffer distances. We analyse two sets of data:

- the first includes all circuit-ends, such that postcodes with more connections are given more weight[864];
- the second only analyses unique postcodes.[865]

Figure 7.14: Network reach analysis of low bandwidth AISBO circuit-ends

Geographic Market	Percentage of circuit-ends within reach of 2+ OCPs		Percentage of unique postcodes within reach of 2+ OCPs	
	100 metres	200 metres	100 metres	200 metres
UK excl. WECLA+	12	25	8	19
WECLA+	88	96	83	94

Source: Circuit data, Ofcom analysis

[864] Therefore, if there are two circuit-ends in postcode 1 and one circuit-end in postcode 2 and the latter is not within each of at least two OCPs, we would find that 66% of circuit-ends meet our network reach test.

[865] If there are two circuit-ends in postcode 1 and one circuit-end in postcode 2 and the latter is not within each of at least two OCPs, we would find that 50% of postcodes meet our network reach test.

7.388 The results show that there is a clear difference in competitive conditions within the WECLA, suggesting that BT is more likely to face constraints than outside the WECLA. However, the impact of the different network presence must be assessed together with the other SMP criteria as part of our thorough and overall analysis of the economic characteristics of the two AISBO markets. For the reasons set out in this sub-section, this analysis has led us to conclude that BT has SMP in both AISBO markets. As noted above, though, we do not ignore these differences in competitive conditions. We take them into account in the subsequent step of our market review which is an assessment of the appropriate remedies.

Economies of scale and scope

7.389 We consider that our assessment in the June BCMR Consultation remains valid, in addition to the general assessment of this criterion as set out in paragraphs 7.97-7.115 above. Furthermore, BT's economies of scale are reflected in our financial modelling analysis for the charge control remedy, and in the basket cap of RPI-12% for Ethernet services outside the WECLA. The scale of the required reduction in real prices reflects, among other things, projected reductions in real unit costs arising from economies of scale as volumes grow.

7.390 BT's scale and scope across fixed telecoms markets provides it with a significant cost advantage outside the WECLA and, to a lesser extent, within the WECLA. Although BT's advantages are not as strong in the WECLA due to the fact that there is more alternative infrastructure, it still benefits to a sufficient extent from being connected to more customer sites than OCPs.

Barriers to entry and expansion

7.391 We consider our assessment in the June BCMR Consultation remains valid, in addition to the general assessment of this criterion as was set out in paragraphs 7.120-7.128 above. Outside the WECLA, these stem from the high sunk costs required to build network infrastructure, economies of scale and scope and switching costs. Within the WECLA, these barriers are unlikely to have the same impact but CPs still face material costs in extending their networks to reach customer sites.

7.392 Regarding BT's comments that Ofcom provided no empirical evidence of switching costs, we note that this assessment is supported by the end-user survey evidence gathered by Ofcom (and discussed in our general assessment above). This showed that more than half of respondents considered the following to be barriers switching:

- hassle;
- risk that the new service will not work; and
- high installation costs.

7.393 Furthermore, more than four in ten respondents (42%) said that high internal costs represented a barrier to switching services.[866]

Countervailing buyer power

7.394 We consider our assessment in the June BCMR Consultation remains valid, in addition to the general assessment of this criterion as was set out in paragraphs

[866] See Jigsaw Research, 'Business Connectivity Services Review (2011), pages 60-61.

7.146-7.157 above. We disagree with BT that purchasers can exert effective buyer power. This is generally only possible if BT's wholesale customers are in a position to self-supply or switch to a competing supplier. Alternatively, the end-user could also exercise countervailing buyer power if it was in a position to self-supply its requirements, for example by using dark fibre. However, as we discussed in our assessment of External Constraints we consider that the vast majority of low bandwidth AI users are unlikely to have the skills or capability to self-supply and manage their own networks.

AISBO outside the WECLA

7.395 As discussed above, in the majority of areas outside the WECLA, BT is the only CP with infrastructure close to large business sites and the costs associated with network extensions means that other CPs are unlikely to make the investments necessary to compete.

AISBO in the WECLA

7.396 Within the WECLA, we recognise that, comparatively, countervailing buyer power will be stronger due to the presence of competing networks, particularly in a growing market. CPs are also more likely to self-supply where their networks are not too far from the point at which they wish to establish a connection. However, we remain of the view that over the course of the three year review period the current low level of countervailing buyer power will not increase sufficiently to constrain BT from acting independently. As discussed in the June BCMR Consultation, the largest customers of BT's wholesale services are its own downstream businesses, meaning other CPs are unlikely to possess sufficient leverage in negotiating with BT. Furthermore, as discussed above, in many cases OCPs are unlikely to have a credible alternative to BT where the latter has network at (or much closer to) the customer's premises because the cost of digging[867] is too high relative to the revenues available (see also paragraphs 7.92-7.93).

7.397 With regard to Level 3's specific comment about the proportion of Openreach sales that are internal, our source for this figure is BT's regulatory accounts. As shown in Figure 7.13, the proportion of 60% remained fairly constant in the 2011/12 financial year.

Prospects for competition

AISBO outside the WECLA

7.398 We consider that our assessment in the June BCMR Consultation remains valid in that the market for AISBO outside the WECLA is not prospectively competitive. That is, this market is not likely to become effectively competitive over the course of the three-year forward-look period. We have found that BT's market share is very large (i.e. 74%), and the share has not changed materially since the 2007/8 Review. We consider that other economic characteristics present in this market, in particular the high sunk costs associated with building networks and the high barriers to entry and expansion and lack of countervailing buyer power, mean that the prospects for effective competition are lacking.

[867] The cost of digging would either be borne by the CP (to self-supply) or by another wholesale provider that is competing with BT.

AISBO in the WECLA

7.399 We consider that our assessment in the June BCMR Consultation remains valid in that, whilst competition has potential to increase, the market for AISBO in the WECLA is not likely to become effectively competitive over the course of the three-year forward-look period. We note, however, the comments received from the European Commission in this regard[868] and we therefore elaborate on our overall assessment of the economic characteristics in support of reaching this conclusion.

7.400 In the June BCMR Consultation[869], we carefully considered the prospects for competition in this market as part of our overall assessment of SMP. In our assessment, we had particular regard to the SMP criteria set out in Table 66 of the June BCMR Consultation, among them BT's market share which we estimated at 45% – 50%. We noted also that BT had, on the whole, maintained its position in the market since the 2007/8 Review. This is consistent with many responses received from CPs other than BT which argued that, based on their experience, they do not consider BT's share to have significantly fallen. Our revised market shares since the June BCMR consultation continue to show that BT has a high share between 45-55%, with our base case estimate of 51% being above the threshold for a presumption of dominance. We have, appropriately, taken the level of and recent trend in BT's market share into account in our prospective analysis of expected or foreseeable market developments over the course of the three-year forward-look period.[870] This level and the lack of a clear downward trend have informed our view that, absent appropriate regulation, the market is unlikely to be effectively competitive by the end of this period.

7.401 That competitive conditions appear to be little changed since the 2007/8 Review is relevant to our prospective assessment. Essentially, the most significant factors which might lead us to consider that the prospects for competition are positive (expectation of strong demand growth and significant OCP network infrastructure) were also present at the time of the 2007/8 Review, though starting from a smaller market size. Despite these favourable conditions for competitors, BT appears to have maintained its share of the market. Accordingly there can be no presumption that continued growth in demand and the presence of rival infrastructure will result in the emergence of effective competition in the next three years, even given our expectation that demand will continue to grow during this period, with continuing migration from TI to AI and greater requirements for higher bandwidth 100Mbit/s-1Gbit/s services.

7.402 Furthermore, as also explained in the June BCMR Consultation, we consider that there are a number of other important factors in support of our finding that this market is unlikely to become effectively competitive within the next three years.

7.403 Firstly, despite the presence of competitive infrastructure in the WECLA, our evidence shows that BT has many more physical connections to business sites in the WECLA than other CPs have. For example, we have found that BT provides AISBO services to just over 40% more postcodes than all OCPs combined.[871] We have also found that BT is the sole supplier in almost half (45%) of the postcodes in the WECLA that have at least one low bandwidth customer AI circuit and that more than

[868] See Annex 4 to this Statement.

[869] See, in particular, paragraphs 7.237 to 7.242 of the June BCMR Consultation.

[870] See paragraph 20 of the SMP Guidelines.

[871] See paragraphs 7.383-7.385.

one third of BT's sales are at sites[872] where there is no OCP presence. The evidence we presented in the June BCMR consultation also showed that OCPs require network extensions more often than BT and have to build further on average to reach customer sites (see paragraphs 7.311-7.317).

7.404 The civil engineering costs associated with network extensions are substantial and BT will continue to have a significant cost advantage over CPs during this period in supplying connections where rivals would need to extend their network. Although BT has argued that OCPs can pass on construction charges to the end customer (see paragraph 7.353), CPs that attempt to do this may not be able to offer a competitive proposition in many circumstances (see paragraphs 7.92-7.93).

7.405 The cost advantage that BT gains from its network is supported by evidence we have received from OCPs, many of whom have told us that it is difficult to compete with BT at the wholesale level because it has significantly more duct and has network closer to more business locations than all other CPs. We have also received evidence from BT's main competitor in this market, COLT, that [✂].

7.406 Secondly, we expect that BT's SMP will be reinforced by barriers to switching within the next three years. As discussed in our general assessment of barriers to entry and expansion (see paragraphs 7.120-7.128), switching wholesale supplier can result in a break in service or lead to additional costs associated with employing two providers until the new service is fully operational. End-users often consider these as barriers to switching, as reflected in our survey evidence discussed in paragraphs 7.392-7.393. Although switching costs are less important in growing markets (see paragraph 7.126), they are more likely to inhibit new entry and expansion if they exist alongside other factors that give BT an advantage.

7.407 Thirdly and notwithstanding the presence of alternative CPs in the WECLA, we consider that customers will not have sufficient buyer power to constrain BT over the next three years. This is because BT's downstream businesses account for the majority of BT's wholesale sales of services in this market, and other customers do not have sufficient leverage in their negotiations with BT. Furthermore, as discussed in paragraphs 7.375-7.376, we do not believe that the vast majority of end-users are in a position to self-supply using dark fibre.

7.408 On the basis of the cumulative assessment above, which considers a number of criteria, we therefore do not consider it likely that the market for low bandwidth AISBO services in the WECLA will become competitive over the next three years. In the absence of an SMP finding, and therefore regulation, BT would be in a position to increase prices and/or reduce service quality in areas where it faced no competition and it could selectively reduce prices in areas where CPs have network to discourage rival entry and expansion. This would risk stifling the emergence of effective competition in the future.

7.409 We recognise the existence of considerable alternative network infrastructure already in place within the WECLA and that OCPs are in a better position to compete with BT than outside the WECLA, particularly for customers that are on or very close to their networks. We also recognise that CPs have stronger incentives to invest and compete in a market that is growing in terms of both volume and value. These two factors – significant rival infrastructure and strong growth – do not both apply to the same degree in the other wholesale markets where we find BT to have SMP.

[872] As discussed in paragraph 7.383, we interpret a postcode unit as representing a specific site.

7.410 We therefore believe that this market may become effectively competitive over the medium to long-term. However, if this does occur, it is likely to be beyond the three year period covered by this review and it will depend, in part, on the type of ex-ante regulation in place. For that reason, we consider it appropriate to take account of the medium- to long-term prospects for competition by imposing appropriate remedies at this stage (which is why we describe this market as 'potentially competitive' in other parts of this Statement, including where we discuss remedies in this market). In particular, we have decided not to impose a strict charge control on AISBO services in the WECLA because it could have the effect of discouraging OCPs from making continued investments in their own networks, thus holding back the development of competition and reducing the likelihood of effective competition emerging. This would prolong the need for regulation, perhaps indefinitely.

7.411 Hence we consider that the market for AISBO in the WECLA is not prospectively competitive, in the sense that it is not likely to become effectively competitive over the course of the three year forward-look period, and it remains our view that BT will continue to have SMP over this period. However, beyond the three year period and over the medium to longer-term, the prospects that competition will become effective are more favourable than in the rest of the UK.

1 Gbit/s AISBO services in the WECLA

7.412 We consider 1Gbit/s AISBO services to be in the same market as lower bandwidths. However, we have carried out further analysis of 1Gbit/s AISBO services in the WECLA following BT's response to the June BCMR Consultation. Specifically, we have considered whether the evidence suggests that BT is less able to act independently for 1Gbit/s AISBO services in the WECLA than for lower bandwidths.

7.413 In Figure 7.15 below, we calculate BT's service share for 1Gbit/s AISBO services within and outside the WECLA+ across five scenarios, in addition to our base case. This shows that BT's service share for 1Gbit/s in the WECLA+ is lower than 40% across a range of sensitivities. This suggests that OCPs have been better able to win business for 1Gbit/s than for lower bandwidths, which most likely reflects the fact that they represent higher value services. We believe this is due to the fact that BT charges significantly more for 1Gbit/s circuits than for 10Mbit/s and 100Mbit/s circuits, and significantly more than the cost of provision, meaning that there is greater scope for OCPs to compete on price.[873]

[873] For example, BT's Regulatory Financial Statements for the past three years show that the external rental price for a Wholesale Extension Service (WES) 1000Mbit/s circuit has persistently been more than double the rental price of a WES 100Mbit/s or 10Mbit/s circuit.

Figure 7.15: Service shares for 1Gbit/s AISBO in the UK excluding the Hull area

Geographic Market	Service shares					
	Base case	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
UK excl. WECLA+ (1 Gbit/s only)	BT: 69% Virgin: 22% CWW: 2%	BT: 72%	BT: 62%	BT: 67%	BT: 64%	BT: 81%
WECLA+ (1 Gbit/s only)	BT: 31% COLT: 40% Verizon: 16%	BT: 33%	BT: 23%	BT: 36%	BT: 27%	BT: 45%

7.414 We have also carried out the same site/postcode analysis that we did for low bandwidth AISBO as a whole and found that the 1Gbit/s circuit-ends in the WECLA+ are spread over more than 900 postcodes. BT supplies just over half (53%) of these and within this subset it is the sole supplier in almost two thirds (63%). This means that if one considers all the WECLA+ sites with at least one 1Gbit/s AI connection, one third are solely supplied by BT. This indicates that there is a significant segment of end-users that would be vulnerable to BT raising prices in the absence of ex ante regulation.[874]

7.415 We have also taken into account the fact that our base case service share figures only include circuits which connect to retail business customer sites. They do not include circuits used for backhaul by MNOs and LLU operators. However, based on the circuit data we have received, BT accounts for more than 50% of 1Gbit/s sales between network-ends, substantially higher than its base case share of sales of 31% to business customers.[875] Although not all network-to-network circuits represent MNO or LLU backhaul, the latter is likely to account for a significant proportion.

7.416 Furthermore, BT's relatively low share of 1Gbit/s AISBO circuits is against a background where BT's prices for these services and the margins generated on them are notably high. This was shown in the recent dispute between BT and a number of other CPs regarding BT's charges for Ethernet services[876], which found that BT overcharged for three 1Gbit/s services during the period 2006/07-2010/11. These included BES 1000 rental in 2006/07-2009/10 and WES 1000 rental for 2006/07-2010/11.[877] In these cases, Ofcom found that BT's prices were above DSAC and not cost-oriented and that the ROCE was substantially above BT's WACC, indicating very high margins.

[874] In this respect, we note that one of the competition problems we have identified in the markets in which we have concluded BT has SMP is the relevant risk of adverse consequences for end-users arising from price distortions. The latter would be a result of BT's ability and incentive to fix and maintain some or all of its prices at an excessively high level.

[875] Under Scenario 5 in Figure 7.12, which counts all circuit ends including network nodes, not just customer ends, BT's service share increases to 45%. This is consistent with the fact that its share of network ends, which includes some CP backhaul, is much greater than customer-ends.

[876] See http://stakeholders.ofcom.org.uk/enforcement/competition-bulletins/closed-cases/all-closed-cases/cw_01078/

[877] BT was also found to have overcharged for BES 1000 Connection in 2006/07.

7.417 In relation to the 1Gbit/s connections that COLT and other CPs have successfully won, we therefore consider that this is likely to be in part a consequence of BT's decision to maintain its prices at a high level, which provided OCPs with both the ability and incentive to expand into this segment of the market.

7.418 We also consider that a significant amount of the growth in OCP supply for 1Gbit/s AISBO services in the WECLA has been driven by OCPs targeting their existing customers for bandwidth upgrades. The latter is consistent with our discussion in Section 3 that the equipment required and costs of delivering 10Mbit/s, 100Mbit/s and 1Gbit/s circuits are similar and so operators with their own infrastructure will supply at all bandwidths.

7.419 In order to improve our understanding of competition for 1Gbit/s services in the WECLA, [✂].

7.420 Given the evidence points to OCPs targeting existing customers, or sites where they have a fibre connection, this means that they are much less likely to constrain BT at sites where they do not have a physical connection.

7.421 Therefore, our conclusion from the 1Gbit/s analysis is that whilst BT's share of sales is less than lower AISBO bandwidths, we consider this is due to BT's decision to keep its prices for 1Gbit/s AISBO services high and as such is just one example evidencing BT's ability to continue to behave to an appreciable extent independently of its competitors, customers and ultimately consumers, in the AISBO market in the WECLA.

Conclusions on Low Bandwidth AISBO (<=1Gbit/s) in the UK excluding Hull and the WECLA

7.422 Having undertaken a thorough and overall analysis of the economic characteristics of this market by applying cumulatively the SMP criteria, and having considered consultation responses, we have concluded that BT has SMP and will maintain this SMP over the course of the three year review period.

7.423 Based on our revised market share estimates, BT's share is well above the 50% threshold for a presumption of dominance across a range of sensitivities, including a scenario where we weight circuits by bandwidth as a proxy for revenue. Furthermore, our arguments in the June BCMR Consultation around barriers to entry and economies of scale remain relevant as BT has a significant advantage due to the extent of its network. It will also benefit from being able to retain customers as they upgrade from lower to higher bandwidths.

7.424 Overall, despite the relative attractiveness of investment in a growing market, we do not consider that the economic characteristics of this market will change significantly over the course of the three year review period. We therefore conclude that BT will have the ability to act to an appreciable extent independently of its competitors, customers and consumers over the course of the three year review period.

Conclusions on Low Bandwidth AISBO (<=1Gbit/s) in the WECLA

7.425 Having undertaken a thorough and overall analysis of the economic characteristics of this market by applying cumulatively the SMP criteria, and having considered consultation responses, we have concluded that BT has SMP and will maintain this SMP over the course of the three year review period.

7.426 Our estimate of BT's market share remains within a range of 45%-55%, and this is sensitive to the weighting of circuits by bandwidths. This has remained stable since the 2007/8 Review. Furthermore, BT still benefits from the fact that its access network is more extensive and is already connected to significantly more buildings than its competitors. BT rarely has to build new duct infrastructure to connect new customers, whereas OCPs will often need to undertake such investments. This is of particular importance given the relatively low average value of the services supplied in this market, compared to medium and high bandwidth TISBO services. In addition to giving BT a cost advantage, it also means that BT takes less time to market when supplying new customers.

7.427 We recognise that prospects for competition are stronger within the WECLA than outside. This is primarily driven by the existence of extensive competing networks in the WECLA. Furthermore, as this is a growing market, we consider OCPs are more willing to invest than in the TISBO markets. This is illustrated by the lower market shares in the WECLA (compared to outside the area) and recent OCP successes in markets that have traditionally been dominated by BT, for example Virgin's contract with MBNL. As discussed in the June BCMR Consultation, we also forecast more competition from EFM services which can be provided by LLU CPs (albeit limited to low bandwidths and subject to constraints on the service levels available on the underlying copper line).

7.428 However, in the absence of ex ante regulation, we have concluded that the prospects of competition are not sufficient to enable effective competition to develop over the course of the three year review period. Equally though, we do not disregard the observed differences in competitive conditions in the AISBO market in the WECLA compared to in the AISBO market excluding the WECLA (and excluding Hull) – we take these into account in the next step of our market review process which is our assessment of the appropriate remedies.

Wholesale market for MISBO in the UK excluding the Hull area

7.429 In this sub-section we set out our SMP assessments for the two MISBO markets outside Hull:

- the UK excluding the WECLA; and
- WECLA.

7.430 Consistent with our proposals in the June BCMR Consultation, we conclude that:

- BT has SMP in the market for MISBO in the UK excluding the WECLA; and
- no CP has SMP within the WECLA.

7.431 Our conclusions are based on a thorough and overall analysis of the economic characteristics of these markets over the course of the three year review period. In our SMP assessment, we have had particular regard to the SMP criteria summarised in Figure 7.16 below in assessing BT's power to behave to an appreciable extent independently of its competitors, customers and consumers.

Figure 7.16: Summary of SMP determinations for the wholesale markets for MISBO in the UK excluding the Hull area

Geographic market	Results criteria applied for SMP assessment	Proposed SMP designation
UK excl. Hull and the WECLA	- BT's market share is greater than 50% - BT remains the dominant supplier of CP backhaul, which is forecast to grow strongly - BT more likely to be connected to, or have network closer to, a potential customer site and create physically diverse routes - No effective interconnection product for WDM - Presence of switching costs - Lack of countervailing buyer power. Self-supply using dark fibre is not a credible option for the majority of end-users	BT
WECLA	- BT's market share is significantly less than 40% - Significant amount of alternative infrastructure. - High value of services encourages network extensions where customers are close to CP networks. - BT's economies of scale and scope provide limited benefit	No SMP

Assessment in the June BCMR Consultation

Market shares and market share trends

7.432 Figure 7.17 summarises some key metrics and our SMP designations from the June BCMR Consultation. It should be noted that our analysis of markets within the WECLA area did not encompass the postcode sectors in Slough which, as set out in Section 5, we have now concluded are part of the same geographic market.

Figure 7.17: Summary of quantitative analysis for the wholesale market for MISBO in the UK excluding the Hull area in the June 2012 consultation

Geographic Market	Volume growth since 2006/07	Market shares 2011	Proposed SMP designation
UK excl. WECLA	346%	BT: 59% Virgin: 9% COLT: 8%	BT
WECLA	346%	BT: 15% COLT: 35% GEO: 17%	No SMP

* We did not define a 'MISBO' market in the 2007/8 Review and there was no SMP in relation to circuits above 1Gbit/s throughout the UK.

Source: CP data, Ofcom analysis

7.433 Demand for very high bandwidth services is witnessing the fastest growth rates of all business connectivity services. Albeit starting from a very low base, volumes of MISBO services across the UK are now over 3.5 times higher than in 2006/07. An increasing number of customers are demanding more than 1Gbit/s of connectivity to particular sites, and in a small number of cases customers are demanding multiple 10Gbit/s circuits between sites. In the June BCMR Consultation, we discussed the types of customers demanding such high bandwidth services. We then considered a number of different measures to estimate market shares for MISBO services.

MISBO customers and demand

7.434 Although the number of customers is still relatively small, it is increasing. In many cases the requirement stems from the aggregated demand from a large number of people using bandwidth intensive applications. For example, both business and residential users are watching, creating and interacting with more digital video content than ever before. This creates demand for bandwidth between the end-users and video content servers. Similarly, as businesses start to make use of cloud services - hosting applications and data remotely - the demand for connectivity between offices and the remote source of the applications and content increases.

7.435 In addition to this 'machine to end-user' traffic, we are also witnessing significant growth in demand from machine-to-machine transactions. For example, back-up and data mirroring services require very large bandwidths, but are not driven by the immediate use of an end-user.

7.436 The willingness to pay for these high bandwidth leased line services depends in part on the underlying application. At one extreme there are financial institutions which are using the networks as a platform to run algorithmic trading, and make use of low latency[878] and very high bandwidths available to reduce the amount of time it takes to deliver trading instructions to the trading exchange. Even a tiny delay potentially results in significant losses, and therefore such customers are willing to pay a premium to achieve these demands.

7.437 In contrast, many of the applications generating demand for very large bandwidths are tolerant of variations in the performance of a circuit. For example, data backup or video streaming services benefit from very high bandwidth, but do not need extremely low latency.

7.438 Aside from the niche users such as the financial institutions, demand for bandwidth is greatest in places where traffic from a large number of end users is aggregated. For example, an office with a large number of people may generate a considerable demand for bandwidth through use of a corporate file sharing/collaboration platform (such as Microsoft SharePoint or Lotus Notes). However, if a company has a number of large offices, then the bandwidth required to provide access to the content source is necessarily much greater still. Therefore, some of the most significant growth in demand for MISBO services is coming from access to data centres.

7.439 In general, data centres are sites which house computer and telecoms equipment. They provide a wide variety of services, fulfilling various customer demands from co-location to allow CPs to interconnect with one-another, to very high security in remote locations for disaster recovery services, to simple web hosting. All data centres require connectivity, but the precise demands of the customers within the data centre will depend on the nature of the hosted services. Similar to the discussion above, some customers, and some data centres, demand very high bandwidth with the very highest levels of availability. However, others are likely to have less stringent requirements.

7.440 Equally, ever expanding volumes of data traffic need to be carried across CP and MNO networks, and this is driving significant demand for bandwidth in backhaul and core networks.

[878] The MISBO market includes both TI and AI interfaces. In this specific example, low latency trading platforms generally use Ethernet interfaces which can reliably deliver very low latency due to the speed and capacity of the connection (so long the circuit is not overloaded).

Volume shares estimates outside the WECLA

7.441 Our market share estimates in the June BCMR Consultation were based on the number of customer circuit- or wavelength-ends supplied by each CP. As a sensitivity test, we also considered unique route volumes and the average bandwidth per route for the largest CPs. This is discussed further below.

7.442 Where WDM was used as the transport technology, we counted each wavelength supplied on any given route separately. The figures in Figure 7.17 above suggested that BT has captured a significant proportion of this growing market outside of the WECLA (we did not have comparable figures for 2006/07 and so could not assess the trend).

7.443 The shares that were presented weighted wavelengths and circuits equally regardless of bandwidth. Services in the MISBO market range in bandwidth from above 1Gbit/s links provided over WDM, through to 100Gbit/s. In addition, WDM bearer circuits may carry 80 wavelengths or even more depending on the equipment used. If some CPs focus just on higher bandwidth services, or tend to sell more wavelengths per bearer, then given the price structure for these services,[879] our volume share estimates would be less reliable as indicators of revenue shares. For this reason, we undertook further analysis of the MI services supplied by the five largest CPs.

Volume shares estimates outside the WECLA - sensitivity analysis

7.444 First, we sought to isolate the number of unique circuit destinations provided by each CP. The analysis considered the unique pairs of A-end and B-end postcodes for MISBO services. This is akin to measuring the number of bearer circuits to unique destinations provided by each CP. It is arguably a useful measure of value since a large proportion of the costs of providing MISBO services relate to the creation of a link between two premises. Once established, the marginal cost of additional bandwidth on that route can be very low.[880]

7.445 Figure 7.18 below sets out the findings. It shows the share of routes wholly within the WECLA, wholly outside the WECLA, and spanning these two areas for each of the five CPs. It suggests that BT's share of routes outside the WECLA is marginally higher than our estimate of the volume share for customer ends in this area. Put

[879] The pricing of WDM services tends to match the underlying cost structure, with relatively high upfront one-off charges for the bearer circuit (i.e. to establish the service), and then relatively low connection and rental charges for each additional wavelength. Therefore, once a customer has incurred the initial expense, the marginal cost of bandwidth is very low.

There may be further one-off charges to increase capacity beyond certain thresholds. For example, a DWDM chassis with the capability to light up to 80 wavelengths might only be installed with a module which allow up to 16 wavelengths. Another module will then need to be added to each chassis to enable the next 16 wavelengths, and so on. This price structure is usually adopted to reduce the upfront charge. Aside from these discontinuities, the connection and rental charges for each wavelength will generally be the same, and so the average cost per wavelength will tend to decrease as bandwidth demand increases.

The rental charges for both wavelengths and individual (non-WDM) circuits tend to increase with bandwidth, but not in proportion with the bandwidth increment. For example, a 10Gbit/s wavelength or circuit might cost twice as much as a 2.5Gbit/s, but offers four times the bandwidth.

[880] In the case of WDM, the cost of adding wavelengths is often just the cost associated with a new line card in the terminal equipment. Increasing the bandwidth of an Ethernet circuit up to 10Gbit/s might not even require additional hardware.

another way, it also suggests that the average number of wavelengths per bearer and circuits per route is roughly the same between the different CPs.[881]

Figure 7.18: Shares of unique routes for MISBO services

CP	Routes outside the WECLA	Routes within the WECLA	Routes spanning both areas
BT	72%	25%	52%
COLT	2%	26%	29%
GEO	1%	12%	5%
Verizon	10%	34%	5%
Virgin	16%	2%	8%

Source: CP data, Ofcom analysis

7.446 Secondly, we considered the average bandwidth per circuit or wavelength provided by the same five CPs. This analysis did not distinguish between the different geographic markets. Although there were differences between the CPs, BT's average was above the average across all five CPs (5.0 Gbit/s).

Figure 7.19: Average bandwidth per circuit or wavelength of MISBO

CP	Average bandwidth (Gbit/s)
BT	✂
Virgin	✂
COLT	✂
GEO	✂
Verizon	✂
CP average	*5.0*

Source: CP data, Ofcom analysis

7.447 Our interpretation of both pieces of analysis was that our estimate of BT's share of volume should not be systematically biased upwards, and should represent a reasonable proxy for BT's share of value in this market.

7.448 In discussions with BT before the June BCMR Consultation, it was observed that our data gathering may not have taken into account a proportion of supply of MISBO services from smaller CPs who either build or lease dark fibre, and from large corporations and public bodies which self-provide MISBO services. We conducted further analysis by taking steps to gain an even more granular picture of the market. We researched over 100 smaller CPs who have code powers, and therefore can build fixed network infrastructure, and were satisfied that the majority of their network infrastructure sits within the WECLA. Self-supply by large organisations was factored into the SMP assessment in relation to countervailing buyer power, as discussed below.

[881] This analysis was based on the same circuit data provided by CPs which we used to calculate volume shares. However, the data was processed in a different way. There was no uplifting to account for missing postcodes or bandwidth. Also, no distinction was made between the circuit end types. That is, all circuit entries counted equally regardless of the circuit end types.

7.449 Another potential issue was the classification of circuit end points. Data centres and carrier hotels can represent both network hub sites and customer end-points. There is therefore a degree of ambiguity over the classification of a circuit end as either network or customer. This issue applied to all markets, but MISBO services are more sensitive to this issue because a large proportion of circuits terminate at these types of site. Although this specific issue is likely to result in less precise share estimates, we did not consider that it should introduce a systematic bias as it applies to all CPs.

7.450 Our estimate of the market shares indicated that BT supplies a significant proportion of total demand (with a share above the threshold for the presumption of dominance), and that no other CP has a share above 9%. The market, therefore, appeared to be highly concentrated. Even if we missed data for the supply of a number of other CPs, these are all likely to be small relative to BT. Therefore, even including these additional suppliers, the market would still appear to be significantly concentrated.

7.451 Overall, therefore, we considered that our assessment of market shares indicated that BT has SMP in this market.

Volume estimates in the WECLA

7.452 The market shares inside the WECLA are very different from those in the rest of the UK. BT has the third largest share after COLT and GEO. There are a large number of data centres and co-location exchanges within the WECLA, and there is a significant concentration of demand from financial institutions.

7.453 No CP was found to have a market share above 40%.[882] Furthermore, as discussed in paragraph 7.448, there were several smaller CPs from whom we did not obtain circuit data. Based on our subsequent research, we considered the majority of these CPs are based within the WECLA, and some offer MISBO services. As a result, we considered that the shares presented above were likely to represent an upper bound for each of the CPs.

7.454 The evidence suggested that the market is not highly concentrated and supply appears to be contested by many CPs, both small and large. This led us to consider that CPs' market shares do not indicate any CP has SMP in this market.

Profitability

7.455 BT's provision of MISBO services is not currently price regulated, and therefore its profitability is potentially more informative than in many of the other markets considered in this review. We obtained data from BT's additional financial statements regarding the profitability of services over 1Gbit/s sold by Openreach. BT also sells a number of other services which would fall within this market, but for which Openreach does not provide a wholesale input. We did not have profitability data for these services, however we estimated that the Openreach sales represented around half of BT's total sales of MISBO services.

7.456 As with the other markets, we did not have geographically disaggregated financial data. Over 80% of MISBO circuit ends supplied by BT are in the UK excluding the Hull area and the WECLA, and so we considered the UK-wide data should be a reasonable proxy for the true profitability in this particular market (we did not have sufficient profitability information for the WECLA).

[882] Being the market share threshold above which the SMP Guidelines state that single dominance concerns normally arise (see paragraph 75).

7.457 The figures[883] implied returns which are above the level that we would expect to find if BT were effectively constrained by competition in the market. We note, though, that the data supplied does not match our market definition precisely. Nonetheless, even the lowest estimate of the ROCE that BT produced was well above the cost of capital. Whilst BT said that even this estimate may be above current rates of return, this claim could not be verified in the absence of financial data for the relevant year. As a result, to address potential inaccuracies regarding the implied returns, we did not rely on the precise ROCE figure – instead, we took into account the data we obtained in the round and on the basis of this we considered that BT's profitability in this market supported our proposed SMP finding.

Control of infrastructure not easily duplicated

7.458 As discussed in relation to both the TISBO and AISBO markets, the costs of duplicating BT's network infrastructure are very high, and BT is likely to derive some advantages from the fact that it has such extensive network infrastructure already in place. However, the relatively high value of the services offered in this market tend to reduce the significance of these advantages.

MISBO outside the WECLA

7.459 The advantages we considered to arise from BT's large network are set out below:

- relative to its competitors, BT is likely to either already be connected to, or have network infrastructure closer to, a potential customer site. This implies that it can generally serve sites faster and for lower cost than its competitors;

- the amount of network creates advantages in terms of being able to create physically diverse routes. This can be a very significant advantage in the provision of MISBO services which can carry traffic aggregated from a large number of end users and services. As such, faults with these services would potentially affect many people and services. Customers therefore often demand circuits which are designed to be resilient to failure through the addition of a physically separate redundant link; and

- BT is less likely to have to rely on third party networks to reach a customer site. This can bring advantages in terms of cost, control of the service specification, and network security.[884]

7.460 An important point we noted in this market is that there is currently no solution in widespread use which allows effective interconnection of WDM optical services. This means that a CP usually self-provides both ends of the downstream customer circuit. In these circumstances, control of network infrastructure takes on extra significance: the potential cost advantages discussed in the first bullet point are effectively doubled.

7.461 As an alternative to the interconnection of optical services, a CP could buy a symmetric broadband origination service to reach a customer site. However, this can be an inefficient solution which requires costly duplication of equipment at the interconnect site.

[883] The figures are derived from data which are confidential to BT.

[884] It should be noted that the non-price advantages are likely to be very limited if a CP is able to reach the customer site using third party dark fibre, or to install its own fibre in third party duct.

7.462 Consequently, our view was that BT gains a competitive advantage from its network throughout the UK and specifically in the geographic area covered by this market. For a large number of sites across the UK, neither self-supply nor OCPs are likely to be effective in contesting BT's supply.

MISBO in the WECLA

7.463 The network reach analysis suggested that there is a considerable amount of alternative network infrastructure in the WECLA, and significantly more than other metro areas in the UK. In addition, there are several smaller CPs who also have network infrastructure within the WECLA, but who were not factored into the network reach analysis.

7.464 BT has more extensive physical network infrastructure than its competitors, but as is clear from the market shares, it does not appear to derive a material competitive advantage from this in this particular market. The demand for MISBO services often comes from sites where there is a real prospect of continued and growing demand, such as data centres and multi-tenanted offices. This, combined with the high value of MISBO services, means that CPs are able to justify the investments required to extend their networks to reach new sites, and therefore contest the supply of connectivity to these sites.

7.465 Overall therefore, we considered BT's control of infrastructure to be an unlikely source of SMP in this market.

Economies of scale and scope

MISBO outside the WECLA

7.466 BT benefits significantly from the scope of its operations across connectivity markets in general which means that a large number of services contribute to the recovery of the substantial common costs associated with an extensive fixed network infrastructure.

7.467 In the June BCMR Consultation, we noted that BT's scale within this market is relatively less important than in other product markets. Once a CP has a passive network connection to a customer site (subject to the need to be connected to both ends of a circuit as discussed at paragraphs 7.460-7.461), its costs of providing MISBO services are likely to be similar to BT's. MISBO services tend to use point-to-point infrastructure, and to the extent that this infrastructure is dedicated to a specific customer it will only generate economies of scale if multiple services are provided to that site. Therefore, while we considered that BT benefits from the scope of its operations, we did not believe that its scale would generate a competitive advantage in relation to MISBO services.

MISBO in the WECLA

7.468 Given BT's relatively low share, it appeared that it did not gain a material competitive advantage from its scale and scope in this market. Over the course of the three year review period, we considered it possible that BT might start to benefit from economies of scope because BT's extensive network coverage outside the WECLA gives BT an advantage over its competitors in selling MISBO services which span both the WECLA and the area outside the WECLA. At present, there is no satisfactory method of interconnecting MISBO services at an active level in the network.

7.469 However, this is primarily relevant to the market outside the WECLA, and we proposed to introduce remedies in the market for MISBO services in the UK excluding the Hull area and the WECLA to address this.[885] Overall, our view was that economies of scale and scope were unlikely to be a source of SMP for any CP in this market.

Barriers to entry and expansion

MISBO outside the WECLA

7.470 We considered there to be considerable barriers to entry and expansion in this market. Due to the lack of an appropriate interconnection service, a CP would need a physical connection to all customer sites in order to provide cost effective WDM services. As discussed throughout this Section, the costs of building fixed network infrastructure are very high, and tend to be both sunk and common. BT benefits from the fact that it has already sunk significant costs in its network, and as a result is either already connected to, or has infrastructure closer to, customer sites. This gives BT the ability to connect new customers faster, and at lower incremental cost than its competitors.

7.471 Similarly, BT benefits from its scale and scope across a wide range of leased lines markets and fixed telecoms markets more generally. Although, as we noted above, these benefits may be limited in relation to MISBO services, the high costs of entry, combined with BT's relative cost advantages generate barriers to entry and expansion.

7.472 We considered that switching costs also create barriers to entry and expansion in this market. Even though we recognised that switching costs tend to be less relevant in a growing market, we identified the following switching costs as most relevant:

- a change of supplier requires a change in physical network routing, and this will generally cause a temporary loss of service for the downstream customer. Given the high value and the traffic volumes associated with these services, we consider this is a significant factor;

- the price structure of WDM services will tend to incentivise customers to stay with the same supplier. Once a customer has paid the high upfront charges to establish a WDM service, the price for additional bandwidth from its current supplier will be far lower than the price of a service equivalent to the increment in bandwidth from another supplier (since the customer would need to pay high upfront charges for a second time); and

- customer equipment may not be wholly compatible with new services. For example, a range of different interfaces can be offered to the customer to create specific connectivity services over a WDM system. Not all WDM equipment supports the same range of customer interfaces.

7.473 We noted that the high value of services in this market, and the price structure of WDM services which typically includes high upfront charges, could act to offset these barriers. In addition, the fact that such high bandwidth is required today is likely to signal that the relevant customer sites will be a source of high demand growth over the course of the review period of three years. For example, when a CP connects to a data centre or a network site, they can be confident that demand for connectivity

[885] See Section 13.

will continue to grow at that site. As a result, CPs are better able to justify the investments needed to extend their networks to reach these sites. This is particularly true for carrier neutral exchanges, multi-customer data centres and very large multi-tenanted offices, where it may be possible to recover the costs of the network extension to reach the site from a number of different customers.

7.474 However, over the course of the three year review period we did not consider that these factors were sufficient to mitigate the barriers to entry and expansion we identified in this market.

MISBO in the WECLA

7.475 Although there are considerable barriers to entry and expansion in this market caused by the high sunk costs required to build network infrastructure, these costs are offset to a degree by the high value of MISBO services. Also, the network reach analysis showed that that a number of CPs have already developed very extensive network infrastructure within the WECLA. Therefore, our view was that barriers to entry and expansion are unlikely to be a source of SMP for any CP in this market.

Countervailing buyer power

7.476 In the June BCMR Consultation, we said that consumers of MISBO services tend to be large and sophisticated and include a number of large corporate customers, public authorities, smaller CPs and data centre providers. Where there is a choice of supplier, this combination of factors suggests that countervailing buyer power may be present. Countervailing buyer power can be augmented by the use of competitive tender and by the ability of some users to self-provide MISBO services.[886] However, in general, the same barriers to entry and expansion and the same economies of scale discussed above led us to consider that the lowest cost method of fulfilling demand for MISBO services was likely to be to buy from an existing CP. We concluded that BT is in the strongest position to provide the service.

7.477 Where self-supply is based on leased dark fibre, then it is most likely to be concentrated in the areas where CPs' network infrastructure, and therefore fibre, is most readily available. This would imply that self-supply would be relatively limited beyond the WECLA and on trunk routes between major metropolitan areas. We did not have data regarding the extent of self-supply, but we gathered information from the larger CPs regarding sales of dark fibre. This suggested that self-supply is limited to a relatively small number of routes. In any event, we did not consider that such self-supply was likely to create a significant additional competitive constraint beyond the supply of the CPs from whom the dark fibre has been leased. The existing supply, and network presence, of these CPs has been taken into account in the analysis presented above.[887]

7.478 Alternatively, self-supply could be based on the provision of new network infrastructure. However, the same sunk costs which generate barriers to entry in this market will tend to limit the effect of self-supply on competition.

7.479 Our view, therefore, was that although we could not qualify the precise extent of self-supply in the market outside the WECLA, we did not consider that buyer power, and

[886] We believe that a number of large customers do self-provide MISBO services given that they buy dark fibre from CPs such as GEO.

[887] Although the sales of dark fibre were not represented in the market shares.

self-supply more generally, was likely to act as an effective constraint on BT's behaviour over the course of the review period of three years.

7.480 Within the WECLA, given the relatively low concentration of supply in this market, we did not believe that countervailing buyer power was a relevant consideration to our assessment of SMP in this market.

Prospects for competition

MISBO outside the WECLA

7.481 In the June BCMR Consultation, we said the demand for MISBO services was likely to continue its rapid growth over the course of the three year review period. A key question regarding the prospects for competition is the distribution of this future demand. If the demand is concentrated at a small number of sites such as data centres, network hubs, and very large office buildings, then it may be reasonable to assume that CPs should be able to extend their networks to reach these sites, and to contest the supply of MISBO services. However, if demand grows principally through customers at a large number of different sites increasing the bandwidth of their current services to more than 1Gbit/s, then we considered that BT is likely to enjoy a competitive advantage from the extensive coverage of its network infrastructure.

7.482 As shown in Figure 7.3, the average revenue *per connected site* in this market is [✂], which is considerably higher than any of the other wholesale connectivity markets. Given this, and the prospect of growing demand from any individual site, we expected CPs to be prepared to build network to reach potential customers. However, these factors have been present in the period since the 2007/8 Review and we still found that BT has a high market share.

7.483 Consequently, whilst we considered that competition is likely to increase in this market, we did not think it would become effective over the course of the three year review period.

MISBO in the WECLA

7.484 Given the high value of the services, and the number of CPs with extensive network infrastructure within the WECLA, we considered the prospects for competition in this market to be very good. We did not consider it likely that any CP would gain a position of strength that would afford them the ability to act to an appreciable extent independently of its competitors, customers and ultimately consumers.

7.485 One caveat we noted, however, was that BT has a potential advantage over its competitors in relation to sales of MISBO services which span the WECLA boundary in light of our proposed market power determination that BT has SMP in the market for MISBO services in the UK excluding the Hull area and the WECLA. We proposed to address this by way of appropriate ex ante regulation in the market for MISBO services in the UK excluding the Hull area and the WECLA.[888]

Responses to the June BCMR Consultation

7.486 In the June BCMR Consultation, we asked the following:

[888] See the discussions of this point in Section 13.

Question 9: Do you agree with our assessment of SMP for the wholesale MISBO markets in the UK excluding the Hull area?

MISBO outside the WECLA

7.487 BT did not agree with Ofcom's proposed SMP finding or its supporting evidence. It argued that we should consider the MISBO nationally and find no SMP. In the event that Ofcom does find separate markets, BT said that it should not find SMP in either market because demand arises within range of existing competitive networks and suppliers are prepared and able to extend their network.[889]

7.488 BT argued that its market share in the June BCMR Consultation was overstated due to Ofcom inappropriately counting circuits used for broadcasting[890] and understating OCP and self-provided circuits (particularly the use of dark fibre and instances where a CP sites WDM equipment within a customer's premise). It argued the latter on the basis of both missing data – i.e. Ofcom did not request data from all the CPs in the market – and measurement error in the existing data. Given the relatively small volumes in this market (compared to TI and AI), market shares are particularly sensitive to sources of error. BT also raised concerns about the binary classification of nodes as 'customer' or 'network' because any site with WDM equipment is likely to represent a core node. This is discussed in more detail in Annex 5.

7.489 BT has submitted its own estimate of market share for MISBO services, which ranges from about 30% to 40%. This is based on a study by Analysys Mason (see below) and a review of Openreach's Terms on Application database. The latter includes more than [✂] requests for quote between January 2011 and early 2012. BT's analysis shows that Openreach won a total of [✂] new provide orders, compared with confirmed losses to other infrastructure providers of between [✂] and [✂] circuits, indicating a win rate of between [✂]% and [✂]% for optical products.[891] BT also considered circuits outside of the WECLA and found a win rate of between [✂]% and [✂]%, which is not significantly different to the UK as a whole. BT also said that these figures would systematically overstate Openreach's share of total new business because in many cases, operators would not approach Openreach for a quote.[892] In BT's view, this suggested that Openreach is winning a low share of new business. As a new and fast growing technology, BT considered that these win rate estimates give a reasonable indication of the overall share of business in the market and represent a forward-looking indicator for market shares in the longer term.

7.490 At the same time, BT also argued against relying on market shares for the SMP assessment because the market is expanding rapidly and so shares are likely to be unstable over the course of the three year review period. It also says market shares are an uncertain indicator of market power in a bidding market such as MISBO, where wins and losses will affect shares in a volatile manner over time.

7.491 BT also asked Ofcom to consider falling wholesale prices, giving the example of OSA and OSEA connection charges falling by 30%-50% in January 2011. It argued that this illustrates the intensity of competition in the market.

[889] BT's detailed response on this market can be found in Part 1 of its response, in particular Section 3, Section 4.4 and Section 4.6.

[890] BT said that excluding TV broadcast circuits would reduce their share to [✂]% at the most.

[891] BT removed some erroneous duplicate orders, thus giving a range.

[892] For example, when choosing to self-supply.

7.492 BT disagreed with Ofcom's profitability assessment, suggesting that ROCE in 2011/12 is in line with the cost of capital and on a downward trend, particularly given the price changes for OSA products late in early 2011. It also said that an assessment of profitability should consider reasonable levels of return in a nascent and technically complex industry. BT also said that Ofcom should not rely on the precise ROCE for products within the residual markets section of BT's regulatory accounts as they are not subject to audit or the same internal review and testing as the regulated markets.

7.493 With regards to control of infrastructure, BT did not consider itself to have a competitive advantage because the high revenues mean that CPs are more willing to sink the high fixed costs necessary to operate in the market. BT pointed out that Ofcom made this finding in the 2007/8 Review and that there has been no change since then. Similarly, in the 2007/8 Review concluded that the large amount of traffic that can be carried over a single high bandwidth AISBO service enables CPs to attain scale in the market and prevent other factors such as economies of scope from placing BT at a significant cost advantage. In BT's view, this statement still applies as other CPs and self-providers are big companies, such that BT does not gain an advantage from economies of scale and scope.

7.494 BT also expressed significant concerns over the use of the Experian database and dig-distance assumption for the MISBO market. It said Experian does not relate to very high bandwidth services, users of which are much smaller in number and many of which will not even be identified in the database. BT also said that customers can change the location of their sites requiring high bandwidth services, for example they do not have to site their primary networking and IT functionality in the main business site that houses employees. It also considered that Ofcom treats high value services in the same way as a low bandwidth TI service by using a 200 metre buffer distance. BT believes that CPs are more strongly incentivised to supply very high bandwidth services customers and that the presence of the customer site in relation to known CP flex points is not relevant, given the way these services are supplied. The research that BT commissioned to Analysys Mason (discussed further below) found several examples of CPs digging 500 metres to several kilometres.

7.495 BT also disagreed that the lack of an interconnect product is a barrier to entry, arguing that no CPs have requested such a product. It considered the lack of demand for a new form of interconnect product is consistent with a competitive wholesale and retail market. BT distinguished between interconnection and interworking. BT agreed with Ofcom that the OTN variants of its OSA products offer greater transparency of the optical performance of the end-to-end circuit. Interworking of these circuits to a customer's optical equipment is possible although, according to BT, this is not necessarily what is understood by the term 'interconnection'. BT suggested that Ofcom implied a meaning of connecting two different vendors' equipment together at each end of an access transmission system. BT did not consider this to be possible today nor is it likely to be realised or proposed by vendors during the next three years.[893]

[893] BT said that aside from the practical problems that would arise from developing this proposal, the operational and commercial benefits of an optical 'half circuit' are highly doubtful. What is saved in terms of cost of terminating hardware in the CP's network node is more than outweighed by increased commissioning costs, monitoring and trouble resolution overheads, and outage due to software and firmware upgrade downtime, among other factors. BT considers that the lack of Openreach-managed termination equipment would make reliable Operations Administration and Maintenance difficult and render service level guarantees unsustainable.

7.496 On barriers to entry and expansion, BT said that these are relatively low in this market, due in part to the low proportion of total costs represented by the underlying cable or duct to support high bandwidth services and also to the high revenues. The growing demand will also make it easier for new firms to enter the market and complete. BT provided some examples of such competitors, including 6 Degrees Group.

7.497 In terms of countervailing buyer power, BT argued that this is strong because circuits are often procured as part of complex multi-site competitive bids, with lengthy contract periods. Furthermore, it said that purchasers of very high-bandwidth services are large and sophisticated, which gives them considerable negotiating power. BT suggested that a significant number of prospective Openreach customers who have sought quotes for MISBO-type services over the past 18 months have indicated that they are considering self-build. BT considered that this needs to be taken into account by Ofcom because self-provision represents a significant proportion of demand (the economies of self-build are more attractive in MISBO). BT cited an Analysys Mason estimate of alternative business models to be more than 5% of the MISBO market outside the WECLA. It also noted that the banking sector in particular commonly uses a mixture of self-provide and dual CP supply. Another example given is the JANET network, which provides capacity between certain UK universities, teaching hospitals and research establishments.

7.498 BT particularly criticised Ofcom for failing to consider business models that use dark fibre from third party infrastructure providers, provided either direct to end-customers or via solutions providers or systems integrators. Dark fibre is considered to exert a price constraint at the retail level, which affects the wholesale price. BT suggested that the prospects for bandwidth growth in the dark fibre market are several times that of the lit optical services over the course of the three year review period.

7.499 With regards to prospects for competition, BT considered that the rate of innovation is very high, suggesting a competitive market. It also argued that there is no obvious market failure from end-users complaining about the absence of competitive alternatives. At a more general level, BT considered that given the nascent state of the technology and the levels of innovation, an SMP finding may discourage investment and innovation by encouraging price following. With regard to AI services at speeds above 1Gbit/s, BT noted that there are only 150 of these compared to 68,000 low bandwidth AI circuits. It therefore questioned whether regulatory intervention in this market is appropriate and timely.

7.500 BT also made a number of arguments about the competitiveness of carrier-neutral data centres in its consultation response. These are summarised and addressed in Annex 6.

7.501 In addition to the above, BT commissioned two reports, by Ovum and Analysis Mason, on the very high bandwidth service market.[894]

Analysys Mason

7.502 Analysys Mason focused on the end-user market, interviewing 350 organisations on their use of high-bandwidth services and conducting in-depth interviews with 17 organisations, including both users of very-high-speed services (these accounted for 11 of the interviews) and those expressing an interest in their purchase. Of the 350 survey respondents, 16 (5%) were high bandwidth users. Analysys Mason said that

[894] These reports can be found in Part 2 of BT's response.

both the survey and in-depth interview evidence suggested that end-user organisations are broadly satisfied with the current level of competition in the market.

7.503 Analysis Mason suggested that dark fibre plays an important role in the market throughout the UK and that excluding dark fibre-based services could have a significant impact on market share calculations. For example, it found 36 organisations employing dark fibre outside the WECLA – by counting these they suggested a potential 5% drop in BT's market share.[895] Their interviews also indicated that services based on dark fibre comprised more than half of the very high-speed capacity provided to end-user organisations. In their view, estimates of market size could therefore vary by as much as 50%, depending on whether dark fibre-based supply is included in the calculations.

7.504 Analysys Mason also constructed a model to estimate BT's market share, which suggested a range of 31%-39%. This was based on assumptions around the penetration of very-high-bandwidth usage stratified by sector and company size[896] and the average number of wavelengths, again stratified by sector and company size. A range was produced by varying the assumptions in what Analysys-Mason described as a "Monte Carlo-type simulation".

7.505 Analysis Mason said that their research suggested that the size of an organisation may not be a good proxy for demand, both now and in the future, as around 10-20% of organisations purchasing very-high-speed services have fewer than 250 employees. The research also indicated some very large organisations had no requirement for >1Gbit/s services at present. This was said to be confirmed by Ofcom's market research.

7.506 Analysys Mason cautioned against generalising about the market, as the needs and behaviours of end-user organisations appeared to vary significantly, even within sectors. They did, however, suggest that end-users belong to three main sectors: finance, education and media.

Ovum

7.507 The Ovum research also covered point to point data transport at bandwidths greater than 1Gbit/s. As part of the study, Ovum interviewed CPs, equipment providers, ISPs, systems integrators, carrier neutral data centres, dark fibre providers, end customers and content distribution networks.

7.508 It estimated the UK high-bandwidth lit service market to be worth £226 million in 2011, with 9,900 end points and 41Tbit/s of transport traffic. It suggested a large proportion of this is accounted for by 10Gbit/s circuits. Ovum also said that there is significant proportion of traffic supplied through dark fibre. In bandwidth terms, Ovum suggested that including dark fibre could reduce BT's share by up to 50%.[897] Demand for dark fibre was considered to be particularly strong from financial institutions, broadcast media companies, ISPs, content distribution organisations, systems integrators and data centres. Much of this is within the WECLA, though Ovum said that a significant proportion is outside. It also found that certain enterprises (mainly financial but also content providers) were fully utilising the capacity of up to 40

[895] Analysis Mason consider this to be conservative because there are likely to be more organisations that it did not find.

[896] For example, penetration rates were assumed for very small, small, medium, large and very large finance companies, manufacturing companies etc.

[897] i.e. because it would add another 41Tbit/s of transport traffic to the market.

wavelengths per fibre. Ovum noted the substantial capacity deployed in the data centre market.

7.509 In terms of Ofcom's market power assessment, Ovum said that BT's competitive advantage is not evident in this market, given that infrastructure duplication takes place and a parallel supply chain exists. With regard to switching costs, Ovum observed a pricing structure characterised by high fixed costs and low incremental costs for additional bandwidth. It said that this makes the dark fibre model attractive.

7.510 On prospects for future competition, Ovum said it is reasonable to expect demand to be concentrated in a small number sites, including data centres and network hubs. It is therefore expected that CPs will continue to be able to build capacity to invest and compete directly with BT.

Other stakeholders

7.511 All other stakeholders who commented agreed with our SMP finding in this market. Some CPs commented on Ofcom's analysis.

7.512 Geo argued that Ofcom should review the market for leased dark fibre, noting a difference between self-provided networks over dark fibre (regularly bought by wholesale firms and certain end-users, such as those in the media industry) and a private network based upon dedicated fibre.[898] Though this comment is directed towards Ofcom's market definition, it is relevant to the SMP assessment because Geo noted that there is a material amount of demand substitution by high-end business users between dark fibre and dedicated fibre-managed services.

7.513 [✂].

7.514 In its response to the June BCMR Consultation, Sky said that it requires increasing LLU backhaul capacity in order to keep pace with the rapid growth in broadband. It expects to upgrade the capacity of its backhaul circuits to an extent that is likely to mean it will become reliant on bandwidths in excess of 1Gbit/s. Sky noted that any market power assessment based on current market shares may not adequately reflect BT's market power over the three year review period because, in part, of the likelihood of future increased demand for LLU backhaul above 1Gbit/s on routes outside of the areas where higher bandwidth services typically have been concentrated today. It noted that many LLU backhaul routes will have little competition in wholesale supply and therefore argued that BT's market power in the provision of LLU backhaul on certain routes is more entrenched than for some other leased line services, particularly in geographically dispersed suburban areas.[899]

7.515 TalkTalk also said that it believes BT will be able to sustain a significant market share and behave without competitive constraints.[900]

7.516 Virgin agreed that BT holds SMP in this market and also agreed that competition will increase as the market evolves.[901]

[898] GEO response, page 2.

[899] BSkyB response, pages 3-4.

[900] TalkTalk response, page 8.

[901] Virgin response, page 22.

MISBO in the WECLA

7.517 Two MNOs disagreed with our SMP assessment. EE/MBNL said that BT has SMP for MISBO leased lines used for mobile backhaul in the WECLA.[902] The reasons given are the same as those discussed in paragraph 7.248, that mobile backhaul is national in nature and so is underpinned by fundamentally weaker competitive conditions than those present for business enterprise sites.

7.518 Telefónica argued that investment in BT solutions meant that switching to alternative installation duplicated investments already made. It said that MNOs have paid BT for duct, in addition to the capital for equipment, and so it considers it difficult to implement alternatives. Telefónica also noted that BT does not allow O2 to use its Wayleaves, meaning that switching provider results in further costs.[903] These are considered to increase barriers to switching.

7.519 Other CPs did not express strong disagreement with Ofcom's SMP finding, but a number of them did note various concerns.

7.520 COLT expressed concern that a finding of no SMP could prejudice the outcome of separate regulatory proceedings, for example the consideration as to whether BT should be granted exemption from the requirement to provide EoI. COLT believes that such action could lead to BT selectively raising rivals' cost to drive out competition in the market.[904]

7.521 CWW had concerns about backhaul in the market, suggesting in particular that the proposal not to regulate MISBO in the WECLA has ramifications for the attainment of economies of scope matching BT. Its argument was that BT does not face issues of having to dilute economies of scope of its backhaul or aggregation points as OCPs do because BT will be permitted to share backhaul for regulated and unregulated services within WECLA. By contrast, OCPs will have regulated services and unregulated services transported over different networks and handovers, increasing their costs.[905]

7.522 Geo expressed concern about the exclusion of Openreach's CCTV, Street Access and Broadcast Access products from the MISBO market. It suggested that the inclusion of these may have an impact on the SMP analysis, either by increasing BT's overall market share or by reducing the area in which BT is found not to have SMP (though it acknowledged that the potential impact is unclear).[906]

7.523 Level 3 expressed caution about Ofcom's SMP assessment in this market, largely due to concerns about the data underpinning the market share evidence. It argued that Ofcom should discount this when considering BT's market power.[907]

7.524 [✂].

[902] EE/MBNL response, page 24.

[903] Telefónica response, page 19.

[904] COLT response, page 11.

[905] CWW response, Section 9, page 36.

[906] Geo response, page 2.

[907] Level 3 response, page 14.

7.525 UKCTA expressed concern that Ofcom had not appropriately reflected the competitive differences for access and backhaul of MISBO services. UKCTA members considered there to be important differences between these services, in particular differences in the characteristics of demand, where backhaul services require resilient supply and different purchasing patterns. They therefore considered it essential that Ofcom is certain that all the affected exchanges in the WECLA will be subject to effective competition, for example that there are two or more external suppliers of backhaul services available at a specific exchange. They requested that Ofcom conducts this analysis for its competitive assessment for MISBO in the WECLA.[908]

Responses to the November Consultation

7.526 Following the evidence submitted by stakeholders, in particular BT, we invited further views and evidence as part of our November Consultation.[909] Specifically, we asked the following:

Question 5: Do you have further evidence on competition in the MISBO market outside the WECLA, including the use and impact of dark fibre?

7.527 Of the responses received, with the exception of BT none of the stakeholders considered the MISBO market outside the WECLA to be competitive. Verizon and Easynet argued that although some large businesses with very high bandwidth (>1Gbit/s) connections may cluster in areas with multiple networks, they did not believe it had any implications for market power. Instead, it may be more appropriate to define further markets, particularly for businesses in low network reach areas that cannot relocate.

7.528 Verizon carried out analysis of its on-net and near-net capabilities for GigE circuits and found that, outside the WECLA, more than 58% of the country does not exhibit the potential for truly competitive conditions. This is based on the fact that in 58% of postcodes outside the WECLA analysed by Verizon, there was only one on-net or near-net option. Furthermore, even if another carrier is in the same postcode as BT, Verizon only considers them to be competitive if they are in the same building (otherwise their dig costs are likely to make them uncompetitive).

7.529 Verizon also disagreed that dark fibre is readily available and that, in their experience, BT and other large operators are unwilling to supply dark fibre.

7.530 Easynet argued that business customers operating across multiple sites are unlikely to be willing to use a patchwork of different alternative suppliers, due to management difficulties. Given that they will tend to supply from one source, the implication is that BT is in a much better position than OCPs to win such contracts.

7.531 Sky re-iterated its position after the June BCMR Consultation, which is that the nature of competition in the delivery of high bandwidth networks has little or no bearing on competition in the delivery of LLU backhaul. Sky believes that it will become increasingly reliant on MISBO circuits over the next three years as a result of increasing broadband usage. It therefore does not believe that current market volumes and shares are a useful indicator of BT's market power in the provision of LLU backhaul because the latter is often concentrated away from areas where high

[908] UKCTA response, pages 12-13.

[909] http://stakeholders.ofcom.org.uk/consultations/bcmr-reconsultation/

bandwidth business networking solutions are deployed. Sky considers BT's ubiquitous network makes it the only viable supplier of LLU backhaul on many routes.

7.532 CWW also had significant concerns about backhaul, specifically the access to MISBO services from BT exchange buildings and mobile base stations. It argued that only BT has network in a large number of these locations. Furthermore, even where there are two alternative operators present, CWW consider competition to be muted given the practice of price following between suppliers that are present.[910]

7.533 CWW said that diversity of services is an important factor given the use of >1Gbit/s services by data centres and CP backhaul to support a very large number of end customers. It argued that for an operator to represent a competitive constraint to BT, it must have two fully separate routes into a location for the supply of MISBO services. More generally, CWW consider a competitive backhaul location to be one where there are at least three principal[911] network operators each offering fully diverse access.

7.534 In terms of local access, CWW accepted that it would be willing to dig further for MISBO services than for TISBO or AISBO but it also argued that today's price signals incorrectly incentivise CPs to undertake certain digs to self-provide MISBO services. This is because current charges are substantially above an efficient price and so if BT were to charge on a more cost reflective basis, CPs would find fewer instances of self-supply of MISBO to be economic.

7.535 Lastly, CWW suggested that an analysis of network competition at a customer site ought to consider the following matters:

- existing fibre connectivity;
- diversity;
- nearby fibre connectivity (which could be extended to the site);
- whether alternative suppliers face entry complications;[912]
- whether the network provider is a principal operator.

7.536 Geo also said that it did not consider the MISBO market to be competitive. It repeated its concern regarding the exclusion of BT's broadcast circuits, which could have an impact on Ofcom's market share analysis. It does not consider that broadcast products are distinguishable from other MISBO products any more than other specialist products, such as MEAS.

7.537 Geo highlighted several advantages that it considers BT to have over other operators, including:

- the majority of physical access connections in the UK and an inherent advantage in its proximity to end-users;

[910] CWW said that this claim was based on quotes they had recently received.

[911] CWW do not consider niche providers to be a competitive constraint as using them would result in overly complex procurement arrangements.

[912] For example, wayleaves.

- approximately 5,500 PoPs with a national ubiquitous network connecting duct infrastructure that can be used to serve end-users anywhere in the UK, whereas the vast majority of BT's competitors have fewer than 100 PoPs[913]; and

- the ability to offer customers lower latency routes, better resilience and higher levels of service.

7.538 In terms of the impact on dark fibre, Geo considers that its availability for MISBO services is an argument *for* BT having SMP (rather than against, which is what BT claimed in its response to the June BCMR Consultation). Due to BT's control on the access segment of the network, without regulation it would have exclusive access to Openreach dark fibre, which reduces connection costs. By contrast, Geo believes that other operators face either the cost of new network build or have to take an active product from Openreach as they cannot use its dark fibre. It does not consider that the availability of OTN interfaces on active Openreach solutions removes the inefficient and costly duplication of active equipment that is required. Furthermore, Geo has found that, on a 'reasonably frequent basis', BT's wholesale active products are inadequate for the customer's requirements, meaning that the OCP must extend its own network, driving its costs up much higher than BT.

7.539 Geo also said that the comparison of dark fibre with MISBO and other BT active products is a fundamentally false premise, as "dark fibre leasing can only be compared with dark fibre leasing". It argued that Ofcom should instead consider the extensiveness of the different fibre assets.

7.540 In terms of mobile backhaul, Everything Everywhere said that it currently considers there to be only two potential providers of high bandwidth circuits with sufficient geographical spread, BT and Virgin. It argued that the latter has around 14 networks in different geographic areas, whereas BT is the only provider with a ubiquitous network with the capability to provide end-to-end connectivity. Given the complexity and density of mobile backhaul, EE therefore remains of the view that BT remains an unavoidable trading partner on a national scale for very high bandwidth services and that it retains market power in the supply of such services. It does not believe that Virgin can provide competition across the whole country on the end-to-end basis that mobile networks require, which limits the constraint on BT. In terms of other more geographically niche providers, EE considers them to offer very low penetration to its cell sites, especially in less urban areas. It also does not believe that dark fibre affects competition because it is not available from BT.

7.541 Lastly, BT reiterated its position in response to the June BCMR Consultation that the MISBO market is competitive across the whole of the UK. It argued that it is a bidding market where the purchaser is largely able to dictate the location and requirements from BT against alternatives. It therefore believes that regulation would impede commercial outcomes.

7.542 BT also presented a number of examples of network operators entering or expanding into the MISBO market. These include Sea Fibre Networks, Gamma, and NetworkFlow. It also emphasised that CPs only distinguish between geographic areas where they are 'on-net' and 'off-net', which encompass metropolitan areas and locations that act as core nodes (including data centres). BT provided further examples of such connectivity and on new data centres outside the WECLA.

[913] Geo said that this allows BT to provide services without long and costly civil digs or new investment.

Ofcom's considerations of consultation responses

7.543 In this sub-section, we present our final assessment for each criterion and, where necessary, explain how we have taken the consultation responses into account. We then conclude on our overall assessment.

Market shares

7.544 Following updates to our estimates of market shares, our revised calculations are presented in Figure 7.20 below. As with the market shares for the TISBO markets, the scenarios are as follows:

- Scenario 1: No bandwidth or geographic uplift is applied;
- Scenario 2: Network-ends are identified based on CP classification for each individual circuit;
- Scenario 3: An upper-bound estimate of the number of network-ends based on CP's own classification of ends in the circuit data;
- Scenario 4: We apply an uplift for missing OCP data;
- Scenario 5: We include both circuit and network ends in the calculation.

7.545 As discussed in Section 5, the geographic market WECLA+ is slightly different to the WECLA area that was assessed in the June BCMR Consultation as it now encompasses additional postcodes in Slough. In this Section, we use the term 'WECLA+' when presenting service share or network reach analysis for the final set of postcodes, in order to distinguish the results from the previous WECLA area that was defined in the June BCMR Consultation. We retain the term 'WECLA' when referring to the geographic market in general.

Figure 7.20: Revised market shares for MISBO in the UK excluding the Hull area

Geographic Market	Market shares					
	Base case	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
UK excl. WECLA+	BT: 57% Virgin: 11% Level 3: 7%	BT: 67%	BT: 53%	BT: 58%	BT: 51%	BT: 63%
WECLA+	BT: 24% COLT: 38% Verizon: 14%	BT: 31%	BT: 15%	BT: 26%	BT: 20%	BT: 27%

7.546 We estimate BT's share of volume to be 57% outside the WECLA+ and 24% within the WECLA+. The former is slightly lower than our estimate in the June BCMR Consultation whilst the WECLA+ estimate is nine percentage points higher, primarily because of our revised method of classifying ends. Under Scenario 2, where we classify ends on the same basis as in the June BCMR Consultation, BT's share is 15%.

7.547 Regarding BT's comment about circuits used for broadcasting resulting in an overestimate of its market share (see paragraph 7.488), Broadcast Access circuits are not included in our calculations (nor were they included in our estimates in the June BCMR Consultation, though we do include generic circuits sold to broadcasters - see Annex 5 for further details). For the same reason, we do not include CCTV and Street Access products, as suggested by Geo in its response. However, following Geo's response to the November consultation, where it argued that including BT's broadcast circuits could have a material impact on BT's market share in the WECLA, we have run a sensitivity test that includes these circuits in our calculations. This showed that including broadcast circuits would increase BT's market share to 29% in the WECLA+, illustrating that it does not have a material impact on our analysis.

7.548 We are confident that BT's market share is above the 50% threshold for a presumption of dominance outside the WECLA+ and below 40% within the WECLA+, as Figure 7.20 illustrates across a range of sensitivities.

7.549 We consider that the data underpinning the market shares for MISBO are subject to two sources of potential error, each working in opposite directions.

- On the one hand, our information requests did not include some small niche providers, meaning that BT's share in the base case could be overstated. We have sought to minimise this bias by researching over 50 smaller CPs, including the CPs that BT mentioned in their consultation responses. Further details of this exercise are presented in Annex 5 but, in summary, we do not consider these CPs will collectively have a material impact on our market share estimates, particularly outside the WECLA+. As such, we consider any potential bias to be small. Furthermore, we consider we have taken into account a sufficiently large enough number of circuits. As shown in Figure 7.20, even if we apply an extreme uplift to the OCP circuit-end count in our base case (Scenario 4), BT's market share remains above 50%.

- On the other hand, we also consider that excluding network-ends from our estimates may result in excluding circuits which are in fact part of the market because the distinction between network and customer-ends is less easy to make in this market. This was a point raised by BT in its consultation response. Many CPs providing very-high-bandwidth services to large customer buildings (particularly at data centres) may use the site as a network node, which makes it difficult to distinguish between a customer site and a network site. In this case, it may be more appropriate to include all circuits in our market share estimates. This is represented in Scenario 5, which shows BT's market share to be 63% outside the WECLA+ and 27% within the WECLA+. Although these are likely to be overestimates – because not *all* network sites should be included – we consider it shows that our base case estimate is more likely to be biased in favour of BT.

7.550 We therefore consider BT's market share to be above 50% for MISBO services outside the WECLA+ and below 30% within the WECLA+. We have not included dark fibre sales because, on the basis of our analysis, we consider that they are confined to a relatively small and unique set of sophisticated end-users. We explain this in more detail in our assessment of external constraints.

7.551 We have also analysed the average number of circuits and the average bandwidth carried across specific routes using our revised dataset. This is the same exercise that we carried out during the consultation to assess whether OCPs are more or less likely to supply higher-value services than BT. As in the June BCMR Consultation,

we do not find that the average BT route is characterised by lower bandwidths compared to most of its main competitors. This means that our estimate of BT's service share by volume should not be systematically biased upwards due to OCPs selling higher-value services per route.

7.552 We have considered BT's alternative market share estimates and concluded that they are not as reliable as our own. With regards to the Analysys Mason estimate, we note that the range of 31%-39% was based on a "Monte Carlo-type simulation". The denominator in this calculation is the total market size in wavelengths, which is based on high level assumptions around the penetration of very-high-bandwidth usage and the average number of wavelengths by sector and company size.

7.553 Analysys Mason's model suggests that there are between 3,500 and 4,800 wavelengths in the UK. This corresponds to 7,000-9,600 circuit-ends, which exceeds the number of circuit-ends obtained in Ofcom's information gathering exercise. If we include the data we have on dark fibre circuits in our base case, this would add around 3,000 circuit-ends[914], which would bring the total to approximately 7,500 circuit-ends, which is at the lower end of Analysys Mason's range (though this number would increase if network ends were included).

7.554 We have identified two issues with Analysys Mason's market share estimate for BT. The first is that they assume BT sells approximately [✂] wavelengths, which is based on retail sales of WDM (OSA/OSEA). This excludes AISBO circuits that are greater than 1Gbit/s which, according to our base case, would add more than [✂] circuits. Furthermore, the source of Analysys Mason's WDM sales for BT is not the same as our own as they have relied on the high level data provided by BT to Ofcom in June 2011. Since then, we have used the circuit data provided by CPs and have undertaken an extensive cleaning process, which is set out in Annex 5. The result is that, under our base case, we estimate that BT sells just over [✂] customer-ended wavelengths in the entire MISBO market (i.e. across the UK), which is about [✂] of Analysys Mason's estimate.

7.555 The second issue, which is relevant given our geographic market definition, is that Analysys Mason's estimates are UK-wide and not disaggregated by geographic area. Given our own estimates, it is clear that there is a significant difference in BT's share within and outside the WECLA. In order to understand how Analysys Mason's results would change if the two markets were separated, we have done the following:

- under our base case, we note that around 30% of all MISBO customer circuit-ends and 15% of BT's sales are located within the WECLA+. If these assumptions are applied to Analysys Mason's estimate of BT sales and its base case market size of 4,000 wavelengths, then BT's share outside the WECLA+ increases to 45% and falls to 19% within the WECLA+. If the Analysys Mason's lower/upper bound market size is used, BT's share outside the WECLA+ increases/falls to 47%/37%. Given that we consider the size of the market to be towards the lower end of Analysys Mason's estimated range if dark fibre is included, this would indicate a service share of more than 40%, which is above the threshold where single dominance concerns normally arise. This is consistent with our own estimate if we include dark fibre sales. However, as discussed below, we do not believe that dark fibre sales should be included in the market share.

[914] 500 dark fibre routes is equivalent to 1,000 route-ends, which correspondents to 3,000 circuit-ends if we assume 3 wavelengths per route.

7.556 We have also reviewed BT's analysis of Openreach's Terms on Application database, which it suggested showed a win rate of [✂]%, with no significant differences outside of the WECLA. BT has submitted the data and the steps it took to calculate its win-loss rate. Having reviewed the data, we consider its win-rate has been understated[915] and we also do not consider it to be as reliable as the circuit data that Ofcom has received from CPs. Firstly, it appears that BT has mis-classified some circuit ends as being outside the WECLA, which resulted in an underestimate of the win-rate outside the WECLA and an overestimate within the WECLA . Furthermore, a number of entries in the Terms on Application data do not have postcode information, in which case BT allocates these to 'non-WECLA'. BT said that this does not make a material difference to the results, but if we exclude these requests from the analysis and correct the classification errors, BT's win-rate outside the WECLA+ is [✂]%, which is higher than BT's estimate of [✂]% for the WECLA area defined in the June BCMR consultation. Given that the lower bound estimates do not remove duplicate records, we consider BT's win-rate to be closer to the upper bound. Furthermore, this appears to be materially different to its win-rate within the WECLA+, which we estimate to be around [✂]%. We also note that BT's analysis did not include single-service Ethernet sales. Based on the information that BT has provided, including single service Ethernet sales in the analysis of OSA/OSEA tenders reduces BT's win rate to [✂]% outside the WECLA+ and increases it to [✂]% within the area (excluding sales that BT has identified as duplicates).

7.557 Also, we note that this analysis is based on [✂] circuit requests where BT has been able to identify a definite win or loss. We therefore do not consider it represents a more reliable estimate of market share than Ofcom's circuit-data, which includes more than 4,000 circuits (including network ends and excluding dark fibre).

7.558 Furthermore, we do not agree with BT that their win-rate estimates give a reasonable indication of the overall share of business in the market, or that they represent a good forward-looking indicator for market shares in the longer term, because they exclude the installed base of customers.

7.559 In conclusion, we consider that BT's share is above 50% outside the WECLA and below 30% within the WECLA. The former market share, in and of itself, gives rise to a presumption that BT has SMP[916] in the market for MISBO services outside the WECLA.

External constraints

7.560 We have considered external constraints – i.e. from outside the market – that are likely to affect competition in this market. We do not regard TISBO and lower bandwidth AISBO circuits as effective substitutes for end-users or very-high-bandwidth CP backhaul given the bandwidth requirements.

7.561 However, as discussed in the June BCMR Consultation and in BT's response, self-supply using dark fibre represents a credible alternative for certain end-users.

7.562 In order to evaluate the potential impact of self-supply using dark fibre, we have analysed the extent to which MISBO services are being provided to customers through dark fibre.

[915] Part of this is due to the fact that we now include certain postcode sectors in Slough in our definition of the "WECLA+"

[916] See, for example, paragraph 75 of the SMP Guidelines.

7.563 Ofcom has received data on approximately 1,800 distinct dark fibre routes, or dark fibre ends.[917] Of these, about 30% are sold to CPs that received Ofcom's s135 request. As discussed in paragraph 7.373, these sales have already been taken into account in our service share analysis.

7.564 When we exclude dark fibre sales to CPs and sales to customers that are likely to be used for a TI or AI connection of 1Gbit/s or less, we are left with around 500 distinct dark fibre routes that we consider could represent self-supply of MI services by end-users. That is, the end-user self-provides a WDM or >1Gbit/s AI/TI service using the dark fibre it rents or purchases.

7.565 Approximately two thirds of these dark fibre sales are located in the WECLA+. In order to estimate the size of the dark fibre segment relative to CP sales of WDM and very high bandwidth[918] AI and TI services, we must make an assumption on the number of wavelengths per route. We have calculated this to be around three for lit WDM services and so we assume the same number for the use of dark fibre.

7.566 If these sales were to be included in our base case estimate for service shares, then BT's share would fall to 42% outside the WECLA+ and 12% within the WECLA+. These shares increase to 46% and 16% respectively if we include network ends for WDM services in our calculations. As discussed above, although we generally exclude network ends in our market share estimates to ensure that we ignore the effects of CP network topologies, this distinction is less clear in the MISBO market. If we adjust our assumption on the number of wavelengths per route and increase this to four/five, then BT's share outside the WECLA+ falls to 38%/36%. If we include network ends, then the shares are 43% and 41% respectively.

7.567 This analysis therefore shows that including dark fibre in our market share estimates would have some impact outside the WECLA, though we consider it likely that BT's share would still be above the 40% threshold where single dominance concerns normally arise.

Our market share analysis does not include sales of dark fibre

7.568 We disagree with BT that our market share analysis should include sales of dark fibre because we do not consider the solution to be a credible option for the majority of end-users in the MISBO market. Of the end-users that we have identified as self-suppliers, the vast majority are very large and sophisticated customers with complex requirements, even more so than most other very-high-bandwidth customers. Many of them use dark fibre in order to have control over their network. This is reflected in our circuit data, which shows that customers purchasing several dark fibre circuits are mostly large organisations such as [✂]. We also consider that this finding was borne out in the research carried out by Analysys Mason, which found that dark fibre was used by three of the 11 organisations using very-high-speed services that were interviewed. These were again very large organisations, including a major retail bank, a data centre provider and [✂] and Analysys Mason acknowledged that networks built using dark fibre represent those with the largest capacity.[919]

[917] This data encompasses information on all sales and purchases of dark fibre circuits that we received by CPs in response to our s135 data request. As with the other circuit data, CPs gave us information on the location of both ends and, in many cases, the name of the purchaser/supplier.

[918] By 'very high bandwidth' we refer to any bandwidth greater than 1Gbit/s.

[919] For example, datacentres and banks.

7.569 Following the June BCMR Consultation, Ofcom commissioned CSMG to carry out research[920] on very-high-bandwidth-connectivity users (VHBC) in order to improve our evidence base. This consisted of 25 in-depth interviews with VHBC end-users, 5 interviews with resellers of VHBC services (including systems integrators) and two interviews with organisations representing key stakeholder groups in the VHBC market (one network equipment manufacturer and one network assurance specialist). The research included active dark fibre users and, consistent with the above findings, found that these tend to be very sophisticated users such as [✂].[921] Those organisations not using dark fibre or only using a small amount gave a number of reasons for doing so. Six end-users felt that they currently lack the skills to buy and use dark fibre (e.g. the operation and maintenance of WDM equipment). Three end-users found it was generally cheaper to use lit services for their current bandwidth requirements whilst six end-users mentioned problems with a lack of supply of dark fibre. In terms of the companies that use dark fibre, the research suggested that it tends to be economic when speeds greater than 10Gbit/s are required, which is consistent with Analysys Mason's finding that dark fibre users tend to have very large capacity needs. One interviewee suggested that the threshold for using dark fibre was even higher at 40Gbit/s.

7.570 With this in mind, we have analysed our WDM circuit data to try and understand the bandwidths being delivered by the largest suppliers on each of their routes and whether a significant proportion of routes have sufficiently large capacity to warrant consideration of dark fibre. To do this, for each CP we isolated individual routes and calculated the bandwidth being delivered between the two end-points. The data suggests that for the majority of large WDM suppliers, most connections (more than 70%) are at speeds of 10Gbit/s or less. If, as the CSMG research suggests, it is only economic for end-users to consider dark fibre when bandwidths are greater than 10Gbit/s, then this means that dark fibre is unlikely to represent an economic option for the majority of end-users.

7.571 Furthermore, many of the organisations willing to use dark fibre that CSMG interviewed said that it was difficult to get access outside London. As mentioned above, six interviewees cited poor availability of dark fibre as a reason for not using more, or any, dark fibre. Certain end-users and resellers with national networks indicated that the supply of dark fibre is good in London but less so outside. Ultimately, organisations can only use dark fibre in locations CPs are willing and able to supply it and, as discussed in the June BCMR Consultation, this is primarily concentrated to the WECLA and trunk routes between major metropolitan areas. In this regard, we note that our network reach analysis includes the networks of the largest dark fibre providers, including Geo.

7.572 Therefore, although including dark fibre sales in the market shares would have some impact on the estimates, this is driven by a minority of VHBC end-users that require very large capacities. The WDM service notionally provided by such dark-fibre users to themselves is not marketed, and unlikely to be offered to other end users in competition to WDM services supplied by CPs. Any general constraining effect on prices is therefore likely to be limited. Hence we consider this to be an example of some countervailing buyer power on the part of some users, but we do not consider that dark fibre is a credible alternative for the majority of end-users.

[920] CSMG, 'Research on Very High Bandwidth Connectivity' (February 2013).

[921] Of the 25 end-users that CSMG spoke to, 20 procured at least some dark fibre as part of their network. 12 of these had dark fibre for historical reasons and generally prefer to take lit services.

Profitability

7.573 We note BT's argument regarding the reduction in prices of OSA and OSEA connection charges in January 2011 (see paragraph 7.492). We also note BT's concerns regarding the estimates of profitability from the residual markets section of their regulatory accounts. Whilst these are not subject to audit, we consider them suitable for use as a source of financial information.

7.574 Since the June BCMR Consultation, we have reviewed BT's latest additional financial statements and these confirm BT's submission that its ROCE in 2011/12 for services greater than 1Gbit/s are closer to (but still slightly above) its cost of capital. However, it is not clear whether this has largely been driven by a reduction in prices, as BT claims. [✂].

7.575 As in the June BCMR Consultation, our analysis of BT's ROCE estimate is taken in the round. However, given the difficulties in interpreting financial data for BT's above 1Gbit/s services, we put limited weight on this criterion.

Control of infrastructure not easily duplicated

MISBO outside the WECLA

7.576 We consider our assessment in the June BCMR Consultation remains valid. By having connections to the majority of premises in the UK excluding the Hull area, BT has an incumbency advantage because it has already made sunk investments across the country and no other CP is able to achieve the same cost advantage. Furthermore, given the importance of physical diversity for many very-high-bandwidth users (supported by the evidence gathered by CSMG), BT's ubiquitous network gives it a further advantage in this market. We also note that seven organisations interviewed by CSMG preferred to go directly to the network operator – usually BT – as they found it gives better control over the network and avoids handover problems between two providers. Furthermore, three interviewees whose supplier relied on third-party fibre experienced problems in getting faults resolved quickly or suffered poorer network service quality as a result of a poor working relationship between their primary supplier and the party that provided some of the underlying infrastructure, which illustrates the advantages of contracting the largest infrastructure provider directly.

7.577 We do not agree with BT's view – made by reference to our 2007/8 Review with regard to single high bandwidth AISBO services – that BT does not have a significant cost advantage in this market. There are a number of important differences between our assessment for high bandwidth AISBO services in the UK in 2007/8 and our assessment for MISBO services in the current review. In the 2007/8 Review, we estimated BT's market share for high bandwidth AISBO in the UK (excluding the Hull area) to be 38-40% and we noted that this may have been overstated.[922] This is significantly different to our current market share estimates for MISBO services outside the WECLA+ and Hull, which are in the range of 51%-67%.

7.578 Furthermore, in the 2007/8 Review, we noted that the high bandwidth AISBO market was small and based largely in London. Although we noted the possibility that demand for above 1Gbit/s circuits could grow in areas outside London, where alternative infrastructures are less well developed, we considered this unlikely to happen on the basis that applications requiring very high bandwidths tend to be

[922] See 2007/8 Review, page 168.

concentrated in urban areas. We also said that demand for LLU backhaul in dense traffic areas was generally being met with 1Gbit/s circuits.

7.579 Whilst this assessment reflected our view of competitive conditions in 2008, there have since been a number of changes. First, as noted in the June BCMR Consultation, there has been rapid growth in the MISBO market during the past three years and a significant proportion of this has been outside London and the WECLA.[923] Furthermore, as shown in our analysis below, a significant proportion of these are in locations where BT is the only network operator present. We also note Sky's consultation response that, during the next three years, it expects to upgrade the capacity of its backhaul circuits to bandwidths in excess of 1Gbit/s. Given the upward trend in fixed broadband connections[924] and higher broadband speeds[925], as well as discussions with operators such as [✂], we believe that the use of above 1Gbit/s backhaul for LLU and, potentially, mobile operators is likely to be a key driver of demand during the next three years.

7.580 Lastly, the 2007/8 Review did not include WDM services in the same market as other wholesale leased lines services. As discussed below, there are certain technical characteristics of WDM – in particular the lack of an interconnection product – that gives BT a cost advantage over its competitors.

7.581 In order to address BT's concerns regarding our use of the Experian database (see paragraph 7.494), given also the relatively small number of very-high-bandwidth users, and in light of Analysys Mason's evidence that a small but significant minority of organisations purchasing very-high-speed services have fewer than 250 employees, we carried out a network reach analysis using current actual demand from MISBO customers (as opposed to potential demand). The rationale for this was to examine the extent to which existing very-high-bandwidth users are located in areas of high network reach.

7.582 We also considered whether it was appropriate to increase the buffer distance above 200 metres in light of the evidence submitted by Analysys Mason that there have been examples of CPs digging 500 metres to several kilometres. We also noted CWW's response to the November Consultation, which stated that they would be willing to dig further for MISBO services than for TISBO or AISBO (though with the caveat that this is driven by current prices being much higher than cost). The research carried out by CSMG also suggested that it is common for VHBC end-users to sponsor network build-out, whereby they pay a fee to a service provider to cover the costs of expanding their network.

7.583 We therefore calculated the proportion of MISBO circuit-ends that were within 200m of at least two OCP flex points outside and within the WECLA+. We then adjusted the buffer distance to 300m and 500m which reflects the fact that OCPs may be willing to build further for circuit bandwidths >1Gbit/s than others. We consider 500m is a reasonable upper bound based on the network extension data we received from OCPs. By considering extensions by OCPs for circuits with bandwidth greater than 1Gbit/s, we found that the mean average dig distance was 249 metres. It should be

[923] Under our base case estimate for market shares, there are more than twice the number of MISBO circuit-ends outside the WECLA+ than within.

[924] See for example Ofcom, 'Communications Market Review 2012' (Figure 5.26, page 309).

[925] See for example Ofcom, 'Communications Market Review 2012' (Figure 5.33, page 314) and Ofcom, 'UK fixed-line broadband performance, November 2011'.

noted that we only had complete data for the relevant fields in 13 cases, which is a very small sample over three years.

7.584 We also received a separate submission from [✂]. We therefore believe that 500 metres represents a reasonable upper bound. We note that BT and Analysys Mason provided some examples of dig distances longer than 500m but we consider these to be exceptions based on the above evidence (see also Figure 5.3 in Section 5)

7.585 In addition to adjusting the buffer distance, we also carried out a sensitivity test to the analysis, requiring the presence of three OCPs being within reach, as well as the BT+2 criterion we use as our base case. This may be appropriate given the diversity requirements of many end-users in this market, as we discussed in the June BCMR Consultation. This issue was also raised by CWW in its response to the November Consultation in relation to CP backhaul (see paragraph 7.533).

7.586 Figure 7.21 below presents the results of the network reach analysis for MISBO circuit-ends. We analyse two sets of data:

- the first includes all circuit-ends, such that postcodes with more connections are given more weight;
- the second only analyses unique postcodes.

Figure 7.21: Network reach analysis of MISBO circuit-ends

Geographic Market	Number of OCPs	Percentage of circuit-ends within reach			Percentage of unique postcodes within reach		
		200 metres	300 metres	500 metres	200 metres	300 metres	500 metres
UK excl. WECLA+	2	39	47	60	31	43	56
	3	22	30	39	15	23	34
WECLA+	2	96	99	100	96	99	100
	3	93	97	100	92	97	100

Source: Circuit data, Ofcom analysis

7.587 The results suggest, outside the WECLA+, that if we assume each circuit-end to represent an existing VHBC customer, between 22% and 60% of customer demand is located in areas where there are multiple network operators competing with BT. On the basis that these are extreme values – i.e. assuming a buffer distance of 200 metres with 3 OCPs is conservative and assuming a buffer distance of 500 metres with 2 OCPs is too lax – we can approximate that the reach is likely to be fairly close to 40%. This suggests that the majority of end-users are in locations where insufficient numbers of CPs are likely to be willing to invest in order to provide MISBO services, meaning that BT is insufficiently constrained in these areas. Even if we assume the upper bound of around 60%, this would still leave a significant number of end-users in areas where there is insufficient competitive constraint on BT at the wholesale level.

7.588 In addition to carrying out a network reach analysis on MISBO circuit-ends, we have done the same for BT exchanges in order to gain an insight into the extent of competitive constraints for CP backhaul. It is not appropriate to consider all BT

exchanges across the UK because we do not expect demand for MISBO services in all these locations. Therefore, in order to identify the locations where such demand is likely to arise, we use the exchanges identified as being in 'Market 3' in the most recent Wholesale Broadband Access market review.[926] These are exchanges where there are four or more principal operators present (or forecast) and exchanges where there are three principal operators present (or forecast) and where BT's market share is less than 50 per cent. We would expect these exchanges are the most likely to require backhaul connections greater than 1Gbit/s, for example LLU backhaul (as suggested by Sky in its consultation response).

7.589 As above, we have carried out the analysis on the basis of two and three OCPs. We consider buffer distance thresholds of 200 and 500 metres, the former being consistent with our analysis in Section 5 and the latter serving as a sensitivity test in the event that OCPs are willing to build further to reach these exchanges.

Figure 7.22: Network reach analysis of BT Exchanges in WBA 'Market 3'

Geographic Market	Number of OCPs	Percentage of exchanges within 200 metre reach	Percentage of exchanges within 500 metre reach
UK excl. WECLA+	2	25	47
	3	6	19
WECLA+	2	96	98
	3	74	98

Source: Circuit data, Ofcom analysis

7.590 The results suggest, outside the WECLA+, that the majority of exchanges where we might expect to see very high bandwidth backhaul demand over the course of the three year review period do not meet the network reach test. This result is robust to a buffer distance of 500 metres. Given that BT's service share increases if we include network-ends, which includes CP backhaul, this is consistent with our view that BT will retain a competitive advantage for CP MISBO backhaul over the course of the three year review period.

MISBO in the WECLA

7.591 We consider our assessment in the June BCMR Consultation remains valid. Our network reach analysis shows there is extensive alternative infrastructure in the WECLA that is close to large businesses, existing MISBO users (as shown in Figure 7.21 above) and BT exchanges that are likely to require MISBO services for backhaul (as shown in Figure 7.22 above). Our analysis of MISBO circuit-ends and BT exchanges in market 3 is robust to the assumption of a buffer distance of 500 metres and a threshold of at least three OCPs. We also note that BT's market share is less than 30 per cent, even if we include network ends (see Scenario 5 in Figure 7.20).

7.592 In addition, the evidence gathered by CSMG is supportive of strong competition within London, as almost all end-users and resellers with a presence in the area indicated that supplier choice was good.

[926] http://stakeholders.ofcom.org.uk/consultations/wba/wba-statement/

Economies of scale and scope

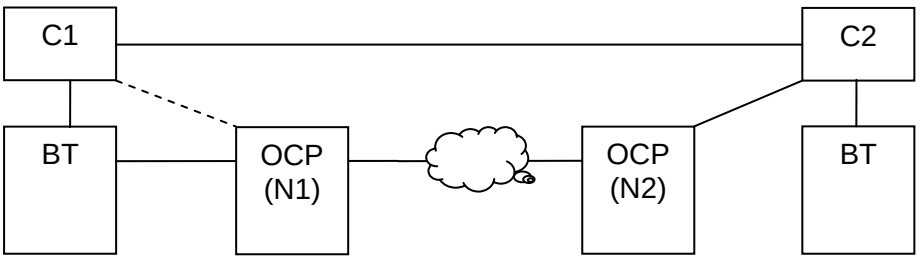
7.593 We consider our assessment in the June BCMR Consultation remains valid, in addition to the general assessment of this criterion as set out in paragraphs 7.97-7.115 above. In relation to CWW's concern that our proposal not to regulate MISBO services in the WECLA will allow BT to attain more effective economies of scope, we do not consider that this will give BT a material competitive advantage. This market has not been regulated in the past and OCPs have still been able to compete effectively.

Barriers to entry and expansion

MISBO outside the WECLA

7.594 We consider our assessment in the June BCMR Consultation remains valid, in addition to the general assessment of this criterion as set out in paragraphs 7.120-7.128 in relation to switching costs. Regarding the latter, it is of note that eight of the end-users interviewed by CSMG in their research suggested they were reluctant to switch due to the either costs involved or the hassle in setting up a new contractual framework with a new supplier. Another end-user also expressed concerns about the risk of service interruptions during the handover period. Furthermore, most of the end-users that actively go back to the market when their contract expires indicated that switching provider would still generally mean that the underlying fibre is provided by BT Openreach.

7.595 With regards to the lack of interconnect product, we have reviewed BT's technical arguments (summarised in paragraph 7.495) and concluded that this still represents a barrier to entry and expansion for other CPs. To illustrate this, we consider a customer that requires two sites (C1 and C2) to be connected at speeds greater than 1Gbit/s. In this example, BT has a physical connection to both sites, whilst an OCP is only present at C2. The following diagram illustrates this.



7.596 In order to provide a very high bandwidth connection, BT can install WDM equipment at both sites and, for long connections, it will also need to invest in other equipment such as optical amplifiers and dispersion compensators. For a CP to connect the two sites, however, it cannot purchase a wholesale product from C1 to its network site N1 in the same way that it can for TISBO or AISBO services because WDM-based line-side optical connections are based on equipment vendors' proprietary technology and are not fully standardised. It therefore has broadly two options.

- the first is to establish a physical link between N1 and C1 and install WDM equipment at the two customer sites, with the associated civil engineering costs.
- the second option is to purchase an optical connection from C1 to N1. Under this option, BT (or any other CP with a connection to C1) would provide a point-to-

point WDM connection between C1 and N1 and the OCP would provide a point-to-point WDM line system between N1 and customer site C2. This would require WDM equipment at both N1 and C2 and it would also require investment at N1 to achieve interworking between the two CPs. Interworking connections between the two WDM line system terminals at the OCP network site (N1) would be fibre based using either the appropriate WDM client interface or an ODU client interface, the latter offering consistent end to end service management and monitoring across all WDM client services and more efficient interworking (fewer interfaces and optical cables) if there are multiple services per wavelength. The WDM line systems provided by the wholesale provider and the OCP need not be from the same equipment vendor. The costs of the wholesale provider's WDM services (line system) and the interwork connections between the WDM line system terminals at N1 would be in addition to the WDM equipment between N1 and C2.

7.597 In either scenario, BT therefore has an advantage from having a physical presence at both customer sites. In the first option, it does not incur a cost of installing duct and fibre. In the second option, it does not have to invest in as much equipment.

7.598 In its consultation response, BT's distinction of interconnection and interworking appears to be the difference between:

i) the connection between WDM system terminal line interfaces at C1 and N1 (interconnect); and

ii) the connection between the wholesale provider's and OCP's equipment within the OCP network site N1 (interworking).

7.599 BT has acknowledged that connection between two different vendors' equipment line-side interfaces at C1 and N1 will not be possible during the next three years, meaning that interworking products is the only solution available to OCPs. As discussed above, we consider this is not as cost effective as a point-to-point solution between customer sites, which reinforces BT's competitive advantage. We therefore do not agree with BT that the lack of demand for a new form of interconnect product implies a competitive wholesale and retail market.

7.600 Regarding BT's argument about barriers to entry and expansion being relatively low given the high revenues and the low proportion of total costs represented by the underlying cable or duct, as discussed above we recognise that OCPs are more likely to dig longer distances in this market compared to TISBO or AISBO services. However, we do not accept that barriers to entry are immaterial, particularly in cases where customer sites are greater than 500m from an OCP network flex point, and also due to the interconnection issue discussed above.

7.601 In terms of Analysys Mason's survey of very-high-bandwidth end-users, we are not convinced that their survey evidence is supportive of a well-functioning competitive market. As acknowledged by Analysys Mason, the size of their sample is small and we do not consider it is large enough to draw robust conclusions. This issue notwithstanding, it is also not clear that the responses that Analysys Mason received indicate that end-users are "satisfied". Of the 16 organisations surveyed currently using >1Gbit/s services, 15 were not planning to change supplier. Whilst only one organisation cited lack of choice as a reason, the most common were "price rise is small" and "long-term contract" and it is not clear to us how these should be interpreted, particularly a "small price rise". We asked Analysys-Mason for further

explanation but, even with the benefit of this, it remains unclear what respondents understood by this question.

7.602 Furthermore, the 11 in-depth interviews that Analysys Mason conducted with organisations that currently use >1Gbit/s services are also difficult to interpret. Two respondents did not answer the question about the level of supply of very-high-speed services whilst another two indicated that there was limited choice.[927] One respondent indicated that the incumbent was the only credible supplier[928] and another said that [✂]. Of the remaining respondents, it is not clear whether the sites were located within the WECLA area.

7.603 We have also considered the evidence presented by CSMG on very-high-bandwidth-connectivity services. The interviewees largely agreed that outside of the major metropolitan areas, they had difficulty getting any on-net providers other than BT. Some of the interviewees said that London was the only city with adequate competition levels but others considered themselves to have sufficient choice in other large cities.[929] It is also worth noting that when asked about satisfaction with choice and supply of VHBC services, those that were based exclusively in London expressed much greater satisfaction than the other interviewees.

7.604 An important finding from the CSMG research was the criteria VHBC users considered to be most important for choosing a communications provider. In the majority of cases, these were:

- commercials – i.e. pricing;
- service level agreement;
- network reliability (including diversity); and
- lead time.

7.605 We consider BT to have a substantial advantage in each of these outside the WECLA. As discussed in paragraphs 7.83-7.93, BT's ubiquitous network means that it is generally able to serve new customers more quickly and is in a better position to ensure network security, diversity and minimise its reliance on third parties. Furthermore, because it does not generally have to dig significant distances to reach new customers (relative to OCPs), it is likely to be able to offer, comparatively, lower prices.

MISBO in the WECLA

7.606 We consider our assessment in the June BCMR Consultation remains valid. Given the extent of competing infrastructure in the WECLA (illustrated by our network reach analysis) and the high value of MISBO services, we do not consider there to be insurmountable barriers to entry and expansion in this market. Furthermore, taking into account the key criteria considered to be of most importance to end-users – being price, SLA, lead time and network reliability – we consider BT's advantages with respect to these are more limited within the WECLA because OCPs are more likely to have network at (or close to) sites requiring very high bandwidth services.

[927] Regional government and [✂]

[928] [✂]

[929] For example, Manchester, Bristol, Birmingham, York, Leeds and Glasgow.

7.607 The fact that there is currently no satisfactory method of interconnecting MISBO services does raise difficulties for CPs needing to connect a site within the WECLA to a site outside the WECLA. However, we consider this is primarily relevant to the market outside the WECLA, where we are proposing to introduce remedies.

Countervailing buyer power

MISBO outside the WECLA

7.608 We consider our assessment in the June BCMR Consultation remains valid, in addition to general assessment of this criterion as set out in paragraphs 7.146-7.157 above. We recognise that end-users in this market are likely to be large and sophisticated and that they will issue competitive tenders, as acknowledged in the June BCMR Consultation. We also note the CSMG research which found that many respondents, particularly in the public sector, used a formal tender to purchase VHBC services whilst the majority are able to negotiate with their suppliers as part of their procurement process (for example on price, route diversity and service level agreement). Furthermore, some end-users have break clauses in their contracts that allow them to terminate the relationship with their supplier under certain conditions (such as unsatisfactory service). There are also benchmarking clauses that allow for an in-life review of contract terms (especially price) relative to the rest of the market. We also acknowledge that self-build is an option for some end-users, as discussed above.

7.609 However, we do not consider that the majority of customers or end-users are able to exercise effective countervailing buyer power at the wholesale level. In order to do so, the customer must be in a position to credibly switch supplier or self-provide the service. We consider this is unlikely to occur where no CP or dark fibre provider other than BT has infrastructure near the relevant site of connection. In this respect, we note that our network reach analysis of existing demand and Market 3 BT exchanges in Figure 7.21 and Figure 7.22 respectively shows that a large proportion of end-users and CPs are unlikely to have an alternative to BT in areas outside the WECLA.

7.610 The research carried out by CSMG also provides evidence of a lack of effective countervailing buyer power outside the major metropolitan areas, as the majority of interviewees said that although they can end their contract if they want to at the retail level – for example in response to price increase or substantial drop in quality – switching provider is generally limited to CPs or resellers that need to use wholesale inputs from BT.

7.611 We have also explained in paragraphs 7.561-7.572 that although some end-users are able to exercise some countervailing buyer power via the option of dark fibre, we consider this is unlikely to apply to the majority of customers.

MISBO in the WECLA

7.612 Given the amount of alternative network infrastructure within the WECLA and the relatively low concentration of supply in this market, we do not consider that countervailing buyer power is a relevant consideration to our assessment of SMP in this market.

7.613 In relation to the comments from MBNL and Telefónica that BT has SMP for MISBO leased lines used for mobile backhaul in the WECLA (see paragraphs 7.517-7.518), we disagree that MNOs face significantly different competitive conditions relative to other MISBO customers for the same reasons discussed in our general assessment

of this criterion and in our SMP assessment for medium and high bandwidth TISBO in the WECLA. MNOs are able to purchase from CPs other than BT in areas where there is sufficient competing infrastructure, which is the case in the WECLA.

Prospects for competition

MISBO outside the WECLA

7.614 We consider our assessment in the June BCMR Consultation remains valid. Outside the WECLA, given the high sunk costs associated with building networks and the high barriers to entry and expansion and lack of effective countervailing buyer power, we do not expect competition to become effective over the course of the review period.

7.615 Given this is a fast growing market, we have also taken into account segments that are particularly likely to exhibit strong demand growth. Analysys Mason asked survey respondents about the extent to which demand is likely to grow and although it is difficult to generalise from a small sample, they suggested a gradual rise in the number of >1Gbit/s services.

7.616 The end-users interviewed by CSMG mostly said that demand for VHBC will materially increase over the next three years (10-50% increase), though resellers indicated that it would be more modest (5-10% increase). Respondents identified the following key drivers of demand:

- financial services requiring low latencies;
- the aggregation of large numbers of CCTV channels used to prevent fraud and theft in retail;
- higher education and research generating more data and increasing the use of IT for teaching and learning;
- growing popularity of videoconferencing and data centre hosting;
- media, including growing consumer and business demand for richer content and (HD) video over IP networks.

7.617 In addition, based on responses received from other CPs and discussions with them, we consider it very likely that CP backhaul capacity (including LLU) is likely to require MISBO service over the course of the three year review period. For example, [✂]. However, as discussed in paragraphs 7.588-7.590, in the exchanges we have identified as being the most likely to require backhaul connections greater than 1Gbit/s, we do not consider it likely that BT will be competitively constrained.

MISBO in the WECLA

7.618 In terms of future demand from CPs and other organisations, for example data centres, financial service and media organisations, we believe there is enough competing infrastructure to serve this market, especially given the relatively high revenues available compared to low bandwidth AISBO services. This enables CPs to justify the investments required to reach new sites demanding MISBO services where they are in close proximity to their networks (which is much more likely to be the case in the WECLA than outside this area).

7.619 We have considered UKCTA's request to check that all affected exchanges in the WECLA will be subject to effective competition (see paragraph 7.525) and have checked whether there are two or more OCPs of backhaul services available at each exchange. Based on the information available to us, we estimate that the vast majority of local exchanges are connected to at least one OCP, and around 60% of local exchanges are connected to two or more. Whilst this does not meet the threshold requested by UKTCA, we note from Figure 7.22 above that the vast majority of BT exchanges in WBA Market 3 and in the WECLA+ are within 200 metres of at least two OCPs. We have also included exchanges in WBA Markets 1 and 2 that are in the WECLA+ and it remained the case that over 95% of exchanges were within 200m of at least two OCPs. Whilst not all of these have at least two physical OCP connections,[930] we consider that the proximity of OCPs to the exchanges and the high value of services available to OCPs that wish to enter or expand in the provision of backhaul should be sufficient to constrain BT.

7.620 We have also considered the concerns of other CPs in relation to our finding of no SMP in this market. Regarding the suggestion from COLT a finding of no SMP could prejudice the outcome of separate regulatory proceedings, we note that for the purposes of this assessment we are required to determine whether BT has the ability to act to an appreciable extent independently of its competitors, customers and consumers over the course of the three year review. Our SMP assessment has shown that this is not the case for MISBO services in the WECLA. For this reason, we do not consider that BT will be able to selectively raise rivals' cost and drive out competition in the market because there is enough choice for its rivals that they should not be reliant on BT.

Conclusions on MISBO in the UK excluding Hull and the WECLA

7.621 Having undertaken a thorough and overall analysis of the economic characteristics of this market by applying cumulatively the SMP criteria, and having considered consultation responses, we have concluded that BT has SMP and will maintain this SMP over the course of the three year review period.

7.622 Based on our revised market share estimates, BT's share is above the 50% threshold for a presumption of dominance across a range of sensitivities. Furthermore, our arguments in the June BCMR Consultation around barriers to entry and countervailing buyer power remain relevant as BT has a significant advantage due to the ubiquity of its network.

Conclusions on MISBO in the WECLA

7.623 Having undertaken a thorough and overall analysis of the economic characteristics of this market by applying cumulatively the SMP criteria, and having considered consultation responses, we have concluded that no operator enjoys a position of SMP, and that no operator will enjoy a position of SMP over the course of the three year review period.

7.624 Given the high value of services, the benefits that BT gains from its network coverage are marginal relative to its competitors. We consider that CPs have already invested to reach existing sites of demand and, although our market shares have been revised upwards since the June BCMR Consultation, we are confident from the sensitivity tests in Figure 7.20 that BT's share is well below 40%.

[930] i.e. two or more OCPs actively serving the exchange.

7.625 Therefore, we conclude that competition in this market is effective, and will continue to be effective over the course of the three year review period.

Relevant wholesale symmetric broadband origination markets in the Hull area

7.626 In this sub-section, we set out our SMP assessments for the five wholesale symmetric broadband origination markets in the Hull area.[931] We conclude that KCOM has SMP in each of the following markets:

- low bandwidth TISBO (up to and including 8Mbit/s);
- medium bandwidth TISBO (above 8Mbit/s and up to and including 45Mbit/s);
- high bandwidth TISBO (above 45Mbit/s and up to and including 155Mbit/s);
- very high bandwidth TISBO (622Mbit/s); and
- low bandwidth AISBO (up to and including 1Gbit/s).

7.627 In terms of MISBO services, given that there is no extant market in the Hull area, we do not reach a conclusion with regard to the existence of SMP and it does not form part of our assessment in this sub-section.

7.628 Our conclusions are based on a thorough and overall analysis of the economic characteristics of these markets over the course of the three year review period. In our SMP assessment, we have had particular regard to the SMP criteria summarised in Figure 7.23 below in assessing KCOM's power to behave to an appreciable extent independently of its competitors, customers and consumers.

Figure 7.23: Summary of SMP determinations for the wholesale symmetric broadband origination markets in Hull

Relevant market	Results of other criteria applied for SMP assessment	Proposed SMP designation
Wholesale low bandwidth TISBO market (<=8Mbit/s) in the Hull area	- KCOM's market share is 100% or close to 100% in every market - KCOM is the only CP with an extensive network in the area - KCOM benefits from significant economies of scale and scope - Lack of countervailing buyer power as KCOM is generally the only viable supplier	KCOM
Wholesale medium bandwidth TISBO market (>8Mbit/s, <=45Mbit/s) in the Hull area		KCOM
Wholesale high bandwidth TISBO market (>45Mbit/s, <=155Mbit/s) in the Hull area		KCOM
Wholesale very high bandwidth TISBO market (622Mbit/s) in the Hull area		KCOM
Wholesale low bandwidth AISBO market (<=1Gbit/s) in the Hull area		KCOM

[931] We refer to 'Hull' and 'the Hull area' interchangeably throughout this section. They both refer to the area defined in the geographic market definition Section.

Assessment in the June BCMR Consultation

Market share and market share trends

7.629 When calculating market shares in the Hull area, the methodology we used for the rest of the UK resulted in shares for KCOM that ranged from 89% to 100% across the various wholesale symmetric broadband origination markets. However, two factors suggested that the lower estimates were not correct:

- first, they were not consistent with our understanding of network reach. In most circumstances,[932] a CP needs to be the access network infrastructure provider in order to have a positive share in a wholesale symmetric broadband origination market. We considered KCOM to be the only supplier with access network infrastructure in the Hull area which is used to provide leased lines. This implies that KCOM's share will be at, or very close to, 100% in wholesale symmetric broadband origination markets in the Hull area; and

- secondly, our estimates suggested that KCOM's share is 100% in the high value high bandwidth markets and at its lowest in the low bandwidth TISBO market. Given the need for CPs to invest in network infrastructure to reach customer sites in the Hull area, this is the reverse of what we expected.

7.630 As a result, we undertook a further analysis of the underlying data provided by BT, CWW and KCOM in relation to circuits sold in Hull. BT and CWW were the two CPs who appeared to have small but not insignificant shares in the Hull area. We compared data provided by BT and CWW in relation to sales of services in Hull with data provided by KCOM regarding its wholesale sales to BT and CWW. As we did for the rest of the UK, we used postcode sector as the unit for analysis. We calculated each CP's service count within a postcode sector as the sum of retail and wholesale sales less wholesale purchases.

7.631 For CWW, this analysis showed that all of its sales of leased line services within the Hull area used KCOM wholesale circuits as an input. The results were the same for BT for all except the postcode sectors which span the border of the original Kingston Communications licence area. In these postcode sectors, BT is the original PSTN network provider for some of the premises, and therefore we expected to measure BT as having a positive wholesale share.

7.632 The reason why the original methodology did not show the same results is that the data provided by CPs regarding their wholesale purchases tends to focus on purchases from BT, and appears to omit services bought from other CPs such as KCOM. Also, BT's wholesale purchase data was missing geographic information, and therefore we could not identify those purchases which related to the Hull area.

7.633 We therefore estimated KCOM's share at, or very close to, 100% in all of the relevant wholesale symmetric broadband origination markets in the Hull area. That is, there is almost no wholesale competition in the provision of wholesale symmetric broadband origination services in Hull. We concluded that this, in and of itself, creates a presumption that KCOM has SMP in each of these relevant markets. The one exception is the MISBO market, in which no services have been supplied.

[932] The exceptions are where a CP uses a passive input, such as dark fibre or MPF (metallic path facility), supplied by a third party to reach the customer site.

7.634 We were not able to provide comparisons with the market share findings in the 2007/8 Review, or provide growth figures specifically for Hull, because the data submitted by KCOM for the 2007/8 Review were found to be incomplete.

7.635 We noted that the trends in demand which were apparent in the UK-wide statistics are likely to be representative of developments in Hull. In this regard, we understood that demand for TI circuits is declining fast, with the most significant falls in demand for higher bandwidth services. Similarly, demand for low bandwidth AISBO services has the fastest rates of growth for relatively higher bandwidths.

Profitability

7.636 KCOM's regulatory accounts showed that its ROCE is exactly 13% in every market in which it is regulated. We did not consider that a better understanding of KCOM's profitability would be likely to affect our proposed market power determinations. Our cumulative assessment of the other SMP criteria, in particular our assessment of KCOM's market shares, was sufficient for our SMP assessment.

Control of infrastructure not easily duplicated

7.637 Hull is the only area in the UK where BT is not the former monopoly provider of PSTN services. The local telecoms network infrastructure in the Hull area is owned by KCOM. For PSTN services and DSL-based broadband, which use the same copper infrastructure, there is a well-defined area within which homes and business are served by KCOM, and not by BT. Immediately outside this area, and in the rest of the UK, BT owns and runs the local PSTN network infrastructure. Due to the fact that the two networks developed at a time when licences restricted where a provider could build network and operate, there is very little overlap between the BT and KCOM networks. Equally, our network reach analysis showed:

- there is no alternative CP network infrastructure in the Hull area; and
- BT has just a handful of flexibility points, and these do not appear to be used to provide leased lines services.

7.638 This means that KCOM is, in effect, the only access network provider in Hull. BT aside, no other CP appeared to have network infrastructure within the Hull area. BT has only [✂] flexibility points in the entire area[933], and from a detailed assessment of its supply, does not appear to provide any business connectivity services from these flexibility points, but instead buys wholesale inputs from KCOM.

7.639 Although Hull is a relatively small area, the issues relating to control of the fixed access network infrastructure are the same as the rest of the UK: the costs associated with replicating the infrastructure are very high relative to the total demand for communications services in the area and largely sunk. As a result, it is very difficult for other CPs to justify these investments. The result is that KCOM gains a significant advantage over its competitors in the areas where it owns the access network infrastructure and we did not consider this would change over the course of the three year review period.

7.640 To some degree, the costs of building network are offset by high revenues for higher bandwidth services. However, we did not have any evidence of CPs making any

[933] We have updated our analysis since the June BCMR Consultation and have found that BT actually has [✂] flexibility points in the KCOM area.

such investments to date, and so we did not consider it likely to happen in the future. Therefore, our view was that KCOM's control of the access network infrastructure in Hull is likely to be a source of SMP in all of the relevant wholesale markets in the Hull area.

Economies of scale and scope

7.641 Given that KCOM has close to 100% market share in all of the markets considered, we concluded that KCOM enjoys greater economies of scale than its competitors. However, as explained in relation to a number of the relevant markets outside the Hull area, economies of scale within relatively narrow economic markets are not necessarily an important characteristic in an assessment of SMP. What matters most is scope across a broad range of economic markets, and the ability to spread the common costs of passive network infrastructure between a wide range of customers.

7.642 There are much larger companies operating in the UK than KCOM, and a number of these have greater scope. However, KCOM is clearly the largest wholesale provider within the Hull area, and will therefore benefit from more efficient levels of network utilisation than a new entrant. It would take time for any new entrant – regardless of the scale of scope of its operations outside Hull – to achieve the same level of efficiency as KCOM within Hull. Overall, we considered KCOM's scale and scope to be a source of competitive advantage, and so supported our proposed market power determinations in the relevant wholesale markets in the Hull area.

Barriers to entry and expansion

7.643 In the June BCMR Consultation, we considered there to be considerable barriers to entry and expansion in the wholesale connectivity markets in Hull. These are caused by:

- the high sunk costs required to build network infrastructure;
- the economies of scale and scope associated with providing services; and
- switching costs.

7.644 The general assessment of these barriers to entry as set out above is also relevant to the relevant wholesale markets in Hull. Although barriers to entry are offset to some degree in the markets for higher value services, as already noted, we had no evidence that led us to consider any CP has overcome these barriers to any sufficient degree, nor did we consider that this would change over the course of the review period of three years.

7.645 Our view, therefore, was that barriers to entry and expansion are significant in all the relevant wholesale markets in Hull and will remain so over the course of the three year review period.

Countervailing buyer power

7.646 Due to the very low volumes in some of the markets in Hull, individual buyers could account for a substantial share of demand for some products, and countervailing buyer power could potentially act as a constraint on KCOM's behaviour. In the medium, high and very high bandwidth TISBO markets, KCOM supplies [✂] circuits respectively. The loss of just one of these circuits would represent a significant

proportion of total market demand (though the aggregate value of the sales that these would represent would likely be small).

7.647 However, the threat to change supplier must be credible for countervailing buyer power to act as an effective constraint. Even if, in theory, a customer could persuade an alternative supplier to enter the market to supply a relatively high value service, or could self-supply using microwave technology, the fact that no other CP has provided any of these circuits in the past led us to consider that the threat is unlikely to be sufficiently credible to alter KCOM's behaviour.

7.648 Our view, therefore, was that countervailing that buyer power is unlikely to act as an effective constraint on KCOM's behaviour over the course of the three year review period.

Prospects for competition

7.649 We considered that the prospects for wholesale competition in the Hull area were poor. It is a relatively small, geographically isolated area, without any great concentration of businesses which might demand leased lines services. KCOM has a significant advantage over potential competitors due to its network infrastructure, and economies of scope and its high share. These conditions create significant barriers to entry.

7.650 In light of the falling demand for TISBO services, we did not see any realistic prospect of increased competition in any of the wholesale TISBO markets. For AISBO services, the prospect of growing demand would make any OCP network investment more attractive, but the relatively low value of the services means that it is unlikely. We were aware of a number of CPs either providing, or planning to provide, wholesale connectivity services in Hull using fixed wireless technologies. In its response to the CFI, KCOM noted that one MNO met its demand for radio station backhaul in Hull entirely independently of the KCOM network. In addition, we researched three CPs who are using fixed wireless technologies to provide the connectivity to support retail internet access services in Hull. As discussed in Section 4, we did not consider that leased lines services provided over fixed wireless technologies are in the same market as those provided over a fixed network. In addition, it is likely that the services supporting retail internet access would fall in the wholesale local access market rather than the AISBO market.

7.651 Therefore, despite these competitive developments in Hull, we did not consider that prospective competition was likely to provide any meaningful constraint on KCOM's behaviour in any of the wholesale TISBO and AISBO markets in Hull over the course of the three year review period.

7.652 For MISBO services, the high value and prospects for further demand growth imply that competition may be possible. To date, though, there are no MISBO services in the Hull area. Should demand for these services develop during the three year review period, it is possible that other CPs would be able to justify the investment to reach a site within Hull. However, we considered KCOM would still have a competitive advantage in supplying these.

Consultation responses

7.653 In the June BCMR Consultation, we asked the following:

Question 12: Do you agree with our assessment of SMP for the wholesale TISBO and AISBO markets in the Hull area?

7.654 KCOM provided the most extensive comments on our SMP assessments in Hull.[934] A particular concern KCOM expressed with Ofcom's analysis was regarding market developments during the next three years. It noted that MS3 Communications is currently deploying a local access network in the Hull area and argued that this could change the competitive landscape for the provision of business connectivity services in Hull very quickly.[935] KCOM said that MS3 plans to offer services through a range of resellers, particularly access to managed services up to 10Gbit/s, duct access and dark fibre point-to-point links. KCOM argued that Ofcom should consider these developments before reaching a conclusion.

7.655 KCOM also said that mobile backhaul warrants separate consideration in Ofcom's analysis, noting significant deployment of radio backhaul solutions in the Hull Area. KCOM indicated that it is aware of one instance in Hull where mobile backhaul is provided completely independently of the its network and also believes that it is facing competition in the provision of backhaul to at least one other mobile provider. It noted that self-provision is more attractive in a small geographic area such as Hull. Given the widespread use of radio backhaul solutions by MNOs in the Hull area, KCOM argued that Ofcom should look separately at TI 2Mbit/s services (currently the main circuits used by MNOs for base station connectivity) when considering market definition and assessing KCOM market power.

7.656 Other stakeholders either agreed with our SMP assessment or had no substantial comment. Two MNOs made some specific comments about mobile backhaul in Hull:

- [✂].[936]
- Telefónica said that mobile backhaul TI services connecting sites in Hull to switch sites outside of the Hull area have been particularly expensive due to the cost of "interconnect links" charged to BT by KCOM. It indicated that it has tried to use microwave links but high ancillary and rental costs has meant that mitigation has only been partial.

Ofcom's considerations of consultation responses

7.657 In this sub-section, we present our final assessment for each criterion and, where necessary, explain how we have taken the consultation responses into account. We then conclude on our overall assessment.

Market shares

7.658 Despite further cleaning and processing, the data underpinning our service share calculations remain incomplete for the reasons discussed in the June BCMR Consultation. Many CPs have omitted services bought from KCOM and BT's wholesale purchase data is missing some geographic information. Having revised our estimates, we still consider KCOM's share to be at, or very close to, 100% in all of the relevant wholesale symmetric broadband origination markets in the Hull area.

[934] See KCOM response, pages 3-5.

[935] KCOM noted that MS3 Communications is currently deploying a network in Hull with an initial investment of £4.5 and plans to build a 116km network. They said that the focus is on business customers.

[936] [✂]

We note that none of the consultation responses questioned our estimates for market shares in the Hull area.

External constraints

7.659 Given that KCOM has SMP in Hull across all the wholesale markets covered in this review and given that it is the only CP with an extensive network in the area, we do not consider constraints outside the relevant product markets have any material impact on our competitive assessments.

Profitability

7.660 We do not have a better understanding of KCOM's profits than we did in the June BCMR Consultation. As with the latter, we do not believe a detailed profitability assessment will change our market power determinations given our analyses under the other criteria.

Control of infrastructure not easily duplicated

7.661 In relation to the network roll-out of MS3, since the June BCMR Consultation we have sought further information from the CP on its plans to offer wholesale services during the next three years. We have been informed that MS3 [✂].

7.662 We have also carried out a network reach analysis using MS3's existing and planned network-roll out and have found that it will be within a 200 metre reach of just less than [✂] per cent of large businesses in the Hull area. Including the infrastructure in our overall network reach analysis results in just one postcode sector becoming high network reach.

7.663 Therefore, although the investments made by MS3 should lead to some improvement in competition within the Hull area in the low bandwidth AISBO market[937], the new network is unlikely to represent any constraint at all at the majority of business premises over the next three years. Furthermore, even in areas where MS3 has built network, KCOM will face only a single rival, and will still retain a competitive advantage resulting from its extensive network in the Hull area, for the same reasons discussed in paragraphs 7.84-7.93 above (but in relation to KCOM in the Hull area rather than BT across most of the UK).

Economies of scale and scope

7.664 We consider our assessment in the June BCMR Consultation remains valid, in addition to the general assessment of this criterion as set out in paragraphs 7.97-7.115 above (but in relation to KCOM in the Hull area rather than BT across most of the UK). Although MS3 has recently invested in a network in parts of Hull, during the early stages of network roll-out it is very unlikely to benefit from the same economies of scale and scope as KCOM. The economies of scale are driven by KCOM having a greater number of physical connections in the area, meaning it benefits from economies of duct (which, as with BT, is the biggest scale benefit), whilst economies of scope are driven by the fact that KCOM is much more likely to be an existing supplier of a leased line or other service to a business site, meaning that the incremental cost of supply is lower for KCOM due to the sharing of common costs.

[937] Given the declining use of TI circuits and the fact that MS3 [✂], we consider it unlikely that MS3 will offer a material competitive constraint in the wholesale TISBO markets.

Barriers to entry and expansion

7.665 The entry of MS3 in the Hull area suggests that barriers to entry in the Hull area are not as large as we suggested in the June BCMR Consultation, particularly for low bandwidth AISBO services and MISBO services (though there are no sales of MISBO at present in Hull). As this alternative network develops, it could be that barriers to expansion start to erode given the relatively small area.

7.666 However, over the course of the three year review period, we consider that the arguments set out in paragraphs 7.120-7.128 remain relevant (but in relation to KCOM in the Hull area rather than BT across most of the UK). As discussed above, MS3's network is in its early stages and is not planned to be within a 200 metre reach of more than [✂] per cent of large businesses in Hull. For some of the businesses within a 200 metre reach, it will still face some sunk cost in order to reach the site, putting it at a cost-disadvantage relative to KCOM. Furthermore, in terms of KCOM's existing customer-base, the switching costs discussed above will continue to act as a barrier, particularly for TI end-users.

Countervailing buyer power

7.667 We have considered KCOM's arguments on mobile backhaul. Although we have previously argued that fixed microwave links are not credible substitutes (in the majority of cases) for leased lines, it is possible that in a relatively small and flat geographic area such as Hull, mobile operators may be in a better position to self-supply. [✂].

7.668 In order to refine our analysis of MNO backhaul in Hull, we have attempted to calculate the number of circuits used by MNOs in Hull and the proportion of these purchased from KCOM. However, this has not been possible due to difficulties in reconciling MNO purchase data and KCOM supply data, in addition to information gaps in the circuit data (particularly around customer identification). We have therefore looked at KCOM's circuit data across all interfaces and bandwidths[938] and have found that there are around [✂] ends in the Hull area. Of these, just over [✂] or 12 per cent are in postcodes with MNO sites. Whilst we cannot say whether the vast majority are used for MNO backhaul (because some MNO sites are in postcodes with business sites using leased lines), we would expect that a significant proportion are used by [✂], which suggests that they remain at least partially dependent on KCOM in the Hull area.

7.669 As discussed in Section 4, once the topology of a network has been fixed, MNOs have limited incentive to change it because sunk costs associated with investing in a particular network configuration would need to be written off and re-incurred. In these circumstances, MNOs that are reliant on KCOM for fixed backhaul connectivity have limited scope to switch to radio backhaul links. Hence, even if a relatively larger proportion of MNO's backhaul is delivered over microwave links, the economics are similar to elsewhere in that there is unlikely to be an effective constraint in cases where MNOs do use fixed links.

7.670 We therefore do not consider it appropriate to treat mobile backhaul separately in our market power assessment.

[938] The majority are made up of low bandwidth TISBO and low bandwidth AISBO circuits.

Prospects for competition

7.671 Given the falling demand for TISBO services, we consider our assessment in the June BCMR Consultation remains valid and that there is no realistic prospect of increased competition in any of the wholesale TISBO markets.

7.672 In the low bandwidth AISBO market, we note that the entry of MS3 could introduce some competition. However, given that the roll-out is in its early stages, we believe that this competitive constraint is likely to be limited across all of Hull during the next three years.

Conclusions on wholesale symmetric broadband origination markets in the Hull area

7.673 Having undertaken a thorough and overall analysis of the economic characteristics of the markets by applying cumulatively the SMP criteria, and having considered consultation responses, we have concluded that KCOM has SMP and will maintain this SMP over the course of the three year review period in the following markets.

- low bandwidth TISBO (up to and including 8Mbit/s);
- medium bandwidth TISBO (above 8Mbit/s and up to and including 45Mbit/s);
- high bandwidth TISBO (above 45Mbit/s and up to and including 155Mbit/s);
- very high bandwidth TISBO (622Mbit/s); and
- low bandwidth AISBO (up to and including 1Gbit/s).

SMP assessment in the relevant retail markets

7.674 As explained in Section 3, since the June BCMR Consultation we have refined our market definition in the presence of upstream wholesale SMP regulation. Due to material differences in competitive conditions in the UK outside the Hull area, we now distinguish between the very low bandwidth TI retail market (which includes analogue and digital circuits less than 2Mbit/s) and the TI retail market consisting of circuits that are of bandwidth greater than or equal to 2Mbit/s and less than 8Mbit/s. For the purpose of brevity, we refer to the latter market as “2Mbit/s+” retail TI.

7.675 Within the Hull area, we do not observe the heterogeneous competitive conditions that exist outside Hull and so we retain a low bandwidth retail TI market that includes circuits of bandwidth less than 8Mbit/s.

7.676 Therefore, in this sub-section, we present our findings for SMP assessments for the following retail markets:[939]

- the retail very low bandwidth traditional interface leased line market in the UK excluding the Hull area;
- the retail 2Mbit/s+ traditional interface leased line market in the UK excluding the Hull area;

[939] These relevant retail markets are based on our market definitions and on our assessment of the three criteria test in each market. The three criteria test is discussed below at the end of this Section.

- the retail low bandwidth traditional interface leased line market in the Hull area; and

- the retail low bandwidth alternative interface leased line market in the Hull area.

7.677 In the June BCMR Consultation, to assess SMP in the relevant retail markets we relied on the application of the same set of SMP criteria used above in relation to the relevant wholesale symmetric broadband origination markets, as well as the impact of vertical integration.

7.678 We continued to adopt the modified Greenfield approach, which meant that we took into account the presence of *ex ante* regulation applied to upstream wholesale input markets, but assumed that no *ex ante* regulation applies in the relevant retail market. This means that CPs have access to regulated wholesale digital low bandwidth leased-line terminating and regional trunk circuits from both BT and KCOM in their respective network areas.[940]

7.679 We follow the same approach in this decision document. Each assessment is presented in the same format as the above wholesale market assessments:

- first, we summarise our conclusion;

- secondly, we present our assessment in the June BCMR Consultation of each SMP criterion for each market;

- thirdly, we set out consultation responses; and

- finally, we conclude on our overall assessment and explain how we have taken consultation responses into account.

Market for retail low bandwidth TI leased lines in the UK excluding the Hull area

7.680 In this sub-section, we consider the retail low bandwidth TI leased lines market in the UK outside the Hull area. Due to the changes we have made in our retail market definition in the presence of upstream regulation, our summary of the June BCMR Consultation refers to the low bandwidth retail TI market (i.e. all retail TI circuits <8Mbit/s), whilst our updated assessment distinguishes between very low bandwidth and 2Mbit/s+ retail TI.

7.681 We conclude that BT has SMP in the very low bandwidth retail TI market and that no CP has SMP in the 2Mbit/s+ retail TI market. Our conclusions are based on a thorough and overall analysis of the economic characteristics of these markets over the course of the three year review period. In our SMP assessments, we have had particular regard to the SMP criteria summarised in Figure 7.24 below in assessing whether BT has the power to behave to an appreciable extent independently of its competitors, customers and consumers.

[940] There is, however, no regulated wholesale product for analogue services.

Figure 7.24: Summary of SMP determinations for the relevant retail TI leased lines markets in the UK excluding the Hull area

Product market	Results of other criteria applied for SMP assessment	Proposed SMP designation
Very low bandwidth TI (Analogue and sub-2Mbit/s digital)	- BT has a market share of 84% - No wholesale access remedy for analogue services - BT benefits from economies of scale and scope - Presence of high barriers to switching - Declining market with low-value services, so OCPs are very unlikely to make investments to compete with BT	BT
2Mbit/s+ TI (>=2Mbit/s and <8Mbit/s)	- Replicability requirements have been achieved - Wholesale remedies have been effective in reducing BT's market share to 34% - Advantages of BT's network have had a limited effect on competition	No SMP

Assessment in the June BCMR Consultation

Market share and market share trends

7.682 In this retail market, we are interested in circumstances where an end customer (not a CP) buys a leased line, that is, dedicated symmetric capacity between two or more sites. However, low bandwidth TI leased lines are used to support a variety of other downstream services, such as internet access, VPNs and PSTN voice. These uses of leased lines are captured in our analysis of wholesale markets, but are not included as part of our retail market. Similarly, sales of leased lines to MNOs do not form part of the retail leased line market, but are captured at the wholesale level.

7.683 Given this distinction between retail and wholesale sales, we noted that the volume of circuits in the retail leased line market is considerably lower than the equivalent upstream wholesale market.[941] Since 2006/07, retail volumes had fallen by just under 30% in the (broadly defined) retail low bandwidth TI market, which was slightly less than the decline in the wholesale input market.

7.684 Across the market as a whole we estimated BT's share of volume to be 68%, falling from around 80% since 2006. We noted that the competitive conditions appeared to vary between analogue, digital services below 2Mbit/s and digital services at 2Mbit/s and above. Our initial estimates of BT's shares in these different product segments are shown in Figure 7.25 below.

[941] Based on the data we received from CPs, the number of retail circuit ends was just over half the number of wholesale circuit ends.

Figure 7.25: BT's volume shares in the retail low bandwidth TI leased lines market in the UK excluding the Hull area

Product segment	Volume share 2007	Volume share 2011
Analogue	98%	96%
Digital TI < 2Mbit/s	79%	73%
Digital TI >=2Mbit/s	60%*	45%
All low bandwidth TI	80%	68%

** This figure is for 2Mbit/s circuits only. BT's share of circuits above 2Mbit/s account for only a very small proportion of the market.*

Source: CP data, Ofcom analysis

7.685 We measured volumes in terms of the number of circuit ends which terminate at customer premises sold by each CP. Sales to other CPs from whom we collected data were excluded to avoid double counting. Equally, any sales of retail circuits to MNOs were excluded. Further details about our methodology for calculating retail and wholesale market shares can be found in Annex 5.

7.686 Circuits that were sold as part of internet access, VPN or voice services are excluded from the retail market, and therefore would ideally have been excluded from our service share counts. However, we were not able to identify these circuits consistently across all CPs due to differences in the data provided. As a result, we considered that shares calculated on the basis of all of the circuits which CPs told us they sold at a retail level (less sales to MNOs and other CPs) would provide the most reliable guide available as to competitive conditions within the retail market. We also calculated shares excluding known sales of VPNs and internet access as a sensitivity test. Although the proportions in the product segments varied, BT's share across the market was 63%,[942] which was not significantly different from our initial estimate of 68%, and substantially above the 50% threshold which gives rise to a presumption of dominance.

7.687 The market share evidence showed that BT continues to supply a very high proportion of the overall market, with particularly high shares in analogue and sub-2Mbit/s segments. In these segments of the retail market, there appeared to be very little competition. However, BT's share of services at 2Mbit/s and above has fallen from 60% to 45%, which suggested that competition for the provision of these services has become more effective.

7.688 We were not able to present reliable market shares on a revenue basis. Although we collected this information from CPs, it was not presented in a manner which allowed us to segment the data according to our market boundaries. The differences in volume shares across the three product market segments create the possibility that BT's overall volume share might not be representative of its share of revenue in the market. In order to test this hypothesis, we re-calculated shares by weighting CP volumes according to the average revenue per circuit for analogue, sub-2Mbit/s and 2Mbit/s services.[943] On this basis, BT's share of the market was 61%. We considered this weighted average volume share to be a better proxy for BT's share of value in

[942] It should be noted that these factors are specific to retail market share estimates since the wholesale market includes all symmetric broadband origination services regardless of their use in downstream markets.

[943] These average revenue figures were derived from BT's profitability data as detailed below, and its circuit volumes.

the market. We noted that this share estimate is over the 50% threshold which gives rise to a presumption of dominance.

7.689 We noted that, across the market as a whole, BT's share had fallen but remained above the 50% threshold. Within the overall market there appeared to have been some increase in competitors' share of the provision of 2Mbit/s services, but there was virtually no competition in the provision of analogue services, and little competitive supply of sub-2Mbit/s circuits. Even at 2Mbit/s, BT's share of 45% remained at a level at which concerns about single dominance normally arise.

7.690 We noted that the market is in rapid decline. As a result, the relative changes in CP market shares are not necessarily a reliable indicator of trends in competitiveness. In a market with growing or static demand, movements in market share provide an indication of the intensity of competition. If supply has become less concentrated, then smaller competitors must have been winning business from (or winning new customers at a faster rate than) larger competitors. This would suggest that the market is becoming more competitive, and that future supply would be contested. However, in a market with declining demand, such as the retail TI market, the changes in market share may reflect differences in the rate at which customers of different CPs are leaving the market altogether. Therefore, the fall in BT's market share need not imply that OCPs have won business from BT by offering more competitive deals, but merely that BT has a larger proportion of customers who have been able to switch to AI or perhaps DSL based services.

7.691 Overall, we concluded that the market shares provided strong evidence to suggest that BT is not yet constrained by its competitors effectively, and that BT had SMP in this market.

Profitability

7.692 In assessing market power in a retail market as distinct from the upstream wholesale input market, we are interested in the profit associated with the activities which occur at the retail level. We did not believe ROCE to be appropriate for these purposes. Much of the fixed capital required to provide telecoms services is associated with upstream wholesale activities, with retailing functions requiring little or no fixed capital. Therefore we considered return on sales (ROS) as our measure of profitability.

7.693 ROS is the proportion of profit to turnover. Unlike ROCE, there is no theoretical benchmark against which we could compare this measure of profitability. However, we noted that the precedent from other competition authorities suggests that an appropriate ROS where capital intensity is low might be in the region of 1.5%.[944]

7.694 BT provided profitability data associated with the retail sales of its leased line products. These are grouped into three categories: analogue circuits, Kilostream (which includes all digital leased lines below 2Mbit/s) and Megastream (which includes 2Mbit leased lines). However, the data did not allow us to calculate BT's profitability in the low bandwidth retail TI market in the UK excluding Hull precisely. There were three differences between the data and our market definition:

i) The Megastream portfolio includes circuits up to 155Mbit/s, whereas the market we are considering only includes circuits up to 8Mbit/s. Whilst the volume of

[944] For further discussion of this point, see paragraphs 7.57 of the January 2008 consultation.

circuits above 8Mbit/s is relatively small, we estimated that these may account for around [✂]% of Megastream revenue;

ii) BT sells a number of retail leased lines to MNOs. These sales are excluded from our market definition. However, the proportion is now[945] very low - less than [✂]%; and

iii) BT also provides a small number of circuits in Hull, which should be excluded. We estimated that these represent around [✂]% of BT's total sales in this market (by volume).

7.695 Therefore, we were comfortable that the profitability figures for analogue services and Kilostream provided an accurate picture of the activity within the market being assessed, but it is possible that the figures for Megastream were not representative.

Figure 7.26: Profitability of BT's retail leased line services

Product segment	Year	Return on sales (ROS)	Turnover (£m)	Net profit (£m)
Analogue	2010/11	46%	61.59	28.30
	2009/10	36%	67.78	24.37
	2008/09	17%	66.31	11.47
Digital < 2Mbit/s (Kilostream)	2010/11	16%	39.59	6.48
	2009/10	4%	51.14	1.85
	2008/09	38%	71.23	23.31
Digital >= 2Mbit/s (Megastream)	2010/11	0%	193.88	0.80
	2009/10	6%	265.86	16.09
	2008/09	1%	316.64	1.85
All retail leased lines	2010/11	12%	295.06	35.58
	2009/10	11%	384.78	42.32
	2008/09	8%	454.17	36.63

Source: BT

7.696 In aggregate, across the three product sets, BT's profit levels appeared to be quite high. The figures showed that BT earns relatively high returns on analogue and, to a lesser extent, sub-2Mbit/s services, but makes a zero return on Megastream. In particular, the profit levels for analogue services are substantially above the level we would expect to see in a competitive market.

7.697 BT accounts for over 90% of retail supply of analogue services, and there is no regulated upstream wholesale input for these services. These factors all suggested that BT is not constrained by competitors in this part of the retail low bandwidth market.

7.698 The figures for Kilostream varied considerably from year to year, but showed a return on sales well above the 1.5% level which has been used before as a benchmark by competition authorities. This suggested that BT may not be effectively constrained by competitors in its supply of sub-2Mbit/s services.

[945] In the 2007/8 Review we noted that 50% of Megastream and 35% of Kilostream circuits were sold to MNOs. We believe that MNOs now buy wholesale products from BT, such as RBS backhaul.

7.699 For Megastream and Kilostream, OCPs have access to a regulated, and cost-oriented wholesale input in the form of PPCs. The market share data suggested that OCPs have focused more on sales of the relatively higher value 2Mbit/s services in competition with Megastream. Therefore, despite the concerns we had as to the reliability of the Megastream profitability data, we regarded it as consistent with our expectation that BT's profit levels would be lower in this segment of the market.

7.700 Overall, we considered the profitability data supported our proposed market power determination. Although there appeared to be significant differences in the profitability of analogue, sub-2Mbit and 2Mbit/s services, doubts about the reliability of the latter and the sustained and very substantial profit levels for the large number of customers of analogue and sub-2Mbit/s services suggested that BT is not constrained to price at the competitive level.

Control of infrastructure not easily duplicated

7.701 In order to offer retail low bandwidth TI services, a CP needs access to the infrastructure necessary to provide these services. This may be purchased through the wholesale market, or a CP could self-provide the relevant network infrastructure. The very high costs associated with building access network infrastructure have been discussed above in relation to the upstream wholesale low bandwidth TISBO market, and in relation to wholesale symmetric broadband origination in general. Our conclusion was that BT has SMP at the wholesale level. As a consequence BT has been required to provide wholesale access to OCPs.

7.702 Although regulation has required BT to make available a regulated wholesale input which allows CPs to make use of BT's network infrastructure, there are a number of factors which implied that BT continues to benefit from its extensive network infrastructure in the retail market. First, in order to be able to use PPCs (the regulated wholesale input), a CP must build and operate an SDH network. Then, to achieve national coverage and an efficient cost base a CP will generally need to establish a large number of points of handover.[946] Building this network and level of interconnection requires significant investment. However, we noted that this is an investment that a number of CPs have already made.

7.703 Secondly, PPCs only allow CPs to provide digital services, and although we said there is a chain of substitution between analogue and digital services, it means that OCPs can only compete with BT's retail analogue service by buying another retail service from BT. This means they cannot offer their own unique retail analogue service.

7.704 Overall, we said that BT's control of an extensive network infrastructure is primarily a competition issue in the upstream wholesale market. The regulatory remedies imposed at that level are designed to address this issue. There have been a number of regulatory interventions since the 2007/8 Review designed to improve the effectiveness of the wholesale remedies, in particular, reductions in Point of Handover charges for PPCs, and the achievement of replicability requirements.

[946] Note that unit costs will be a function of, amongst other things, the number of points of handover required and the utilisation of this equipment and of the CP's network. It is possible that a CP could establish an efficient level of utilisation in a small region with relatively low volumes and little network infrastructure. However, across the entire geographic region of the market - the UK excluding Hull - it will not be possible to achieve high levels of efficiency without both significant circuit volumes and points of handover.

7.705 However, even with the remedies in place, significant investment by CPs is required to make effective use of the resulting interconnection. Given the declining nature of the market and low average revenues per circuit, and the fact that this makes the market less attractive for CP investment, we did not expect further significant competitive investment to provide TI services. As a result, and in conjunction with the fact that there is no wholesale access remedy for analogue services, we considered that BT will continue to derive a competitive advantage in the retail market from its extensive network infrastructure.

Economies of scale and scope

7.706 Economies of scale and scope are a significant factor affecting the wholesale input market. However, as discussed above, regulatory remedies imposed in the wholesale market are designed to address these issues, and thereby allow CPs to compete in downstream markets. As noted in paragraph 7.702, cost effective use of the regulated wholesale input to the retail low bandwidth leased line market requires scale and network infrastructure. In general, owning and operating network infrastructure is subject to scope economies due to the high proportion of fixed and common costs. Therefore, CPs with greater scale and scope will generally benefit from lower costs in the retail market. This will apply to BT and its largest competitors but the former is likely to benefit to a greater extent due to its ubiquitous network.

Barriers to entry and expansion

7.707 In addition to the barriers to entry and expansion discussed in relation to the two previous criteria, we noted that CPs may find it difficult to break into the retail leased line market due to switching costs. As discussed at paragraphs 7.124-7.125 the costs of switching wholesale provider are significant: physical changes in the connectivity to a customer site are required. Changes in retail supplier where the underlying wholesale provider stays the same also often require changes in the physical routing of a circuit. This results in a temporary loss of service for the customer or an over-lapping of services. These costs must be borne by both the new supplier and the customer.

7.708 This problem is made worse by the fact that the market is in decline. Both customers and CPs are less willing to invest in TI services when they feel that they should be focusing their efforts on longer-term solutions. In this regard, we noted that BT intends to close the DPCN network in 2018, with the result that all sub-2Mbit/s services and many analogue services will be forced to migrate by this time.

7.709 Our view, therefore, was that barriers to entry and expansion in the retail market mean that BT is unlikely to be constrained effectively by its competitors.

Vertical integration

7.710 We noted that BT's vertical integration was likely to generate efficiencies that are not available to other CPs, for example, by avoiding transaction costs and interconnection costs. In addition, vertical integration in conjunction with SMP in the upstream wholesale market creates the opportunity for leverage of power into the retail market.

7.711 Remedies in the wholesale market are designed to obviate the damaging effect of SMP but we noted that these are likely to alleviate, rather than entirely eradicate, the potential for anti-competitive conduct in downstream retail markets.

7.712 The advantages that BT derives from vertical integration have been discussed in the past by Ofcom in relation to replicability (by which we mean that BT's competitors should be able to replicate effectively BT's retail prices and terms and conditions of supply). Ofcom has previously consulted on the question of whether BT's retail leased line services are now replicable.[947] In their responses to this consultation, some CPs claimed that significant issues still remained. For the purposes of SMP assessment, we noted that many aspects of replicability have been achieved in relation to digital services, but as previously noted, there is no wholesale input for analogue services. This question and the general issue of replicability are discussed further in Section 10.

7.713 Overall, our view in the June BCMR Consultation was that vertical integration continues to generate a competitive advantage for BT. Wholesale digital services have improved, but significant investment is still needed to use PPCs – a PPC is not a pure resale product – and some cost disadvantages remain. In addition, the conditions in the market have changed with demand now falling rapidly and expected to continue to decline. In these circumstances it is relatively more difficult for OCPs to justify the investment required to serve new customers. This is an advantage to BT who can focus on retaining its large installed base of customers, and because BT is less likely to need to invest to serve new customers.

Countervailing buyer power

7.714 In relation to countervailing buyer power, we noted in the 2007/8 Review that:

> "retail low bandwidth leased lines are a relatively low value product. It is unlikely that a customer could induce new entry into the market simply on the basis of procuring this item from a potential supplier. For similar reasons, options for self-supply that arise in the context of higher bandwidth leased lines are unlikely to be viable. Further, even the largest buyers of leased lines would be small in the context of the overall market and therefore would be unlikely to be individually important to a supplier."[948]

7.715 We considered that this analysis still held and, therefore, our view was that countervailing buyer power is unlikely to constrain BT's behaviour in this market.

Prospects for competition

7.716 There will continue to be demand for low bandwidth retail leased lines for some time to come. However, the market is in long term decline, and there is very little prospect of new entry. We did not consider, therefore, that the prospect of increased competitive intensity in the future was likely to act as a constraint on BTs behaviour in this market over the course of the three year review period.

Consultation responses

7.717 In the June BCMR Consultation, we asked the following:

> *Question 6: Do you agree with our assessment of SMP for the retail low bandwidth TI leased lines market in the UK excluding the Hull area?*

[947] http://stakeholders.ofcom.org.uk/consultations/low_bandwidth/

[948] See paragraph 7.130 of the January 2008 consultation.

7.718 BT disagreed with Ofcom's SMP finding in the low bandwidth retail TI market outside Hull.[949] It noted that volumes have been steadily declining since 2007 and is likely to accelerate as customers switch to alternatives such as Ethernet and ADSL. BT believed that Ofcom has defined the market too narrowly and has not considered potential constraints and wider market dynamics, in particular the ability of existing users to switch to newer alternatives. In pursuing this approach, BT believed that Ofcom will continue ex-ante regulation until the last remaining sub-2Mbit/s circuit is withdrawn, which is inconsistent with the aim of removing retail ex-ante regulation. BT also suggested that such regulation will discourage earlier migration to newer alternatives.

7.719 With regard to market shares, BT provided circuit data for March 2012 and noted an annual volume decrease of 15% (compared to 13% between March 2010 and March 2011). BT believed that this decline is likely to accelerate as users seek better value in business-grade broadband and Ethernet (including EFM). BT believed that such constraints were given insufficient weight by Ofcom.

7.720 Furthermore, although volumes are large, BT showed that a small number of customers have a disproportionately large share of the circuit-base, suggesting that regulation will only benefit a distinct minority of business connectivity users. When these users switch, BT expects the remaining volumes to decline sharply and unpredictably.

7.721 On profitability, BT argued that the economic costs attributed to these services will reflect the use of near fully depreciated assets.

7.722 In terms of control of infrastructure, BT agreed with Ofcom that regulated wholesale inputs for digital services exist. However, it believed Ofcom should have placed more weight on the chain of substitution between analogue and digital services. In the presence of fit-for-purpose wholesale inputs and a chain of substitution between analogue and digital, BT considered Ofcom should remove all retail ex-ante regulation.

7.723 In relation to barriers to entry and expansion, BT accepted the presence of switching costs but argued that a new supplier and user will derive benefits that must be set against any cost of change. It cited paragraph 12 of the Commission's Recommendation that even in a market characterised by high barriers to entry, other structural factors may make it tend towards an effectively competitive outcome within the relevant time horizon.[950] In this context, BT argued that a wider view must be given to the constraining effect of alternatives such as Ethernet and ADSL. It noted that this was taken into account in France and Germany, where NRAs decided to deregulate the relevant retail markets. BT believed that Ofcom should follow this example, particularly as the retail market is no longer on the European Commission's list of recommended markets.

7.724 In terms of prospective competition, BT argued that if a legacy market is of little interest to OCPs, any alleged market power only becomes an issue if the provider seeks to exploit it (e.g. by charging excessive prices or withdrawing services unreasonably). However, BT has indicated that it could address consumer protection

[949] BT's detailed response on this market can be found in Part 1 of its response, in particular Section 3 and Section 4.4.

[950] The Commission notes that market dynamics may, for instance, be caused by technological developments, or by the convergence of products and markets which may give rise to competitive constraints being exercised between operators active in distinct product markets.

concerns without an SMP finding, for example by giving commitments on the withdrawal of legacy services and on the pricing of analogue services through commercial channels.

7.725 All other stakeholders either supported or did not comment on Ofcom's SMP findings in this market. Level 3 agreed with our assessment but expressed misgivings about not including broadband and leased lines in the same market. It said that based on its experience, a significant number of customers are switching to low cost broadband to meet their needs. However, in its response to our market definition analysis, Level 3 indicated that customers were switching from low speed AI services, with no reference to TI services.

7.726 Whilst not directly relevant to Ofcom's SMP assessment, Level 3 also commented that the anticipated swing away from PPC towards Ethernet solutions is far from universal and the company expects there to be significant residual end-user demand for PPC services in 2015.[951] Level 3 argued that this is particularly relevant at 2Mbit/s where there exists a large legacy base of TDM customer premise equipment. This has implications on the constraint posed by alternative technologies.

Ofcom's considerations of consultation responses

7.727 In this sub-section, we present our final assessment for two markets – very low bandwidth and 2Mbit/s+ retail TI – under each criterion and, where relevant, explain how we have taken the consultation responses into account. We then conclude on our overall assessment.

Market shares

7.728 Following updates to our estimates of market shares, our revised calculations are presented in Figure 7.27 below. We include all TI circuits that have been identified as being sold at a retail level and we exclude VPNs and internet access tails. For the very low bandwidth market, we present the aggregate market share in addition to service shares for two product segments, analogue and digital TI circuits less than 2Mbit/s.

Figure 7.27: Revised market shares for relevant retail TI leased lines in the UK excluding the Hull area

Product segment	BT's Share
Analogue	99%
Digital TI < 2Mbit/s	53%
All very low TI	84%
Digital TI >=2Mbit/s	34%

7.729 Our estimates for BT's service share for digital circuits less than 2Mbit/s and its market share for 2Mbit/s+ are lower than those we presented in the June BCMR Consultation. This is partly because we are now better able to exclude VPNs and internet access and we are also able to comprehensively exclude re-sales to other CPs, which was not possible before the June BCMR Consultation (details of our new method for processing the circuit data can be found in Annex 5).

[951] Level 3 response, page 3.

Very low bandwidth TI

7.730 Consistent with the SMP Guidelines,[952] BT's high market share in the very low bandwidth retail TI market of 84% in and of itself gives rise to a presumption of dominance – i.e. SMP. We note that there is a significant difference between its service share for analogue and sub-2Mbit/s digital circuits but even the latter is above 50%, which is the threshold for a presumption for dominance. To the extent that this reflects a difference in competitive conditions, a variation in remedies may be warranted between the two sub-segments.

2Mbit/s+ TI

7.731 By contrast, in the market for 2Mbit/s+ retail TI, we note that BT's share is lower than the 40% threshold where single dominance concerns normally arise. We therefore consider this is consistent with a finding of no SMP.

External constraints

7.732 As discussed in paragraph 7.168, for each of our SMP assessments we explicitly address competitive constraints outside the market and whether we consider them be important in our analysis of market power.

7.733 We recognise that low bandwidth TI circuits (both sub-2Mbit/s and 2Mbit/s+) are declining and that a number of customers will switch to alternatives such as Ethernet and business-grade broadband. This is supported by our market research, which showed that 14 per cent of businesses using leased lines are quite or very likely to switch to ADSL whilst 29 per cent are likely to switch to Ethernet.[953] With regard to the latter, we note that EFM is likely to offer a cost-efficient option for some low bandwidth users to migrate from a traditional interface.

7.734 However, with regard to BT's argument that a wider view must be given to the constraining effect of alternative such as Ethernet and ADSL, we do not consider that the trend towards alternatives is sufficient to constrain BT's market power in the very low bandwidth market. As discussed in Section 3, the process of migration remains gradual and a moderate increase in the retail prices – i.e. a SSNIP – of the legacy products is unlikely to make a large difference. Further, as highlighted in our market research, a significant proportion of businesses have concerns about switching to ADSL and Ethernet. For ADSL, these include meeting necessary bandwidths, contention of service and reliability. For Ethernet they include price, quality of service and reliability. The very low bandwidth retail TI market outside Hull also remains one of the largest product markets covered in this review, encompassing around 80,000 circuits and worth more than £100 million in 2010/11 to BT alone. Even if a significant proportion of users switch to an alternative interface during the next three years, our market analysis has led us to conclude that a large majority of customers will remain that are reliant on BT and are unlikely to have any other alternative.

7.735 We therefore do not agree with BT that our approach will necessarily lead to regulation continuing until the last remaining sub-2Mbit/s circuit is withdrawn. Our conclusion is that the market remains large enough to warrant ex-ante regulation for the next three years. Whether there will continue to be concerns regarding BT's

[952] See paragraph 75.

[953] See Jigsaw Research, 'Business Connectivity Services Review (2011), page 62.

market power, or the appropriate remedies needed to address it, will be revisited during the next review and appraised in light of the market evidence at the time.

7.736 We have also considered BT's claim that a small number of customers have a disproportionately large share of the circuit base (see paragraph 7.720). We disagree with BT that ex-ante regulation would only benefit a distinct minority of business connectivity users. Excluding sales to the top three customers for each sub-segment still leaves BT's existing volumes at approximately [✂] lines, which remains a large economic market. Furthermore, BT has provided some details of their largest customers in this market, which include [✂]. It is not apparent from this information that a large proportion of users are likely to switch to products outside of the low bandwidth retail TI market over the course of the three year review period. For example, in the case of [✂]. More generally in the case of large customers, the process of replacing a large ICT system is a major undertaking that can take a long time to provision.

Profitability

7.737 We recognise BT's argument that the assets underpinning TI services are heavily depreciated, which may be reflected in higher accounting rates of return. However, there is relatively little capital employed at the retail level. The fact that BT's net profit did not follow a trend in 2009/10 and 2010/11[954] across BT's very low bandwidth TI retail leased line services illustrates the difficulties in interpreting the data (see Figure 7.26).

7.738 Given our SMP assessment is based on a cumulative assessment of the SMP criteria, we consider the fact that BT's ROS appears to be relatively high for analogue and sub-2Mbit/s digital circuits is consistent with our SMP conclusion for the very low bandwidth market. Similarly, the relatively low ROS for 2Mbit/s circuits is consistent with a finding of no SMP. However, in light of the difficulties in interpreting the data, we do not place much weight on profitability compared to the other SMP criteria.

Control of infrastructure

Very low bandwidth TI

7.739 We consider our assessment in the June BCMR Consultation remains valid for very low bandwidth TI circuits. There is no wholesale access remedy for analogue circuits, meaning that BT retains a significant advantage in the supply of these services. In the case of sub-2Mbit/s circuits, although wholesale remedies have been implemented to achieve replicability, we still consider that BT retains a number of advantages. First, even though some OCPs have established a number of interconnection points with BT, their networks are smaller and this could increase their costs due to the need to use longer or more indirect routings. In growing markets, this may not constitute as significant a competitive disadvantage because OCPs may be willing to invest in additional interconnection. However, given the declining nature of the very low bandwidth TI market and the low average revenues per circuit, we do not expect CPs to make such investments. This is reinforced by the fact that BT's wholesale product for sub-2Mbit/s services runs on its DPCN network, which is being switched off in 2018, meaning that OCPs have even less of an incentive to compete in this market. For example, [✂].

[954] i.e. it did not increase or decrease in both years.

7.740 In relation to BT's comments about the constraint imposed by the chain of substitution between analogue and digital service, (see paragraph 7.722), BT's argument appears to be that competition for speeds of 2Mbit/s and above is sufficient to protect lower bandwidth and analogue customers. However, as discussed in Section 3, we take the view that once upstream regulation is taken into account, it is appropriate to define a separate market for 2Mbit/s and above. We therefore do not consider that the majority of very low bandwidth TI users would switch to a 2Mbit/s service, even in response to a small but significant price increase by BT. We also believe that, in the absence of regulation, BT would be able to price discriminate at the retail level against lower bandwidth customers.

2Mbit/s+ TI

7.741 We consider that upstream wholesale regulation for 2Mbit/s+ circuits, particularly the achievement of replicability, has benefitted competition at the retail level more than in the very low bandwidth retail TI market. This is reflected by the significant reduction in market shares since 2007 to a level below the 40% threshold where single dominance concerns normally arise. As with the very low bandwidth market, we note that 2Mbit/s+ services are also declining and are unlikely to represent significantly attractive revenues for OCPs to enter or expand in the market. However, in addition to the fact that BT has a much smaller share of this market, an important difference for 2Mbit/s+ is that BT's wholesale inputs will remain available after 2018. Therefore, an end-user using 2Mbit/s is more likely to benefit from competition among retail suppliers than a sub-2Mbit/s customer.

Economies of scale and scope

7.742 We consider our assessment in the June BCMR Consultation remains valid. BT's ubiquitous network and large customer base allows it to enjoy economies of scale and scope that reduces its average retail costs in the retail market relative to OCPs. This applies in both the very low bandwidth and 2Mbit/s+ TI markets but we note that its advantage in the latter has not been sufficient for it to retain a dominant position.

Barriers to entry and expansion

Very low bandwidth TI

7.743 We consider our assessment in the June BCMR Consultation remains valid. Barriers to switching are particularly important in this market because they reinforce BT's strong position. Several factors were identified by more than 50 per cent of respondents in our business survey as a barrier to switching, including: price, being locked into a contract, hassle, risk the new service won't work and high installation costs.[955] We believe that this will limit the proportion of businesses willing to switch supplier.

7.744 We have noted the decision by the French and German NRAs to deregulate the retail market for low bandwidth leased lines. In Germany, even though there is no wholesale obligation to provide wholesale terminating segments with a bandwidth lower than 2Mbit/s, BNetzA considered that wholesale regulation at 2Mbit/s would erode the market entry barriers for the overall market as lower capacity leased lines are expected to be replaced by 2Mbit/s capacity lines.[956] In France, ARCEP found

[955] See Jigsaw Research, 'Business Connectivity Services Review (2011), pages 60-61.

[956] Commission decision concerning case DE/2009/1009 – Minimum set of leased lines.

that competition in the retail market for leased lines was effective due to wholesale regulation and developments in local loop unbundling, bitstream offers and the deployment of proprietary fibre infrastructure. It also noted businesses becoming increasingly interested in Ethernet offers.[957]

7.745 Whilst we are aware of the decisions by BNetzA and ARCEP, more importantly we are required to make our SMP assessment in the relevant markets we have defined appropriate to national circumstances in the UK.[958] This means undertaking a thorough and overall analysis of the economic characteristics of the relevant markets in the UK. In this respect, with regard to BT's reference to the EC's Recommendation,[959] our market analysis, in particular our SMP assessment, has not shown other structural factors that would mean this market tends towards an effectively competitive outcome within the three year review period. We therefore do not consider it appropriate that the UK's approach to regulation should be the same as other European countries where our assessment on the basis of competitive conditions in the UK suggests otherwise, which we consider to be the case.

2Mbit/s+ TI

7.746 The evidence presented on barriers to switching in the very low bandwidth TI retail market is also relevant in the 2Mbit/s+ market. However, the barriers have not been sufficiently strong to allow BT to retain a position of SMP in this market. Furthermore, as discussed above, OCPs know that they will be able to retain 2Mbit/s+ customers using BT's wholesale inputs past 2018, meaning that barriers to expansion are not as significant in this market compared to the very low bandwidth TI market because suppliers have a longer time period in which to recover their investments.

Vertical integration

Very low bandwidth TI

7.747 We consider our assessment in the June BCMR Consultation remains valid. BT's vertical integration generates efficiencies that are not available to other CPs, for example, by avoiding transaction costs and interconnection costs. In addition, vertical integration in conjunction with SMP in the upstream wholesale market creates the opportunity for leverage of power into the retail market. Whilst this can be addressed by requiring wholesale products to be made available on non-discriminatory terms, such regulation may not remove all the advantages arising from vertical integration. In addition, there is no requirement to provide a wholesale analogue product.

2Mbit/s+ TI

7.748 We consider that BT benefits from vertical integration efficiencies for the same reasons as in the very low bandwidth retail TI market. However, we note that these advantages have not been sufficiently strong to allow BT to retain a dominant position in this market.

Countervailing buyer power

[957] Commission decision concerning case FR/2010/1050 – Leased lines in France.

[958] See section 79 of the Act.

[959] BT referred to Recital 12.

Very low bandwidth TI

7.749 We consider our assessment in the June BCMR Consultation remains valid. Given that very low bandwidth TI leased lines are low value products, customers are unlikely to be able to induce entry, nor is self-supply likely to be a viable option. Furthermore, as discussed above, given this is a declining market we do not expect CPs to undertake much investment in very low bandwidth TI over the course of the three year review period, which will restrict end-user choice and leave a large number of customers dependent on BT.

2Mbit/s+ TI

7.750 As with very low bandwidth TI circuits, 2Mbit/s TI customers are unlikely to be able to induce entry or self-supply. However, as discussed above, due to the effectiveness of upstream wholesale regulation, 2Mbit/s customers have a greater amount of supplier choice if they need to switch.

Prospects for competition

Very low bandwidth TI

7.751 Although this is a declining market, in terms of circuit volumes it remains significantly large. We therefore believe that there will continue to be demand for some time to come, and at least over the course of the three year review period. However, as discussed above we do not consider it likely that there will be any new entry, nor do we believe that BT's competitors are likely to focus their efforts on this market relative to AI leased lines and other types of business connectivity.

2Mbit/s+ TI

7.752 Although we do not expect new entry, the OCPs that currently compete with BT will remain in the market whilst they are able to purchase wholesale inputs. Furthermore, given their success in reducing BT's market share during the past three years, it is very likely that they will continue to exercise a competitive constraint on BT. As noted above, the fact that BT will continue to supply 2Mbit/s circuits beyond 2018, is also relevant.

Conclusions on retail very low bandwidth TI (<2Mbit/s) leased lines in the UK excluding the Hull area

7.753 Having undertaken a thorough and overall analysis of the economic characteristics of this market by applying cumulatively the SMP criteria, and having considered consultation responses, we have concluded that BT has SMP and will maintain this SMP over the course of the three year review period.

7.754 Based on our revised market share estimates, BT's share is 84 per cent. Given that there is no wholesale access remedy for analogue services and BT will be switching off its DPCN platform in 2018, combined with the fact that this is a declining market, we do not consider it likely that BT will face any significant competitive constraints.

7.755 We note BT's offer of addressing Ofcom's consumer protection concerns without an SMP finding. However, BT's offer is relevant to the third step in our market review process which is an assessment of the appropriate remedies.

7.756 Finally, this market is not included in the EC's Recommendation. When identifying markets other than those in the EC's Recommendation, we must ensure that three criteria are cumulatively met for each market. We explain later in this Section why we have concluded that the three criteria test is satisfied for this retail market.

Conclusions on retail 2Mbit/s+ TI (>=2Mbit/s and <=8Mbit/s) leased lines in the UK excluding the Hull area

7.757 Having undertaken a thorough and overall analysis of the economic characteristics of this market by applying cumulatively the SMP criteria, and having considered consultation responses, we have concluded that no operator enjoys a position of SMP, and that no operator will enjoy a position of SMP over the course of the three year review period.

7.758 In coming to this decision, we have had particular regard to BT's relatively low market share of 34% and the long-term availability of regulated wholesale inputs that allow OCPs to achieve replicability. We have also noted the extent to which OCPs have successfully competed with BT during the past three years and have seen no evidence to suggest that this will not continue.

7.759 Therefore, we conclude that competition in this market is effective, and will continue to be effective over the course of the three year review period.

Markets for retail low bandwidth TI and AI leased lines in the Hull area

7.760 As discussed in paragraph 7.675, we retain a low bandwidth retail TI market that includes circuits of bandwidth less than 8Mbit/s in the Hull area. Therefore, in this section, we consider the retail low bandwidth TI and AI leased line markets in Hull. We conclude that KCOM has SMP in these markets. Our conclusions are based on a thorough and overall of the economic characteristics of these markets over the course of the three year review period, having regard to existing market conditions.

7.761 In our SMP assessment, we have had particular regard to the SMP criteria summarised in Figure 7.28 below in assessing whether KCOM has the power to behave to an appreciable extent independently of its competitors, customers and consumers.

Figure 7.28: Summary of SMP determinations for the retail low bandwidth TI and AI leased line markets in the Hull area

Product market	Results of other criteria applied for SMP assessment	Proposed SMP designation
Low bandwidth TI	- KCOM's market share is 87% - Presence of high barriers to switching - KCOM benefits from economies of scale and scope - Declining and small geographic market with low-value services, so CPs are very unlikely to make investments to compete with KCOM	KCOM
Low bandwidth AI	- KCOM's market share is greater than 75% - KCOM benefits from economies of scale and scope - Entry by one CP has occurred only very recently - KCOM retains a number of incumbency advantages	KCOM

Assessment in the June BCMR Consultation

Market share and market share trends

7.762 Due to inconsistencies between the data provided by KCOM in this and the last market review, we were unable to compare market shares or calculate demand growth rates. Therefore, we focused on estimates of current market shares. Figure 7.29 below sets out our estimates of KCOM's share in various product segments of the retail low bandwidth market.

Figure 7.29: KCOM volumes shares in the retail low bandwidth TI and AI leased lines market in the Hull area

	Product segment	Volume share 2011
TI	Analogue	84%
	Digital TI < 2Mbit/s	36%
	Digital TI >=2Mbit/s	65%
	All low bandwidth TI	67%
AI	All low bandwidth AI	75%

Source: CP data, Ofcom analysis

7.763 The shares were calculated using the same assumptions as the analysis of the equivalent retail market outside Hull. That is, we excluded sales of retail services to other CPs, but did not exclude known sales of VPN and internet access services due to inconsistencies in the availability of information to make this exclusion.

Retail TI

7.764 Unlike BT, KCOM does not provide wholesale leased line products at cost based charges. KCOM's wholesale product is simply a version of the retail product where one end of the circuit is a designated Hull exchange building.

7.765 We noted that CPs are unlikely to compete for business within Hull. They only use the wholesale service when a customer with a UK-wide footprint of premises happens to require connectivity to Hull in addition to services required in the rest of the UK. Even if a CP did try to compete in the retail market for leased lines within the Hull area, it would likely only provide only a limited constraint on KCOM since the CP would, in effect, be reselling a retail service.

7.766 We therefore considered that the calculated retail share of 67% could, if taken at face value, understate KCOM's retail market power - though even KCOM's overall share of 67% is well above the 50% level which creates a presumption of dominance. However, its share in the sub-2Mbit/s segment appeared to be considerably lower than the rest of the market. On further investigation, we concluded that this is driven by sensitivity to the low volumes in the Hull market and because we did not remove VPN sales from our estimate. When known sales of VPN and internet access were removed, accepting that this may not be wholly reliable, KCOM's share in this segment increased to 54%. In light of this, and the fact that we had no prior reason to believe that the sub-2Mbit/s segment should be more competitive, we assumed that on a forward looking basis competitive conditions in the sub-2Mbit/s segment are likely to be similar to those in the market as a whole.

7.767 As with the market outside Hull, we were unable to calculate revenue based shares. The value of services in the different segments varies, and so as a proxy for value based shares we weighted the volumes in each segment according to the average value of services in that segment.[960] On this value-weighted basis, KCOM's share of the market was the same at 67%.

7.768 Overall, we considered that the market share data provided strong evidence that KCOM has SMP in the retail market for low bandwidth TI leased lines in the Hull area.

Retail AI

7.769 Our initial estimate of KCOM's share of volume in this market - using the same methodology as our calculations for the retail TI leased line markets – was 98%. However, we had a number of concerns with this estimate, and considered that it was likely to be too high. First, we had to infer BT's retail sales from its internal use of Openreach wholesale services. This is not appropriate in Hull where we believe BT is likely to use KCOM as its supplier of wholesale symmetric broadband origination services.

7.770 More generally, the data supplied by KCOM suggested that they sell a small but not insignificant number of AI leased lines to wholesale customers in Hull (including BT). We assumed that a reasonable proportion of these wholesale sales would relate to retail leased line sales by the relevant CPs. However, we did not find a comparable number of such retail circuits in the data supplied by these other CPs.

7.771 We discussed a number of possible explanations for the discrepancy:

- the circuits may be used to support downstream services other than leased lines, for example, internet access or MNO backhaul, and therefore should not be counted in the retail leased line market;
- we were missing geographic information from the data supplied by OCPs, and therefore do not recognise some retail circuits that may have an end in Hull;
- there are a number of duplicate entries in the KCOM data of circuits provided to CPs; and
- some of the wholesale circuits categorised by KCOM as Ethernet, and therefore included in the AI market (for example, sub-2Mbit/s and 2Mbit/s Ethernet circuits), may have been listed as TI leased lines by the CPs in their submissions.

7.772 We investigated these issues but, given the inconsistencies in the various datasets, we resolved to accept a wide range in our share estimate. In effect, we calculated a lower bound for KCOM's retail share by assuming that every sale of a wholesale leased line to a CP results in a retail sale. On this basis, we estimated KCOM's retail volume share to be at least 75%.

7.773 Given that this lower bound is well above the 50% level which creates a presumption of dominance, we did not consider it necessary to undertake further analysis of the shares in this market.

[960] See paragraph 7.688 for further details of the weighting.

Profitability

7.774 We did not have any reliable financial data to calculate KCOM's profitability for retail leased lines sold in the Hull area because it has not been regulated in this area. Therefore, there is no requirement to publish profitability at the retail level. However, in light of the cumulative assessment of the other SMP criteria, in particular KCOM's market shares we did not consider an assessment of this criterion would affect our proposed market power determinations.

Control of infrastructure not easily duplicated

7.775 As discussed previously, a CP needs to provide a wholesale upstream input in order to offer retail leased lines. This requires either the purchase of a wholesale terminating segment service, or the self-provision of the relevant network infrastructure. The high costs of building network infrastructure are the primary reason why we find SMP in the upstream wholesale markets. As a result of SMP in the wholesale markets, we require that KCOM provide access to its network in the market for wholesale low bandwidth TISBO and AISBO in the Hull area.

7.776 Despite the availability of this regulated wholesale service, we noted that KCOM has maintained a very high share of the low bandwidth TI and AI retail markets. One of the reasons for this may be that very few CPs have network infrastructure near to Hull. In order to use the regulated terminating segment service from KCOM a CP needs to interconnect in the Hull area, or buy an additional service from KCOM to hand over the traffic remotely.

7.777 From the circuit data we collected from CPs, we concluded that most competitors to KCOM opt to have their traffic handed over remotely (e.g. in Leeds). The result is that KCOM benefits from the fact that it has both network infrastructure within the Hull area, and to and from Hull. Although it is possible to duplicate the infrastructure to reach Hull, the limited demand for leased lines in the Hull area means that this is unlikely to be financially justifiable for many CPs.

Economies of scale and scope

7.778 Much of the discussion of this criterion in relation to the retail low bandwidth TI leased lines market in the UK excluding the Hull area applies equally to these markets, i.e. KCOM derives some advantage from economies of scale and scope. One example is the cost associated with selling to (including marketing and branding) and managing customers in Hull. Most of the customers supplied by competitors to KCOM are organisations with a national footprint which includes sites within Hull. Truly effective competition within Hull would require that CPs contest the supply of services to local businesses. This would require the establishment of a local sales force and investment in marketing to local businesses. It may be difficult to justify these investments given the small relative size of the market in Hull.

Barriers to entry and expansion

Retail TI

7.779 The discussion of this criterion in relation to the retail low bandwidth TI leased lines market in the UK excluding the Hull area applies equally to this market. This is a declining market with relatively high switching costs. It will therefore be difficult for new or existing entrants to win business from KCOM over the review period. Our

view was that barriers to entry and expansion in the retail market will mean that KCOM is unlikely to be constrained effectively by its competitors.

Retail AI

7.780 We concluded that there are barriers to entry and expansion in the retail low bandwidth AI market in Hull. Although this is a growing market, the total size of the market means that it is unlikely to attract significant investment from alternative suppliers.

Vertical integration

7.781 We did not have any direct evidence on the effect of KCOM's vertical integration on competition in either the TI or AI market. However, in light of our overall assessment of the other SMP criteria, in particular KCOM's market shares we did not consider an assessment of this criterion would influence our proposed market power determinations.

Countervailing buyer power

7.782 We did not consider that buyer power would provide an effective constraint in either market due to the low value of the services, the lack of alternative suppliers of wholesale inputs, the high costs of self-supply and the small size of customers relative to the market as a whole.

Prospects for competition

Retail TI

7.783 Given the long term decline in demand for TI circuits, we did not consider new entry to be likely. Equally, given the small size of the market, the economies of scale and scope and barriers to switching discussed above, there appeared to be little prospect of a substantial increase in competitive intensity over the course of the review period of three years. We did not consider, therefore, that the prospect of increased competitive intensity was likely to constrain KCOM's behaviour in this market.

Retail AI

7.784 Despite demand growth for AI services, the small size of the market, economies of scale and scope and barriers to entry and expansion, as discussed above, led us to conclude that a substantial increase in competitive intensity over the course of the review period of three years is unlikely.

Consultation responses

7.785 In the June BCMR Consultation, we asked the following:

> *Question 11: Do you agree with our assessment of SMP for the retail low bandwidth TI leased lines market and the retail low bandwidth AI leased lines market in the Hull area?*

7.786 KCOM said that it "*accepts that findings of SMP in the TI and AI low bandwidth markets and understands Ofcom's application of the three criteria text*" but that it

does not believe regulation to be necessary or appropriate in these markets.[961] It noted that low bandwidth TI services, particularly analogue, are nearing the end of their life and that at some point the cost of maintaining obsolescent network elements will become prohibitive. KCOM will therefore eventually look to withdraw services. It also said that regulatory obligations are likely to impact on KCOM's ability to recover costs, which has a knock-on effect on the ability to fund new services. This could be detrimental for customers. KCOM also noted that AI has never been regulated, whilst TI was deregulated in the last market review.

7.787 As discussed above, KCOM does not accept that its market position will not change given the roll out of MS3 Communications' network. It argues that this will provide direct infrastructure based competition in a short timeframe, given the limited geographic area. KCOM argues that this refutes Ofcom's suggestion that low bandwidth TI services is a small and shrinking market with few incentives for OCPs to compete. Similarly, KCOM did not agree that low bandwidth AI services is a market which offers insufficient potential for growth to attract a significant amount of new entry. It also points out that there has been no suggestion of a refusal to supply on the part of KCOM and no allegations of excessive pricing or undue discrimination.

7.788 All other stakeholders either supported or did not comment on Ofcom's SMP findings in these markets.

Ofcom's considerations of consultation responses

7.789 In this sub-section, we present our final assessment for each criterion and, where relevant, explain how we have taken the consultation responses into account. We then conclude on our overall assessment.

Market shares

7.790 Following updates to our estimates of market shares, our revised calculations are presented in Figure 7.30 below.

Figure 7.30: Revised market shares for retail low bandwidth TI and AI leased lines in the Hull area

Product segment	KCOM's Share
Analogue	92%
Digital TI < 2Mbit/s	68%
Digital TI >=2Mbit/s	85%
All low bandwidth TI	87%
All low bandwidth AI	>75%

7.791 As discussed in paragraph 7.729, we are now better able to exclude VPNs and internet access from our service share calculations in the retail markets. This has resulted in material increases for our estimates in the Hull area since the June BCMR Consultation. However, despite these methodological improvements our market share calculations are prone to the same data issues that were discussed in the June BCMR Consultation, particularly the fact that we do not have a complete set of retail

[961] KCOM response, pages 3-6.

circuits. However, in both the AI and TI retail markets, we are confident that KCOM's share is well above the 50% threshold for a presumption of dominance.

External constraints

7.792 As discussed in paragraph 7.168, for each of our SMP assessments we explicitly address competitive constraints outside the market and whether we consider them be important in our analysis of market power.

7.793 In terms of low bandwidth retail TI, we note that this is a declining market and that some end-users will switch to alternative technologies (such as Ethernet) during the next three years. However, there remain a significant number of end-users buying KCOM circuits in the Hull area[962] and we consider that a large proportion of these are unlikely to switch to new products. This is supported by our market research, which showed that a significant proportion of businesses have concerns about switching to ADSL and Ethernet. For ADSL, these include meeting necessary bandwidths, contention of service and reliability. For Ethernet they include price, quality of service and reliability.

7.794 In terms of low bandwidth retail AI, we do not consider there to be any strong competitive constraints from outside of the market. For bandwidths above about 20Mbit/s, broadband does not offer a large enough bandwidth and MI connections or self-supply using dark fibre are too expensive. In terms of customers at the lower end of the bandwidth range, even broadband is unlikely to represent a constraint on KCOM given the general need for a dedicated and symmetric connection. It is possible that the use of superfast broadband may represent an additional constraint in future. However, as discussed in paragraph 7.372 there is still some uncertainty about how competition for business-grade superfast broadband will develop over the next three years, though we do not expect it to do so to an extent which would affect our SMP findings in Hull.

Profitability

7.795 As in the June BCMR Consultation, we do not have reliable financial data to calculate KCOM's profitability for retail leased lines sold in Hull. However, as before we do not consider an assessment of profitability is necessary given the other evidence we have drawn on.

Control of infrastructure not easily duplicated

7.796 We consider that our analysis from the June BCMR Consultation remains valid and that KCOM benefits from having both network infrastructure within the Hull area, and to and from Hull. This is reflected by the fact that rival CPs often purchase retail circuits instead of wholesale products, as they do not have the necessary interconnection.

Economies of scale and scope

7.797 We consider that our analysis from the June BCMR Consultation remains valid and that KCOM derives an advantage from economies of scale and scope.

[962] Our available evidence suggests that KCOM has approximately [✂] retail low bandwidth circuits with at least one end in Hull

Barriers to entry and expansion

Retail TI

7.798 We believe our analysis from the June BCMR Consultation remains valid and that the declining nature of the market, along with relatively high switching costs, means that it will be difficult for new or existing entrants to win business from KCOM over the review period.

Retail AI

7.799 Given the entry of MS3 in the Hull area, our assessment in the June BCMR Consultation that this market was unlikely to attract significant investment from alternative suppliers proved to be too cautious. As discussed earlier, demand for low bandwidth AI services has been growing during the past three years and this trend is likely to continue. We believe this is one of the main reasons for MS3's investment in a fibre optic network in parts of Hull, with plans to offer [✂].

7.800 However, despite this investment we still believe that KCOM will maintain a dominant position in the market over the next three years. This is because, according to our network reach analysis, MS3's infrastructure will not be within 200 metres of approximately [✂] per cent of large businesses in Hull.

7.801 Further, as in the wholesale symmetric broadband origination markets, we consider that for the next three years whilst MS3 is establishing a foothold in the Hull area, KCOM will continue to benefit from an incumbency advantage. This arises from its economies of scale and scope, its ubiquitous network within Hull and its position as a universal communications provider in the area.

Vertical integration

7.802 We consider that our analysis from the June BCMR Consultation remains valid.

Countervailing buyer power

7.803 We consider that our analysis from the June BCMR Consultation remains valid.

Prospects for competition

Retail TI

7.804 As stated above, we do not consider new entry to be likely given that this is declining market. Furthermore, the competitive constraints we have identified suggests there is very little prospect of a substantial increase in competitive intensity over the course of the review period of three years.

7.805 In terms of MS3's network roll-out, we do not believe the CP or others are likely to use the infrastructure to deliver low bandwidth TI services. This is based on declining business demand and the fact that, based on the information we have received, MS3 [✂].

Retail AI

7.806 Despite demand growth for AI services and the entry of MS3 in the market, we do not consider that KCOM will be sufficiently constrained by competition over the next

three years given its incumbency advantages and the fact that MS3 has only recently entered the market.

Conclusions on retail low bandwidth TI (<=8Mbit/s) leased lines in the Hull area

7.807 Having undertaken a thorough and overall analysis of the economic characteristics of this market by applying cumulatively the SMP criteria, and having considered consultation responses, we have concluded that KCOM has SMP and will maintain this SMP over the course of the three year review period.

7.808 Our revised market shares show that KCOM's share is well above the 50% threshold for a presumption of dominance. Furthermore, we still consider our assessment of other criteria in the June BCMR Consultation to be relevant.

7.809 Finally, this market is not included in the EC's Recommendation. When identifying markets other than those in the EC's Recommendation, we must ensure that three criteria are cumulatively met for each market. We explain later in this Section why we have concluded that the three criteria test is satisfied for this retail market.

Conclusions on retail low bandwidth AI (<=1Gbit/s) leased lines in the Hull area

7.810 Having undertaken a thorough and overall analysis of the economic characteristics of this market by applying cumulatively the SMP criteria, and having considered consultation responses, we have concluded that KCOM has SMP and will maintain this SMP over the course of the three year review period.

7.811 Our revised market shares show that KCOM's share is very high, at over 75% (well above the 50% threshold for a presumption of dominance). Whilst we accept that the prospects for competition are stronger than we suggested in the June BCMR Consultation, given the investments by MS3, it is plainly premature to conclude that this will eliminate KCOM's SMP.

7.812 Finally, this market is not included in the EC's Recommendation. When identifying markets other than those in the EC's Recommendation, we must ensure that three criteria are cumulatively met for each market. We explain later in this Section why we have concluded that the three criteria test is satisfied for this retail market.

Wholesale markets for TI trunk segments

7.813 In this section, we present our findings for the SMP assessments in the markets for regional and national trunk segments. As discussed in Section 6, we define separate markets for TI trunk – national and regional.[963] National trunk generally captures circuits between the largest urban areas where operators other than BT have built core network. On these routes, CPs will aggregate traffic to ensure the efficient transport of electronic information. Regional trunk captures circuits that cross a TAN boundary and 'notionally' include a trunk segment but do not aggregate traffic to the same extent. This means that they are more akin to a terminating segment.

7.814 We also identified a separate AI trunk market but, due to the nature of Ethernet services, we did not consider it necessary to identify a regional trunk segment because point-to-point Ethernet circuits (such as EAD) are included in the terminating

[963] We assume that circuits between non-adjacent TAN catchment areas will contain a national trunk segment, whereas circuits between adjacent TAN catchment areas will contain a regional trunk segment.

segment market, even if they cross TAN boundaries. There is no AI equivalent to the notional trunk circuits in the TI regional trunk market.

7.815 In the June BCMR Consultation, to assess SMP in these relevant wholesale TI trunk segment markets we relied on the application of the same set of SMP criteria used above in relation to the relevant wholesale symmetric broadband origination markets.

7.816 We follow the same approach in this Section. Each SMP assessment is presented in the same format as the above relevant wholesale and retail market SMP assessments:

- first, we summarise our decision;
- secondly, we present our assessment in the June BCMR Consultation of each SMP criterion for each market;
- thirdly, we set out stakeholders' responses; and
- lastly, we conclude on our overall assessment and explain how we have taken the responses into account.

Summary

7.817 We have concluded that BT has SMP in the regional TI trunk segment market, and that it will maintain this SMP over the course of the three year review period.

7.818 We have also concluded that no operator enjoys a position of SMP in the national TI trunk segment market, and that no operator will enjoy a position of SMP over the course of the three year review period. Therefore, we have concluded that competition in this market is effective, and will continue to be effective over the course of the three year review period.

7.819 As per our SMP assessments of the above relevant wholesale and retail markets, we have used the same SMP criteria in to order to undertake a thorough and overall forward-looking analysis of the economic characteristics of these two trunk markets, based on existing market conditions, before coming to a conclusion as to the existence of SMP.[964]

7.820 In our SMP assessment, we have had particular regard to the SMP criteria summarised in Figure 7.31 below in assessing whether BT has the power to behave to an appreciable extent independently of its competitors, customers and consumers.

[964] Consistent with the SMP Guidelines (see paragraphs 75 and 78).

Figure 7.31: Summary of market power determinations in the markets for wholesale national and regional TI trunk segments in the UK

Relevant market	Results of other criteria applied for SMP assessment	Proposed SMP designation
Wholesale national TI trunk segment market in the UK	- BT's market share is 30-50% - Significant amount of alternative infrastructure (more choice) - CPs are prioritising the migration of long-distance TI circuits to alternative technologies	No SMP
Wholesale regional TI trunk segment market in the UK	- BT's market share is above 50% - Similarities with terminating segments means that BT gains significant advantages from its ubiquitous network - BT's benefits from economics of scale and scope - High switching costs of re-routing regional circuits	BT

Assessment in the June BCMR Consultation

Market share and market share trends

7.821 Due to the change in market definition, we were not able to compare volumes and share estimates directly with the 2007/8 Review. However, we expected aggregate volumes to follow the same pattern of falling demand as symmetric broadband origination markets. Therefore, we said that volume is likely to have fallen in both of the markets by between 30% and 50% since 2006/07. Continuing falls in volume are likely to mean that OCPs have spare capacity in the national trunk market, as we discuss below.

7.822 We estimated BT's market share to be 89% for regional trunk and 49% for national trunk. We considered that these share estimates represented an upper bound on BT's share in the two markets for the following reasons:

- data supplied by OCPs was often missing relevant information which would allow us to identify the trunk element of a circuit, such as location data for the circuit ends;
- as evidence of this missing data, there was a significant discrepancy between the number of circuit ends supplied by OCPs in wholesale and retail markets, and the number of circuits bought by OCPs from BT; and
- the shares included trunk requirements for analogue circuits even though BT does not supply wholesale analogue trunk products. When these circuits were excluded, BT's share fell to 46% in the national trunk segment market, and to 87% in the regional trunk segment market.

7.823 After adjusting the data to allow for the above factors, BT's share of the national trunk market fell to less than 45%. At this level, BT's share does not create a presumption of market power, but neither is it clear that competition will be effective. We also considered it likely that BT's share of the national trunk market has fallen given that its share of the supply of all trunk segments has fallen.

7.824 In contrast to the national trunk segment market, we found that BT's share of the regional trunk segment market is well above the 50% threshold for the presumption of dominance. Although BT's share of all trunk segments has fallen, we considered it likely - given the difference in shares, and the evidence from our assessment of the other SMP criteria - that the fall is driven by changes in the national trunk segment market. Overall, we considered that BT's high share is indicative of impediments to effective competition in this market, and that it provided strong evidence that BT has SMP in this market.

Profitability

7.825 Figure 7.32 below shows the figures published by BT in its regulatory accounts for trunk segments (national and regional combined).

Figure 7.32: BT profitability on sales of wholesale trunk segments

Year	Reported ROCE	Adjusted ROCE	Turnover (£m)	Reported profit (£m)	Adjusted profit (£m)	Mean Capital Employed (£m)
2010/11	22.4%	28.3%	108	47	60	212
2009/10	43.7%	45.3%	164	149	112	247
2008/09	71.3%	68.5%	257	193	185	270
2007/08	66.9%	63.9%	265	190	182	285
2006/07	44.6%	51.0%	256	133	153	300

Source: BT regulatory financial statements, Ofcom analysis

7.826 BT's return on capital has been well above its cost of capital since the 2007/8 Review. We did not consider that these levels of profitability would be sustainable if BT had faced effective competition to all of its supply of trunk segments. We also noted that the recent fall in profitability stems, at least in part, from reductions in price forced by regulatory intervention rather than competitive pressure.[965]

7.827 We considered that this profitability data provided evidence that competition has not constrained BT's pricing of trunk segments to the competitive level. However, as we did not have disaggregated profitability data, we could not say whether returns were high in both national and regional trunk markets.

7.828 BT's pricing for wholesale trunk segments is largely uniform, but it does offer discounts on certain routes between major urban areas.[966] All of these routes lie within the national trunk segment market. In addition, national trunk segments account for less than 20% of BT's total supply of trunk segments. Whilst the share of revenue accounted for by national trunk might be slightly higher than this, we considered these factors to suggest that the majority of BT's profits are likely to be derived from the regional trunk segment market.

7.829 We expected demand for TI trunk services to fall over the period covered by this review, reflecting the continued migration to Ethernet products. On national trunk

[965] See for example Ofcom, 'Determination to resolve disputes between each of Cable & Wireless, THUS, Global Crossing, Verizon, Virgin and COLT and BT regarding BT's charges for partial private circuits' (October 2009)

[966] In cases where BT supplies two PPCs, it will charge a fixed annual rental for each local end (between the customer's premises and exchange). If a main link is needed (a segment between two exchanges), BT will charge both a fixed annual price and a per-kilometre annual rental. If the two customer-ends are in different TANs then the circuit is assumed to include a trunk segment and BT will charge a per-kilometre annual rental for the trunk segment (the length of which is determined by the PPC routing model, as described in Section 6).

routes where a number of OCPs have infrastructure, we took a view that the resulting spare capacity will put further pressure on national trunk prices and tend to erode profits in the national trunk market.

7.830 Overall, we considered that the profitability data provided further evidence to support the position that BT has SMP in the market for regional trunk segments. We considered the evidence to be consistent with our proposal not to make a market power determination in the national trunk segment market.

Control of infrastructure not easily duplicated

7.831 For the purposes of our analysis, we viewed a retail leased line as consisting of two symmetric broadband origination segments, and if needed, a trunk segment. In order to supply a trunk segment, a CP needs to provide transmission capacity between the two origination segments. As discussed in the TISBO market assessments above, BT has a very extensive access network infrastructure and supplies a very high proportion of wholesale TISBO services in the UK excluding Hull. As a result, there are two critical elements in the provision of trunk segments:

- facilities to provide long distance transmission capacity; and
- facilities to connect to points in the BT network where symmetric broadband origination segments can be aggregated and handed over.

7.832 The second of these is not required when the symmetric broadband origination segment is self-supplied, and is therefore not required by BT. The result is that BT derives a cost advantage in the provision of trunk segments due to its high share in TI symmetric broadband origination markets[967], which ultimately derives from its control of an extensive access network infrastructure. However, as seen from the market shares, OCPs have been relatively more successful competing in the market for national trunk segments, and so this benefit need not always be material.

7.833 As explained in section 6, a key distinction between regional and national trunk circuits is that the former may not actually involve use of a core network. Regional trunk circuits may in fact be similar to terminating segments in that they are short-distance circuits connecting a customer premise to the nearest network node, but where these premises and the network node are in different but adjacent TAN areas. In these circumstances, the circuit is regarded as including a “trunk” segment under the PPC routing rules. National trunk circuits by contrast are typically longer-distance circuits between urban centres and as such will involve use of core infrastructure. As we explain below, a number of CPs have to a large extent duplicated BT’s national trunk infrastructure but, as with the terminating segment markets discussed earlier, this is much less true of regional trunk circuits.

7.834 CPs often build their networks in a piecemeal fashion: providing additional transmission links and points of handover as and when required. This can only be justified when there are a sufficient number of symmetric broadband origination segments in an area to support the required investment.

7.835 In contrast, BT has a very extensive SDH trunk network to support the large volume of terminating segments that it provides throughout the UK, both internally and to OCPs. It is unlikely that an OCP would ever reach the scale required to replicate BT’s entire trunk network.

[967] By having a greater share of terminating segments, BT aggregates more traffic, which reduces its unit costs.

7.836 We noted that OCPs do not need to replicate BT's entire national trunk network by interconnecting at every possible location in order to compete in the supply of national trunk segments. There are 67 Tier 1 nodes so, in theory, if a CP were to interconnect with BT within each area served by these nodes, they would be able to self-provide all of their national trunk segment requirements. That is, they would not need to buy any national trunk segments from BT. Furthermore, national trunk circuits can be routed indirectly via an adjacent Tier 1 node, and so CPs without complete coverage of interconnection in the Tier 1 node areas would still be able to compete to supply services in the national trunk segment market.

7.837 In general, we considered that OCPs have been able to replicate a sufficient amount of core network infrastructure to compete with BT in the provision of national trunk segments. As part of our network reach analysis, we collected data from OCPs regarding the extent of their network infrastructure. This showed that many of the CPs have built long distance transmission networks connecting major urban areas in the UK. In addition, several CPs have built up a large number of points of interconnection with the BT network. Three CPs – [✂] – have interconnection in more than 60 of the 67 Tier 1 node areas, and could self-supply virtually all of their trunk national segment requirements (or offer comprehensive national trunk services to other CPs).

7.838 Therefore, we considered that BT is unlikely to derive a material competitive advantage from its network infrastructure in the national trunk segment market.

7.839 There is less scope to aggregate traffic on routes in the regional trunk segment market, and it is therefore more difficult for an OCP to justify investment in either the transmission facilities or additional points of handover. In this market, we therefore concluded that BT gains a material competitive advantage from its extensive trunk and access network infrastructure.

Economies of scale and scope

7.840 Both regional and national trunk segment markets are characterised by economies of scale. As discussed in the previous section, the provision of national trunk segments requires significant investment in network infrastructure to provide long distance transmission capacity, and for OCPs it is also likely to require investment in facilities to interconnect with BT (i.e. points of handover). Both facilities are subject to economies of scale due to high upfront costs.

7.841 Regional trunk circuits may not make use of the core network at all and, in economic terms, they have more in common with symmetric broadband origination. Under the definition of the trunk market, the use of a core trunk segment in these circuits was notional and did not necessarily reflect the actual routing of the circuit, or the potential for competitive investment in similar circuits.

7.842 Defining two trunk markets in this way is a means of reflecting the differences in the extent of economies of scale between regional trunk segments and national trunk segments. This is because "national trunk" routes between major urban centres will tend to be the high volume routes where the potential for aggregation is likely to be relatively high.

7.843 By contrast, circuits between adjacent TANs tend to be relatively short-distance circuits enabling a CP to serve a customer site by connecting it to the nearest BT node. Compared to these regional trunk circuits, "national" trunk circuits between non-adjacent TANs are far more likely to employ trunk or core networks.

7.844 In the market for national trunk segments, OCPs have been able to reach the level of aggregation necessary to compete with BT, which demonstrates that BT does not have a material competitive advantage due to its scale. In contrast, BT's share of volume in the market for regional trunk segments suggests that it benefits from a significant scale advantage relative to its competitors.

7.845 We considered that economies of scope are a factor potentially affecting competition in both trunk segment markets. Many of the costs of transmission facilities required to provide trunk segments are common to a wide range of services. For example, the duct, fibre, buildings and some of the transmission equipment will be used by almost all downstream services in addition to TI leased lines. As a result, we concluded that BT potentially benefits from the scope of its operations across the fixed telecoms sector.

7.846 We considered that economies of scope are also likely to be present in the national trunk segment market, but we did not consider it likely that they have a material effect on competition. The reason is that CPs are able to aggregate traffic from a variety of services on national trunk routes, whereas this is not feasible on regional trunk routes.

Barriers to entry and expansion

7.847 Barriers to entry are present in both trunk segment markets due to the high sunk costs associated with building a long distance transmission network. However, as already noted, a number of CPs have already built long distance fibre networks connecting major urban areas in the UK.

7.848 In addition, there are barriers to entry and expansion resulting from the fixed costs of establishing points of interconnect with BT in different locations. As noted above, three OCPs have already established enough points of interconnect to allow them - in theory - to self-provide almost all of their trunk segment requirements. There may still be incremental costs for these CPs associated with providing additional capacity at the relevant points of handover, but these costs are much less significant than the costs to establish interconnection in the first place. Therefore, we considered that these CPs have overcome the main barriers to entry but that some barriers to expansion may remain.

7.849 As discussed above, there is greater potential to aggregate traffic on national trunk routes relative to regional trunk routes. Therefore, it is easier for CPs to justify the costs of providing additional capacity at points of interconnect in the national trunk segment market. Consequently, the barriers to expansion are lower in the national trunk segment market. In addition, we noted that demand for trunk segments is falling, and this implies that capacity is likely to become available at points of interconnect. To the extent that CPs are able to re-use this capacity, there is less of a barrier to expansion in both the regional and the national trunk segment markets.

7.850 There are further barriers to entry and expansion in the form of barriers to switching. A change in trunk segment provider may incur significant costs associated with work to re-route circuits to a different point of handover; the provision of additional point of handover capacity and the establishment of systems and processes to transact with a new supplier. In addition, the re-routing of circuits may mean a temporary loss of service for the downstream leased line customer. In a growing market, switching costs are less likely to affect the competitive process. However these are rapidly declining markets in which CPs are less likely to want to invest.

7.851 Overall, we considered that barriers to switching, and other barriers to expansion and entry, will mean that competitive conditions are unlikely to change rapidly over the review period of three years. In particular, it is unlikely that competition will provide an effective constraint on BT's behaviour in the regional trunk segment market.

7.852 Equally, we considered that OCPs already provide an effective constraint on BT in the market for national trunk segments, and did not expect this to change over the review period of three years. One reason, as noted above, is that falling volumes are likely to mean that OCPs have spare capacity in the national trunk market. Where there is existing spare capacity on direct or alternative indirect national trunk routes, the additional cost incurred to use that capacity to provide national trunk services will be relatively low. This is much less relevant to regional trunk where the actual routing may not involve use of trunk capacity in any case.

Countervailing buyer power

7.853 Demand in the markets for trunk segments is relatively concentrated as it is only bought by CPs with SDH networks. As such, it is theoretically possible that BT's behaviour in these markets could be constrained by buyer power.

7.854 In order to have some buyer power a CP needs to be able to make a credible threat to switch a significant proportion of its demand to an alternative supplier, or to self-supply, within a relatively short period of time. In the June BCMR Consultation, we identified various reasons why such changes in supplier are unlikely in the regional trunk segment market:

- first, alternative suppliers need to be present in the appropriate locations and to have sufficient spare capacity to accommodate the new supply. The barriers to expansion discussed above imply that existing CPs would find it difficult to cater for the demand from a large customer. Equally, the barriers to expansion are likely to limit the viability of self-supply; and

- secondly, the falling demand for TI services means that CPs are less likely to be willing to undertake the investments required to change supplier, since in many cases they will expect to migrate away from TI services in due course.

7.855 In addition, we noted that the largest customer of BT's trunk segments is BT's downstream business. It is extremely unlikely that BT would consider using an alternative supplier for trunk services. This reduces the chance that buyer power will have a material effect on BT's behaviour.

7.856 In conclusion, we considered that CPs are unlikely to have sufficient buyer power to act as an effective constraint on BT in the market for regional trunk segments.

7.857 By contrast, in the national trunk segment market, alternative suppliers have already built extensive trunk networks to reach major urban centres throughout the UK. As noted above, three CPs have invested to interconnect with BT at a sufficient number of sites to give them the opportunity to self-provide almost all of their trunk segment requirements. The falling demand for services in this market implies that these CPs will be left with spare capacity. This creates the possibility that a CP which currently purchases trunk services from BT could switch to an alternative supplier without that alternative supplier having to make significant incremental investments in capacity. We considered that this effect makes the threat to switch supplier more credible, and generates a degree of buyer power in the national trunk segment market.

Prospects for competition

7.858 The threat of potential entry can prevent firms from raising prices above competitive levels. However, given the falling demand for TI services, and relatively high barriers to entry and expansion, we did not believe that competitive intensity was likely to increase over the review period of three years. This applies most clearly to the regional trunk segment market. As such, we did not believe that the threat of enhanced competition would provide a material constraint on BT in this market.

7.859 In the national trunk market, falling demand for trunk services implies that CPs will have spare capacity. We considered that this will allow CPs to supply new customers at a relatively low incremental cost. In addition, the price of some Point of Handover services supplied by BT to CPs was reduced significantly in 2011 following regulatory intervention. This reduces the cost to CPs of interconnecting with BT, and therefore encourages the competitive supply of trunk segments. Overall, we considered these factors to mean that competitive intensity in the national trunk segment market will remain at its current level, or potentially increase, over the three year review period.

Consultation responses

7.860 In the June BCMR Consultation, we asked the following:

> *Question 10: Do you agree with our assessment of SMP for the wholesale TI regional trunk market and the wholesale TI national trunk markets?*

7.861 The majority of stakeholders did not agree with our SMP findings. BT argued that it did not have SMP in respect of circuits that we have classified as regional trunk whilst the vast majority of OCPs argued that BT has SMP in respect of national trunk.

7.862 BT disagreed with Ofcom's finding of SMP in the regional trunk market, suggesting that Ofcom's market share estimates are not robust and that no reliance can be placed on them. A number of BT's criticisms about Ofcom's SMP finding are relevant to its comments on market definition. These are summarised in Section 6, where we also consider and reject an alternative definition of trunk proposed by BT, and so are not repeated here.[968]

7.863 However, in relation to the SMP assessment specifically, BT noted a number of concerns regarding market shares, in particular missing data and the inclusion of analogue circuits and MNO circuits (for which BT says there is no direct retail point—to-point service). With regard to the MNO circuits, BT argues that the provision of these circuits is undertaken on the basis of bids with very strong countervailing buyer power and real alternative suppliers, including wireless solutions and self-supply. BT also says that MNO circuits will soon be migrating to other technologies such as Ethernet, which negates their inclusion in an SMP assessment.

7.864 BT also argued that market shares for regional trunk are based on an artificial routing of circuits via Tier 1 network nodes. It suggests this systematically overstates BT's volumes and indicates that BT's shares have not substantially changed since 2008 - instead, it believes that circuits have been 'moved around' between alternative market definitions. BT said that sensitivity tests should be carried out regarding alternative assumptions about downstream markets, as they were in 2008.

[968] BT's detailed response on this market can be found in Part 1 of its response, in particular Section 3, Section 4.4 and Section 4.8.

7.865 With regard to profitability, BT says ROCE is a poor measure due to the use of legacy equipment and the change in definition of trunk in 2009, which led to BT rebalancing charges between trunk and terminating segments.

7.866 In terms of control of infrastructure, BT argued that CPs do not draw a distinction between regional and national trunk and it therefore rejects the focus on Tier 1 nodes. It therefore disagreed with Ofcom's assessment that there is less scope to aggregate traffic on routes in the regional trunk market because it argued that capacity is undertaken on a total network basis and not on particular routes which have a retail connotation. BT also noted that trunk is 'nothing other than self-supply' and there would not normally be a merchant market by itself distinguishable from a wider service.

7.867 BT said that PPCs are now handed over at more than 600 BT buildings, demonstrating the extent of competition for TI services in the UK.[969] They also submitted analysis of BT's retail private circuits using the existing TAN catchment areas to determine which ones had a trunk segment. Each circuit was then examined to see which CPs have a PoH at each end of the circuit that would enable them to self-supply the trunk segment. The analysis showed that two operators could self-supply connectivity between 100% of TANs (including adjacent ones) while a third could supply 98%. A further two CPs could compete for more than 70% of BT's retail TI circuits without having to buy trunk from BT or any other CP.

7.868 BT agreed that there are economies of scope across services and said that other CPs such as CW&W and COLT are active in many related markets. It disagrees that Tier 1 nodes provide BT with any economy of scale, citing the SPC report (see below) that Tier 1 nodes serve the purpose of taking traffic off the SDH rings to prevent dis-economies of scale on the ring. SPC claimed that this alleviates pinch points in urban areas by providing 'cross-connects' on SDH rings, but they do not of themselves provide BT with any economy of scale. SPC also said that, due to the legacy nature of BT's (and OCP's) SDH network, there is now little opportunity for economies of scale and scope.

7.869 On barriers to entry, BT argued that excess capacity is usually a strong indicator of the absence of ability to act independently of competitors. BT disagreed that declining demand implies less willingness to incur switching costs and investment, as CPs are more likely to want to capture customers switching from TI to AI. BT also argued that it is empirically undeniable that there are not high barriers to entry, given the replicability of trunk by other operators. It noted that TI services are migrating and that the industry is adopting common core networks (albeit in a staged fashion).

7.870 In terms of countervailing buyer power, BT said that if proper account is taken of CP presence at all nodes where they interconnect, it is clear that it faces significant competitive constraints for regional trunk, particularly from the three large mobile customers (BT noted that a considerable portion of PPC trunk segments derive from mobile backhaul).

7.871 On prospects for competition, BT said that spare capacity in national trunk suggests there must be spare capacity for regional trunk as well because CPs make no such distinctions in their networks. BT estimate that, on average, 50% of the capacity at PoHs is unused. Given the TI market is in decline, BT argued that the availability of capacity should not prevent a CP from competing for leased lines business, particularly with the migration to AI. It also considers it likely that CPs will roll out

[969] BT also noted that there are more non-Tier 1 nodes with two or more OCPs present than Tier 1 nodes.

more modern equipment to their sites and will be capable of supplying either TI, AI or MISBO connectivity.

7.872 BT also commissioned SPC Networks to research the trunk market.[970] Many issues are related to market definition and were addressed in Section 6. However, SPC also raised a number of concerns regarding Ofcom's finding of SMP in the regional trunk market.

7.873 SPC argued that Ofcom's estimate of market shares relies on a flawed measure on the number of circuits as it overstates the supply of BT. It noted Ofcom's formula to calculate the total volume of wholesale trunk segments for an individual operator:

Wholesale = Retail – Wholesale Purchases + Wholesale Provision to OCPs

7.874 SPC illustrated its take on market shares by referring to the following example in the June BCMR Consultation.

Figure 7.33: Example of TAN boundary issues

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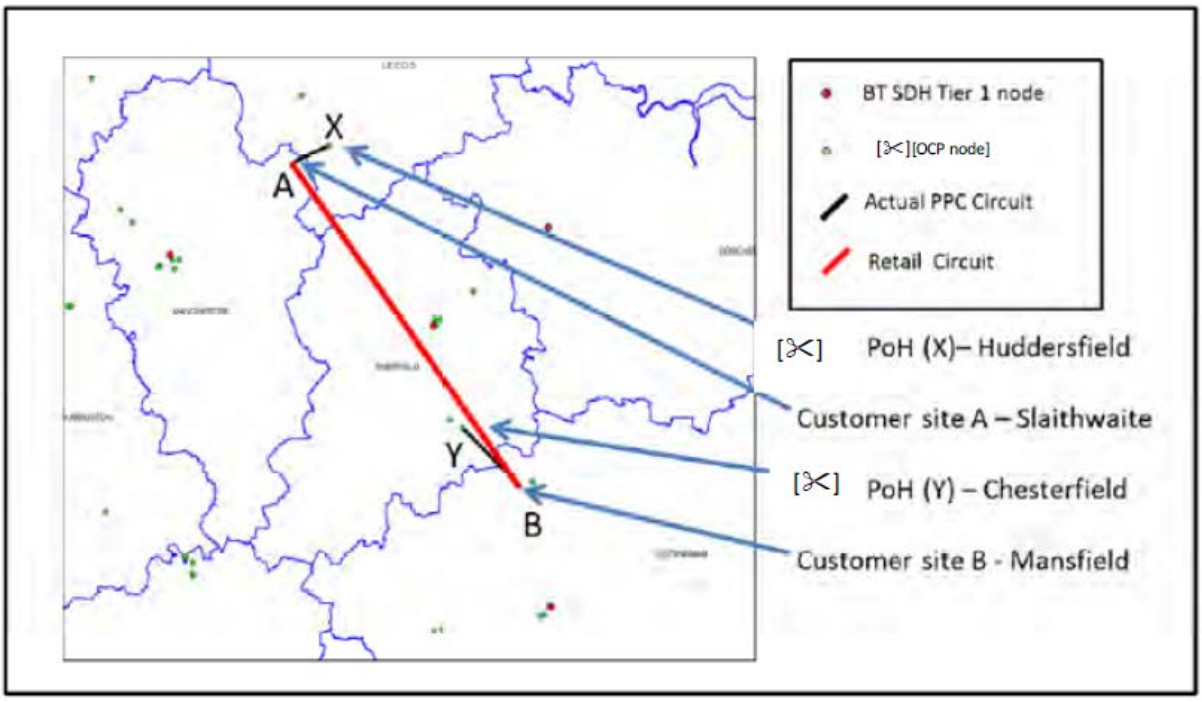

7.875 SPC said that in this example, BT provides two regional trunk segments (AX and BY) and the OCP self-provides one Regional Trunk Segment, so there is no retail regional trunk segment recorded. SPC calculate the wholesale numbers as follows:

Wholesale (OCP) = 0 – (AX+BY) – XY = 0 – 2 – 0 = -2

Wholesale (BT) = 0 – 0 + (AX+BY) = 0 – 0 + 2 = +2

7.876 SPC argued that this invalidates Ofcom's methodology as it gives a negative number of trunk segments. Though SPC accepted that such an error is unlikely to apply to all circuits, SPC said that it had the effect of overstating the market share of a net supplier to trunk segments and understating the share of net purchasers. SPC also

[970] See Part 3 of BT's response.

argued that BT's market share is an artefact of a market defined by Ofcom that does not reflect the way in which OCPs purchase wholesale trunk segments from BT or the way in which they self-supply.

7.877 SPC also said that a high market share by itself does not guarantee a firm has the ability to set prices substantially above the competitive level for a sustained period. It noted difficulties in applying market shares to business connectivity services, which SPC considers to possess some of the characteristics of a bidding market.

7.878 Given these issues with market shares, SPC suggested that Ofcom give more weight to other factors, particularly the countervailing buyer power of MNOs, which SPC considers a significant constraint on BT prices. By separating TI and AI markets, SPC also submitted that Ofcom has ignored the price constraint of AI on TI, particularly given the one way substitution from TI to AI (which can emulate TI). SPC suggested that maintaining regulation could distort investment incentives for OCPs, rendering them less likely to invest in their own infrastructure when it would be efficient to do so.

7.879 SPC also noted Ofcom's statement that demand for trunk segments is relatively concentrated and only bought by CPs with SDH networks. SPC's analysis of BT's data shows a total of 187,729 regional trunk segments, of which 47% were either RBS or SiteConnect, which are sold exclusively to MNOs. Given the small number of MNOs and their ability to threaten to move their business in-house or to an OCP, SPC believes MNOs are able to pre-empt any BT attempts to behave in an exploitative manner. SPC also argue that Verizon, CWW and Virgin have significant buyer power given their size and access to capital and other resources.

7.880 Regarding Ofcom's analysis on the control of infrastructure, SPC noted that BT's SDH network has been built in a piecemeal fashion (with tiers of nodes added to relieve traffic from existing rings to avoid diseconomies of scale) and that OCPs have extensive networks covering the major urban and business centres. Economies of scale associated with Tier 1 nodes are a function of business customer density, not the tier of the node. It notes Ofcom's finding that three OCPs have interconnection within reach of 60 of the 67 Tier 1 nodes and suggests there is little evidence to support Ofcom's conclusion that there is less scope to aggregate traffic in the regional trunk market. SPC considers that regional trunk is easily duplicated and that duplication has already occurred.

7.881 On economies of scale, SPC considers this moot given the problems with market shares. However, in the event that market shares are correct, it still disagrees as it argues that economies of scale at Tier 1 nodes do not exist. It also argues that OCPs have already incurred sunk costs of building out their networks well beyond the buildings that house Tier 1 nodes and so benefit from their own economies of scale.

7.882 On prospects for competition, SPC argued that a firm entering the business connectivity market would not build an SDH network. Instead, it would build an all-IP network that could emulate SDH. It suggests that network operators are more likely to move customers off their SDH network onto AI, as stated by CWW. The prospects for further competition therefore comes from AI networks, which SPC considers to be a constraint on BT.

7.883 In their responses to the June BCMR Consultation, the majority of other CPs argued that BT has SMP in the national market (or that there is a single trunk market in which BT has SMP). A number of CPs noted that BT has a market share above 40%, which is above the EC threshold for single dominance concerns.

7.884 CWW[971] argued that, although it is logical to expect potential competition in the national market, because PPCs are in the later stages of their product lifecycle, CPs are currently investing in newer technologies and so there are no prospects for greater competition in the national trunk market. They suggested Ofcom compares the market share for national trunk with the 2008 share (where Ofcom did not distinguish between national and regional) to assess the relative change.

7.885 Even if BT's market share has fallen, however, CWW said that it may be because CPs have targeted PPC circuits with a costly heavy reliance on BT's national trunks and that these have been migrated to alternative services as a priority. End users on this type of circuit will be far more cost sensitive when weighing up the benefits of moving to potential substitute services. CWW believe that looking at customer planned behaviour in more depth will show that there are limited prospects for competition. CWW also asked us to consider the availability of a merchant market and the likelihood that the prospect of additional national trunk sales would be an attractive option before concluding its market power assessment.

7.886 CWW sought to understand the impact of Ofcom's proposal by looking at its PPC purchases. It found that it purchases a significant quantity of national trunk on a wide range of routes. CWW explained that the actual circuit routing is heavily influenced by a variety of factors including historic constraints, the requirements for resilience and the specific location of platforms to which circuits are routed (e.g. in the DPCN network, which has a limited number of nodes).

7.887 COLT was broadly supportive of Ofcom's approach but argued that we had not gone far enough in carving out all the non-competitive elements of the market. They noted a number of routes where options were limited and said that Ofcom should take a more granular approach to national trunk and define specific trunk routes, delineated by competitive conditions.

7.888 Level 3 argued that there were merits in distinguishing between regional and national trunk, but considered our classification too restrictive. It said that difficulties would arise where a relatively short trunk service crossed three TAN boundaries. It therefore suggested that Ofcom consider a three TAN model.[972]

7.889 Telefónica sought to clarify that trunk did not include RBS access and backhaul.[973] Everything Everywhere and MBNL argued that, because mobile backhaul is purchased as an "end to end product", there should be separate regulation of a mobile backhaul product that includes both trunk and access segments.[974]

7.890 UKCTA said in its consultation response that purchasers of TI services continue to rely on trunk services from BT in sufficiently large proportion to consider that BT has overall SMP in the combined market, noting a combined market share of 49%.[975] It argued for a single trunk market, in which BT has SMP.

7.891 With regard to national trunk, UKCTA argued that Ofcom has not considered the nature of trunk as a legacy service in the later stages of its life cycle and that market share differences do not provide evidence of a competitive market. It considered it

[971] CWW response to June BCMR Consultation, Section 8 and Section 9, page 38.

[972] Level 3 response, pages 15-16.

[973] Telefónica response, page 16.

[974] MBNL response, page 23.

[975] UKCTA response, pages 13-14.

quite probable that Ofcom's findings were reflective of CPs/end-users migrating more expensive long distance TI circuits supplied by BT to other services as a priority. UKTCA asked Ofcom to engage in this type of detailed analysis, comparing the nature of national trunk circuits in installation over the course of the proceeding review. In particular, it is not clear to UKCTA members whether BT's market share has decreased due to CPs switching trunk supply or terminating PPC usage. It noted that Ofcom has not provided any evidence of increased competitive entry into the national trunk market since the last market review – in fact it noted that CPs are not investing in new POH handover.

7.892 UKTCA members also expressed concerns that Ofcom's proposals will put at commercial risk a proportion of trunk conveyance and that CPs/end-users are unlikely to find it commercially sensible to rearrange these circuits to alternative/new handover points or to seek provision from alternative PPC trunk providers. UKCTA said that end users and CPs do not wish to incur avoidable costs for the supply of legacy TI circuits and would instead rather focus on migration away from TI.

7.893 Lastly, Virgin also argued that there is a single trunk market, in which BT has SMP.[976]

Ofcom's considerations of consultation responses

7.894 In this sub-section, we present our final assessment for each criterion and, where relevant, explain how we have taken the consultation responses into account. We then conclude on our overall assessment.

Market shares

7.895 Since the June BCMR Consultation, we have revised our market shares for regional and national trunk segments to incorporate new circuit data[977] extracted via the methodology set out in Annex 5. In response to comments from stakeholders on our estimates, particularly BT, we have also carried out various sensitivity tests. The scenarios are as follows:

- Base case – we follow the same methodology that we used in the June BCMR Consultation with the revised circuit data (excluding known analogue, VPN and internet access circuits)

- Scenario 1 – we do not apply bandwidth uplifts, so for example a 2Mbit/s trunk segment is given the same weight as a 45Mbit/s segment. This reflects volume-based market shares and allows us to consider a different metric.

- Scenario 2 – we apply no uplift to account for missing geographic data.[978] This means that we only calculate market shares using data for which we have complete information (but at the expense of excluding some circuits).

- Scenario 3 - we calculate market shares using wholesale provisions only. This means that we do not add retail circuits or subtract wholesale purchases from the calculation. This is presented to illustrate a more simplistic calculation that just

[976] See Virgin response, pages 20-22.

[977] This includes updated circuit lists from Colt and Global Crossing.

[978] In the base case, if one CP provides full information on 100 circuits in addition to 10 circuits with missing postcode data, we calculate the proportion of the 100 circuits that are in TAN X (e.g. 20) and assume that the same proportion applies to the missing circuits (e.g. 2).

considers third party circuit sales from a CP to another CP (so it excludes self-supply).

- Scenario 4 – we assume that every OCP national retail circuit requires two regional trunk segments that the OCP self-supplies. That is, for each OCP retail circuit between two customer-ends in non-adjacent TANs, we assume they self-supply two regional segments.

- Scenario 5 – we assume that every OCP national and regional retail circuit requires two regional trunk segments that the OCP self-supplies That is, for each OCP retail circuit between two customer-ends in different TANs (whether adjacent or non-adjacent), we assume they self-supply two regional segments.

7.896 Scenarios 4 and 5 were carried out in response to SPC's criticisms of our market share estimates (see paragraphs 7.873-7.876). As set out above, our method for calculating the number of CP circuits is as follows.

Wholesale = Retail – Wholesale Purchases + Wholesale Provision to OCPs

7.897 BT argued that the methodology of netting off wholesale purchases from retail requirements means that BT's service shares will, in some circumstances, be biased upwards. To address this, we recalculate BT's market shares under some extreme assumptions in order to identify the extent of any possible bias. We allocate two regional circuits to OCPs for each national retail circuit under scenario 4 and two regional circuits for each national *and* regional retail circuit under scenario 5. This will lead to a downward bias in BT's market share because, as acknowledged by SPC, the alleged flaw in Ofcom's method does not apply to all circuits. To take a specific example, suppose we observe an OCP selling a retail circuit that spans non-adjacent TANs and we do not observe any purchases from BT. In this case, our formula would correctly identify the OCP as supplying the national trunk segment and there would be no regional trunk segments. However, under scenarios 4 and 5, for this circuit we would allocate an additional two regional trunk segments to the OCP, even though no regional trunk circuits are used.

7.898 Figure 7.34 below presents the results of our market share estimates under the five scenarios. Further details of the methodology about how we derive our estimates can be found in Annex 5.

Figure 7.34: Revised market shares for wholesale national and regional TI trunk segments in the UK

Trunk segment	BT's Market share (%)					
	Base case	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
National	33	45	40	34	33	33
Regional	88	100*	97	81	60	50

*When no bandwidth uplift is applied, OCP net wholesale sales (i.e. after subtracting purchases) are almost identical to their retail requirements

7.899 For national trunk, the results show that BT's market share is likely to fall within a range of 30-50%. Our base case suggests that BT's market share is below 40%. Although the share is higher under scenarios 1 and 2, we consider these to be less robust due to the fact that we do not apply any uplifts to give more weight to higher bandwidth circuits or to correct for missing data. We therefore consider that BT's

market share for national trunk segments is likely to be less than 40%, though we cannot rule out the possibility that it is higher. We do not believe, however, that it is above 50%. Our base case is lower than our estimate (49%) in the June BCMR Consultation and this is primarily due to the inclusion of new OCP circuits (particularly from [✂]) and our revised method of processing the underlying data (see Annex 5 for further details).

7.900 By contrast, our base case estimate of market share for regional trunk (88%) is similar to what we presented in the June BCMR Consultation. This is because the extra circuits from [✂] have been balanced out by additional purchase data from [✂]. As discussed above, it is possible that this estimate for regional trunk is biased against BT for the reasons given by SPC. However, as illustrated by our estimates under scenarios 4 and 5, BT's share remains at or above the 50% threshold that creates a presumption of dominance.[979] As discussed above, the estimates under scenarios 4 and 5 are significantly biased against OCPs and so BT's share of the regional trunk market will in reality be significantly higher than the results of these scenarios suggest.[980] Furthermore scenario 3, which just considers trunk segments that are sold externally (i.e. to third parties) by CPs, shows that BT's share of these are very high at 81%. By contrast, BT's share of national trunk sales in this scenario is much lower, at 34%.

7.901 We therefore consider our market shares for regional trunk to be robustly above 50%, whilst for national trunk we estimate the share to be within a range of 30-50%. With regard to BT's comments on the inclusion of analogue and MNO circuits (see paragraph 7.863), we have removed analogue circuits but do not consider removing MNO circuits to be appropriate because although there is no direct retail point-to-point service, our market analysis has shown that the use of leased lines for mobile backhaul is part of both trunk markets. In relation to Telefónica's comment regarding the inclusion of RBS access and backhaul (see paragraph 7.889), these are only included in one of our trunk markets if the two ends of the circuit are in different Aggregation Nodes. Regarding MBNL's comment that mobile backhaul should encompass both access and trunk, we explain in Section 4 why we have not identified a downstream end-to-end mobile service.

7.902 In relation to CWW's request that Ofcom compares the market share for national trunk with the 2008 share (see paragraph 7.884), we have carried out this analysis on the same basis as the base case and found that BT's share in the national trunk segment at that time was 50% (for regional trunk segments it was 90%, though this potentially suffers from the biases discussed above). On the basis of our new estimates, this suggests that BT's share of the national trunk market has fallen slightly, though we note that CWW and UKCTA argue that this may be due to OCPs migrating PPC circuits to alternative services, as opposed to OCPs gaining TI trunk customers at BT's expense.

External Constraints

7.903 As with other SMP assessments, we have considered the external constraint of AI on TI in the context of trunk. Whilst the decline in volumes in TI circuits (both terminating and trunk) is likely to continue, as CPs migrate to more modern networks, we do not believe this will be complete during the next three years, particularly for regional trunk

[979] See, in this respect, paragraph 75 of the SMP Guidelines.

[980] Note that these scenarios only apply to regional trunk as we have allocated additional regional segments to OCPs. No changes are made in the number of national trunk segments, meaning that the estimates are the same as the base case.

segments. As discussed in our assessment of External Constraints for TISBO and retail TI circuits, we expect a large volume of end-users will remain on legacy platforms over the next three years, with migration occurring gradually. In this respect, we note that there are currently still a large number – more than 100,000 - regional and national trunk segments operating in the UK.

Profitability

7.904 Since the publication of the June BCMR Consultation, BT has published its 2011/2012 regulatory financial statements. These include updated profitability figures, which are presented in Figure 7.35 below.

Figure 7.35: BT profitability on sales of wholesale trunk segments

Year	Reported ROCE	Adjusted ROCE	Turnover (£m)	Reported profit (£m)	Adjusted profit (£m)	Mean Capital Employed (£m)
2011/12	38.6%	33.5%	90	63	55	164
2010/11	22.4%	28.3%	108	47	60	212
2009/10	43.7%	45.3%	164	149	112	247
2008/09	71.3%	68.5%	257	193	185	270
2007/08	66.9%	63.9%	265	190	182	285
2006/07	44.6%	51.0%	256	133	153	300

Source: BT regulatory financial statements, Ofcom analysis

7.905 We note that in its latest financial year, BT has increased its ROCE – which was already above the cost of capital – whilst revenues have continued to decline. It is not possible to separate regional from national trunk, though given that we estimate more than 80 percent of BT's total trunk sales are regional, we expect the financial data to present a reasonable picture of this market (though it is likely that the share of revenue accounted for by regional trunk is less than its share of volume). Although BT argued that ROCE is a poor measure due to the use of legacy equipment (meaning that capital employed is understated) and the rebalancing of charges following the change in definition of trunk in 2009, we consider the fact that both the reported and adjusted ROCE has been significantly higher than BT's cost of capital for the past six years is consistent with the position that BT has SMP in the market for regional trunk segments. However, as with the symmetric broadband origination markets, we do not place as much weight on this as other criteria.[981]

Control of infrastructure not easily duplicated

7.906 We consider that our assessment in the June BCMR Consultation remains valid, namely that BT's extensive network gives it a competitive advantage in the regional trunk market (which often does not use a core network and so has the characteristics of a terminating segment) but not in the national trunk market.

7.907 This is supported by the evidence presented in Section 6, which showed that OCPs have been better able to enter and compete for wholesale national trunk segments than regional trunk segments. For example, we estimate that almost one third of all BT wholesale TI circuits sold to OCPs are trunk circuits (based on our definition of TANs) and the vast majority of these are regional trunk segments, which make up

[981] We regard this as consistent with the ERG Revised SMP Paper which notes that although the existence of profits persistently and significantly above the competitive level often indicates that a CP has SMP, it is not a necessary condition for finding SMP (see Section 3, paragraph 20).

just over one quarter of BT's wholesale TI sales. This is consistent with our view that BT has a much stronger position in regional trunk than national trunk.

7.908 Furthermore, as we explain in Section 6, competitive conditions in the provision of regional trunk segments will be similar to terminating segments. Hence we consider that BT gains an advantage from its ubiquitous network, as discussed in the general assessment of infrastructure in paragraphs 7.83-7.93 above.

7.909 Another factor to consider is that when re-routing a circuit, CPs can incur a significant switching cost relative to the underlying value (given that the majority of TI circuits are low bandwidth and so do not generate large revenues). This was explained in a follow-up submission to Ofcom by [✂]. Due to the incremental basis on which CPs tend to build out their networks, the routing of a circuit may not represent the theoretical optimal routing but instead it reflects what was cost-efficient at the time of installation. Whilst in theory the CP could re-route the circuit if it has expanded its network and interconnection, it may not do so where circuits are low-value and switching costs are relatively high. These switching costs could apply to both 'short' and 'long' distance trunk, therefore acting as a barrier for national trunk segments as well. However, as discussed in CWW's and UKTCA's response to the consultation, OCPs are more likely to migrate more expensive long distance circuits. This incentive is less strong for shorter distance circuits, some which are likely to be included in our definition of regional trunk. This means that BT is less likely to be constrained by the threat of switching in the regional trunk market than in the national trunk market, as reflected in our market shares.

7.910 BT also benefits from resilience requirements and, in some cases, capacity constraints on the existing interconnection circuits. An example of this is [✂]. This particular network is not geared towards providing additional wholesale circuits, meaning it could not constrain BT in an unregulated environment. The fact that the TI markets are declining exacerbates the problem as CPs have little incentive to invest in trunk segments for TI circuits. Furthermore, in addition to the financial costs of switching, there is also a risk of customer disruption, as discussed in the case of symmetric broadband origination markets in paragraphs 7.124-7.125.

7.911 Regarding COLT's suggestion of taking a more granular approach to define specific trunk routes, we do not believe this is practicable, both in terms of market definition and market power assessment. We also do not consider Level 3's suggestion of a three-TAN model is necessary as TAN boundaries reflect areas where OCPs interconnect with BT. Therefore, even if a relatively short trunk service crossed three TAN boundaries, a CP purchasing from BT should have sufficient options in the majority of cases to self-supply or switch to another supplier because the route is more likely to use trunk conveyance, as opposed to a notional trunk circuit.

Economies of scale and scope

7.912 We consider that our assessment of economies of scale and scope in the June BCMR Consultation remains valid. Economies of scale (scope) are associated with falling average costs as output of the same (a different) product increases. The ubiquity of BT's network provides it with a competitive advantage for regional trunk segments, which are often similar to symmetric broadband origination, for the same reasons discussed in paragraphs 7.97-7.115. However, for national trunk segments, we accept that BT is unlikely to derive a significant advantage from economies of scale and scope, given the number of CPs that have built out their networks across the UK and are able to aggregate a large number of circuits.

Barriers to entry and expansion

7.913 We remain of the view that switching costs and the declining nature of the market poses significant constraints in the market for regional trunk segments, as reflected by the extent to which OCPs rely on BT for regional trunk segments. As per our view in the June BCMR Consultation, we consider these to be less applicable for national trunk segments, where there is greater potential to aggregate traffic.

7.914 We have considered BT's comment that declining demand does not imply a reduced willingness to incur switching costs and investment because CPs will want to capture customers who subsequently switch from TI to AI (see paragraph 7.869). Given the expected decline in TI demand, a CP's willingness to sign new TI customers is likely to depend on how confident it is of retaining those customers when they migrate to AI, on the extent to which it can pass the cost of migration to AI on to the customer, and of course on the profitability of TI and AI services. In the light of this, it seems unlikely that the decline in TI demand has no effect on CPs' incentives; for example, CPs may be more likely to focus on winning AI customers to avoid further switching costs and to improve retention.[982] End-users that are likely to remain on TI are also less likely to be targeted by CPs if they attract low revenues for a long period, with little expectation of growth in their demand for TI circuits. In addition, because this market is in long-term decline, competition will largely be for existing users rather than those that are new to the market and consequently our view is that switching costs are clearly a relevant consideration. For these reasons, we do not agree with BT's view on the implications of declining TI demand.

Countervailing buyer power

7.915 We consider that our assessment in the June BCMR Consultation remains valid. Regarding BT and SPC's arguments around countervailing buyer power (see paragraphs 7.870 and 7.878), we do not consider this to be strong for regional trunk segments. This also applies to MNOs, for the same reasons discussed in paragraphs 7.150-7.154. MNOs and CPs only have effective buyer power if they are in a position to self-supply or if there are alternative suppliers that they can credibly switch to. We do not believe MNOs can self-supply using microwave links as these are not substitutes at the margin for leased lines. Furthermore, given the similarities between regional trunk and terminating segments, we believe that the switching costs described above and BT's ubiquitous network gives it a material competitive advantage over its rivals.

7.916 However, we accept that countervailing buyer power is likely to be stronger for national trunk, where OCPs are likely to have greater choice and are also able to self-supply using their own core networks if necessary.

Prospects for competition

7.917 We consider that our assessment in the June BCMR Consultation remains valid. In the regional trunk market, falling demand for TI services and high barriers to entry and expansion mean that BT is unlikely to be competitively constrained over the next three years. For national trunk, however, given the fact that this is a smaller market where OCPs are likely to have more choice and a greater ability to self-supply (including the migration of BT circuits onto their own network), we consider both current, and prospects for, competition are such that BT is unlikely to be able to

[982] CPs' concerns about the cost of migrating customers from TI to AI services are discussed in Section 12.

behave independently of its competitors and customers over the course of the three year review period.

7.918 Regarding BT's specific argument about the presence of excess OCP capacity being relevant for regional trunk (paragraph 7.871), we do not believe this represents a sufficient constraint on BT in the regional trunk market given the switching costs of re-routing a circuit. Furthermore, due to their economic characteristics, regional trunk routes are generally not substitutes for each other, whereas national trunk routes are. For example, if an OCP has spare capacity at a TAN in the south of the UK, this cannot be used to re-route a regional circuit in the north of the country without incurring significant costs. However, this limitation is less applicable at the national level. As discussed above, we disagree with BT that there is no distinction between national and regional trunk, as the latter is often more akin to terminating segments and offer less scope for high levels of aggregation.

7.919 We have considered the comments by CWW and UKCTA that there are limited prospects for competition in the national trunk market. We accept that TI is a declining market and, as discussed above, that re-routing of circuits can incur significant costs. We also note UKCTA's comment that it is unlikely to be commercially sensible to rearrange circuits to new handover points or seek alternative supply. However, as discussed in paragraph 7.902 our evidence suggests that BT's market share in national trunk has fallen during the past three years. Even if this is largely due to the migration of expensive long distance TI circuits, as suggested by CWW and UKTCA in their consultation responses, this shows that OCPs can exercise alternative options at the national level other than supply from BT. Lastly, although we accept that there are costs involved in the re-routing of circuits, we do not believe that these represent an insurmountable barrier to switching given that a number of OCPs have built out extensive networks that interconnect with BT's network at a large number of Tier 1 nodes (many of which have spare capacity). Whilst in the regional trunk market these barriers are accompanied by other advantages to BT[983], this is not the case in national trunk. In the latter market, OCPs have more alternatives to BT, including the ability to self-supply.

Conclusions on the wholesale national TI trunk segment market in the UK

7.920 Having undertaken a thorough and overall analysis of the economic characteristics of this market by applying cumulatively the SMP criteria, and having considered consultation responses, we have concluded that no operator enjoys a position of SMP, and that no operator will enjoy a position of SMP over the course of the three year review period. Based on our revised market share estimates, our best estimate is that BT's share is below 40% (and definitely not above 50%). Furthermore, our assessment of external constraints, barriers to entry and control of infrastructure suggests that OCPs are in a position to effectively compete with BT.

Conclusions on the wholesale regional TI trunk segment market in the UK

7.921 Having undertaken a thorough and overall analysis of the economic characteristics of this market by applying cumulatively the SMP criteria, and having considered consultation responses, we have concluded that BT has SMP and will maintain this SMP over the course of the three year review period.

[983] For example economies of scale and scope and cost advantages from its ubiquitous network

7.922 Based on our revised market share estimates, BT's share is above the 50% threshold for a presumption of dominance. Furthermore, given the similarities between regional trunk segments and wholesale symmetric broadband origination terminating segments, we believe that BT's ubiquitous network gives it a material cost advantage over OCPs. Also, the fact that TI is a declining market and consists of mostly low value services exacerbates barriers to entry and expansion and means that OCPs are unlikely to make any further investments to provide effective competition to BT.

The Three Criteria Test

Introduction

7.923 As set out in the preceding Sections, in accordance with our statutory duty to do so, we have identified leased lines markets in the UK in which we have concluded ex ante regulation may be warranted.[984] In carrying out this exercise, we have taken due account of the EC's Recommendation.[985]

7.924 In this sub-section we assess how, in our view, the three criteria test is satisfied for each of the markets we have identified as markets in the UK in which ex ante regulation is warranted, and which are not included in the EC's Recommendation. However, we would also point out that we do not consider passing the three criteria test constitutes a legal requirement for the undertaking of a market review and, where appropriate, the imposition of ex ante regulation.

The EC's Recommendation and the EC's Previous Recommendation[986]

7.925 The EC's Recommendation lists those markets, at a European level, in which the EC consider ex ante regulation may be warranted.

7.926 It is important to note here that it is precisely because we have a duty to identify markets in which ex ante regulation may be warranted *appropriate to our national circumstances,*[987] that we may identify markets that are not on the EC's Recommendation.

7.927 The EC's Recommendation states:

> "The markets listed in the Annex have been identified on the basis of [the] three cumulative criteria. For markets not listed in this Recommendation national regulatory authorities should apply the three-criteria test to the market concerned."[988]

[984] In accordance with section 79 of the Act, implementing Article 15(3) of the Framework Directive.

[985] In accordance with section 79 of the Act.

[986] Recommendation 2003/311/EC of 11 February 2003 On Relevant Product and Service Markets within the electronic communications sector susceptible to ex ante regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communication networks and services.

[987] See Article 15(3) of the Framework Directive. Section 79(1)(a) of the Act states that "OFCOM must identify (by reference, in particular, to area and locality) the markets in which in their opinion are the ones which in the circumstances of the United Kingdom are the markets in relation to which it is appropriate to consider whether to make [a market power determination]."

[988] See Recital 17.

7.928 The markets we have identified in the UK in which we propose ex ante regulation is warranted and which are not listed in the EC's Recommendation (the Relevant Markets), are:

- the retail market for very low bandwidth TI leased lines in the UK excluding the Hull area;
- the wholesale market for TI regional trunk segments in the UK;
- the retail market for low bandwidth TI leased lines in the Hull area; and
- the retail market for low bandwidth AI leased lines in the Hull area.

7.929 In the 2007/8 Review, in light of our market analyses we found that competition was ineffective in two of the Relevant Markets[989] and we decided it was necessary to impose ex ante regulation to address the competition problems in those markets. Regarding the retail market for the provision of low bandwidth TI leased lines in the Hull area our finding of no SMP in this market in the 2007/8 Review was based on a significantly understated market share of 25% for KCOM. Our current estimate of KCOM's market share is approximately 87% which is higher than its market share in the 2003/4 Review, where as a result of our analysis we did impose ex ante regulation on KCOM in this retail market. Consequently, it is important to highlight that:

- three of the Relevant Markets are markets in which, prior to this market review, ex ante regulation has existed; and
- in this market review we are assessing whether, on the basis of national circumstances, these Relevant Markets are *still* susceptible to ex ante regulation.

7.930 As a result, we consider in identifying the Relevant Markets:

- we have acted in accordance with our relevant duty under the Act; and
- we are also consistent with the EC's Recommendation.

The three criteria test

7.931 When identifying markets other than those in the EC's Recommendation, we should ensure the following three criteria are cumulatively met for each market:

i) the presence of high and non-transitory barriers to entry;

ii) a market structure which does not tend towards effective competition within the relevant time horizon; and

iii) the insufficiency of competition law alone to adequately address the market failure(s) concerned.[990]

[989] The retail market for low bandwidth TI leased lines (which includes the retail circuits we define in this Review as very low bandwidth, that is analogue and sub-2Mbit/s services) in the UK excluding the Hull area, and the wholesale market for trunk segments in the UK.

[990] See paragraph 2 of the EC's Recommendation.

Approach to assessing how the three criteria test is satisfied for each of the Relevant Markets

7.932 In assessing how the three criteria test is satisfied for each of the Relevant Markets, we have taken due account of the EC's Explanatory Note.[991] We have also taken into account the ERG Three Criteria Guidance,[992] which provides guidance on the burden of proof required for sustaining that a market is a candidate market for ex ante regulation, and on the interaction between the three criteria and SMP.[993] We regard the following guidance of particular relevance to our assessment:

- first, "the burden of proof necessary to demonstrate that the three criteria are...met should under no circumstances be higher than the burden of proof required for a finding...of SMP";
- secondly, "it should be recalled that the first criterion (presence of high and non-transitory barriers to entry) and the second criterion (tendency towards effective competition) are inherently related to the SMP assessment. Therefore, in those cases where the SMP analysis will be undertaken (e.g. for the purposes of regulating a market no longer included in the Recommendation), reference to the SMP analysis should in principle be sufficient to prove that the first and second criterion are also met. The same conclusions should also hold true with regard to the level of detail (data that needs to be supplied) necessary for the passing of the three criteria";
- thirdly, "the burden of proof for fulfilling the three criteria test and maintaining at national level a market that was included in [the Previous EC Recommendation] but that is no longer included in [the EC's Recommendation]...should be lower than the burden of proof that may be required for defining a market that has never made part of the list of candidate markets retained by the European Commission in its Recommendations"; and
- fourthly, "in order to prove fulfilment of the three criteria test for maintaining regulation on a market listed in [the Previous EC Recommendation] but not in [the EC's Recommendation], in principle it should be sufficient for NRAs to substantiate why the elements invoked by the European Commission in its Explanatory Note to justify withdrawal of a market from the list on the basis of the three criteria are not applicable to the national circumstances, thus leading to the conclusion that the situation is closer to that existing under [the Previous EC Recommendation]."[994]

Consultation responses

7.933 Only BT commented specifically on the Three Criteria Test. It argued that the retail TI market outside Hull and the regional trunk market do not meet the three criteria test, noting that the French and Germany NRAs do not regulate either of these. The

[991] Explanatory note 2007 (Second Edition), accompanying document to the Commission Recommendation on Relevant Product and Service Markets within the electronic communications sector susceptible to ex ante regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services.

[992] ERG Report on Guidance on the application of the three criteria test, June 2008.

[993] See Section 4.

[994] See Section 4.

reasons for its disagreement, and our response to BT's comments, have been set out in our SMP assessment for each market.

7.934 Taking into account all of the above, we now set out how, in our view, the three criteria are cumulatively satisfied for each of the Relevant Markets.

Retail market for very low bandwidth TI leased lines in the UK excluding the Hull area

We consider there are high structural barriers to entry in this market

7.935 We note that in its assessment of dedicated connections and capacity (leased lines), the EC's Explanatory Note states that, "[w]ith wholesale regulation in place there should be few barriers to entry into the retail market."[995] However, in light of our SMP assessment we consider that in this retail market the barriers to entry are high, in particular due to the lack of wholesale access remedies for analogue services and the very high sunk costs associated with building the required network infrastructure.

7.936 Even though we consider CPs can replicate BT's retail products effectively, both technically and commercially, for sub 2Mbit/s digital services, we also consider that where CPs seek to rely on regulated wholesale inputs - i.e. PPCs. However, the use of PPCs nevertheless requires:

- incurring sunk costs in building and operating the necessary SDH network; and
- achieving economies of scale by establishing a sufficient number of points of handover.

7.937 Regarding analogue services in this retail market, in the absence of any wholesale product, where an end-user requires such a service CPs can only compete with BT by either incurring sunk costs in extending their network to the end-user or by purchasing a retail analogue service from BT.

7.938 We consider switching costs also act as a barrier to entry. As explained above in our SMP assessment, changes in retail supplier (even where the underlying wholesale provider stays the same) often require changes in the physical routing of a circuit. Not only does this result in a temporary loss of service (or higher costs if there is a temporary period of running two services), but the costs incurred in carrying out these changes must be borne by the new supplier and the customer. Cumulatively, these have the effect of reducing the commercial incentive to switch. They are also likely to raise rivals' costs of supply and limit the scale of that part of the market that they could commercially contest were they to incur the costs of entry and expansion.

7.939 Finally, and importantly, all these structural barriers are exacerbated by the declining demand in this retail market and the low average revenues per circuit, again with the cumulative effect of reducing the incentive for competitors to incur the costs required for entry into, and expansion in, this market.

[995] See section 4.2.3.

We consider the structure of this market does not tend towards effective competition within the relevant time horizon

7.940 We do not consider there is clear evidence of dynamics in this retail market which would indicate it will reach the status of effective competition, either over the course of the review period of three years or indeed in the longer term, without ex ante regulation being imposed in this market.[996]

7.941 First, as set out in our SMP assessment, even in the presence of SMP remedies imposed at the wholesale level, since the 2007/8 Review BT has retained a very large market share of well over 50% giving rise, in and of itself, to a presumption of dominance. We have no reason, nor have we seen any evidence, to suggest that BT's position will change over the next three years. The main development in this market is that it continues to decline but, importantly, our market analysis has shown that it remains sufficiently large to warrant regulation.

7.942 Secondly, as set out in our SMP assessment, we consider BT will continue to have SMP over the course of the review period of three years. In this respect, even though we consider CPs can replicate BT's retail products effectively, both technically and commercially, for sub 2Mbit/s digital services, as mentioned above the market is in long-term decline. In particular, BT intends to close the DPCN[997] network in 2018 with the result that end-users of sub 2Mbit/s services, and of many analogue services, will be obliged to migrate prior to this date, limiting the time period for suppliers to recover investments in their sub 2Mbit/s business. Taking into account also the high structural barriers to entry and expansion and low service revenues that this market is characterised by, we consider therefore that CPs are unlikely to be able to justify the investment required to provide services for new end-users primarily because there would be a limited and uncertain period in which to recoup that investment.

We consider competition law alone would be inadequate to address the market failure(s) concerned

7.943 Our proposal to identify this retail market as one in which ex ante regulation may be warranted follows on from two previous market reviews – the 2003/4 Review and the 2007/8 Review – which both concluded that competition was ineffective and that SMP remedies were necessary to address the competition problems identified. As set out in our SMP assessment, even in the presence of SMP remedies at the wholesale level, we continue to consider BT has SMP in this market. This is based, in particular, on its very large market share of 84% which, in and of itself, gives rise to a presumption of dominance.

7.944 We consider that in the absence of SMP remedies in this market, BT would have the ability and incentive to:

- engage in price and non-price discriminatory practices (for example against customers that are unlikely to switch to alternative products or suppliers, or to

[996] This is consistent with the approach taken in the EC's Explanatory Note in relation to the application of this second criterion. See, in particular, Section 2.2(ii) where it states: "[t]he tendency towards effective competition does not necessarily imply that the market will reach the status of effective competition within the period of review. It simply means that there is clear evidence of dynamics in the market within the period of review which indicates that the status of effective competition will be reached in the longer-run without ex ante regulation in the market concerned."

[997] Digital Private Circuit Network.

aggressively target price cuts where BT does face competition, seeking to disincentivise expansion of rivals);

- cease to provide legacy services prematurely (such as analogue services) in order to migrate customers to more profitable services; and

- charge excessive prices to end-users to the detriment of those end-users and also with the effect of distorting the choice and encouraging inefficient migration to less suitable services.

7.945 We do not consider competition law alone would adequately address BT's ability and incentive to engage in these practices. We note, in this respect, that both the competition problems set out above and our view that relying in competition law alone would be inadequate reflect the conclusions reached in the 2007/8 Review.

7.946 We consider ex ante regulation would be more effective than reliance on competition law in guaranteeing a timely and effective response in addressing the risk of BT engaging in the practices set out above, in particular for the following reasons:

- the difficulties in the detection and proof of these practices – e.g. in the assessment of excessive pricing scenarios. In this respect, we consider the compliance requirements of an intervention to redress potentially anti-competitive practices would be excessive involving lengthy and data-intensive investigation in relation to each occasion on which such practices are alleged to have taken place;

- the need for timely, efficient and potentially frequent intervention to avoid adverse effects on consumers;

- ex ante regulation would provide clarity to both BT and to the market with regard to the types of practices which would be regarded as compliant and non-compliant which can be achieved through appropriately drafted SMP remedies and, given their intended clarity and transparency, would be less costly to enforce in the event that enforcement was deemed necessary; and

- ex ante regulation allows for the imposition of specific SMP remedies to address the competition problems identified and for the subsequent monitoring of those remedies – e.g. we are also proposing the requirement to publish a reference offer, to not unduly discriminate and to publish quality of service information.

Wholesale market for TI regional trunk segments in the UK

We consider there are high structural barriers to entry in this market

7.947 As set out in our SMP assessment, high structural barriers to entry in this market arise from the sunk costs in the form of very high investments required in order to build:

- network to points in the BT network where symmetric broadband origination can be aggregated and handed over; and

- interconnection and associated infrastructure at those points to enable the handover.

7.948 These sunk costs are exacerbated by two related factors:

- the lower potential for realising economies of scale since the traffic that can be aggregated will be limited to the demand supplied by the relevant regional trunk route. This means, as explained in Section 6, regional trunk segments share similar characteristics to terminating segments and consequently we consider CPs are unlikely to be able to aggregate a sufficient amount of traffic to operate as efficiently as BT on most regional TI trunk routes. Thus, we consider they are unlikely to be able to justify investment in this market in many cases; and

- the use of retail TI leased lines, which make use of regional trunk, are in long term decline, which has the effect of further reducing the commercial incentive to invest in entry in this market.

7.949 Additionally, there are switching costs, which add to the barriers to entry and expansion. A change in regional trunk segment provider can incur significant costs associated with work to re-route circuits to a different point of handover and the provision of additional point of handover capacity - such changes would also involve service disruption for the downstream end-user of the leased line or a temporary cost of running two services. In a growing market, switching costs of this type are less likely to affect the competitive process because new entrants could compete for new customers who would not face switching costs because they did not have existing supply to switch from. However, this market is in long-term decline and any competition is likely to focus on existing circuits rather than new ones - consequently we consider switching costs are likely to present a significant barrier to entry.

We consider the structure of this market does not tend towards effective competition within the relevant time horizon

7.950 We do not consider there is clear evidence of dynamics in this wholesale market which would indicate it will reach the status of effective competition, either over the course of the review period of three years or indeed in the longer term, without ex ante regulation being imposed in this market.[998]

7.951 In this respect we note the EC's Explanatory Note which states that, "In a number of other Member States, the NRA has found the market for trunk segments of leased lines to be effectively competitive as a number of parallel networks have been established." However, as set out in our SMP assessment, we propose that BT has SMP in this market as a result of, amongst other things, the absence of such parallel networks. [999] Nor do we consider this trend will change over the course of the review period of three years. The retail leased lines markets which make use of regional trunk segments are in long term decline. Consequently, we consider OCPs are unlikely to have either the ability or the incentive to expand to a scale where they can operate as efficiently as BT. Although the declining nature of this market means that existing suppliers may have spare network capacity, for the reasons set out above in our assessment of the first criterion and in our SMP assessment, such capacity may not be usable to supply a regional trunk segment in the required location.[1000]

[998] This is consistent with the approach taken in the EC's Explanatory Note in relation to the application of this second criterion.

[999] Furthermore, as discussed in Section 6 and in our SMP assessment, regional trunk segments are often more akin to terminating segments than long-distance trunk routes.

[1000] This takes into account the EC's Explanatory Note which states, in its assessment of the second criterion, that "there may also be excess capacity in a market that would allow rival firms to expand output very rapidly in response to any price increase, provided that there are no barriers to expansion behind the barriers to entry."

7.952 In light of the above, and taking into account also the following, we do not consider the structure of the market will tend towards effective competition due to:

- the presence of switching costs;
- the sunk costs that OCPs must incur to expand their regional trunk capability;
- submissions from stakeholders that they do not have plans to expand their regional TI trunk coverage over the course of the review period of three years; and
- the advantages that BT gains from its ubiquitous network, including economies of scale and scope.

We consider competition law alone would be inadequate to address the market failure(s) concerned

7.953 We consider that in the absence of SMP remedies in this wholesale market, BT would have the ability and incentive to engage in anti-competitive practices, in particular:

- engaging in price and non-price discriminatory practices in the supply of regional TI trunk services to OCPs; and
- charging excessive prices to OCPs.

7.954 We consider these practices would have an adverse effect on the development of competition in the wholesale and retail TI leased lines markets, ultimately to the detriment of consumers.

7.955 In this respect we note again the EC's Explanatory Note which states that:

> "a significant number of routes may continue to be served only by a single operator in particular where the route is thin. This will vary within and between Member States but often new entrants cannot be expected to compete with the established operator across the whole of the territory, individual NRAs may be in a position to demonstrate that trunk segments of leased lines continue to fulfil the three criteria and are susceptible to ex ante regulation. Whilst it might be considered that competition law can address the failure on such thin routes, *it is unrealistic to rely solely on competition law for as long as the number of unduplicated routes in a country remains high, considering the general costing and pricing principles that would have to be applied throughout the network*" (emphasis added).[1001]

7.956 We consider ex ante regulation would be more effective than reliance on competition law in guaranteeing a timely and effective response in addressing the risk of BT engaging in potentially anti-competitive practices, in particular for the following reasons:

- the difficulties in the detection and proof of these practices – e.g. in the assessment of excessive pricing scenarios. In this respect, we consider the

[1001] See section 4.2.3.

compliance requirements of an intervention to redress potentially anti-competitive practices would be excessive involving lengthy and data-intensive investigation in relation to each occasion on which such practices are alleged to have taken place. We consider this can be avoided by the proposed imposition of price controls in this wholesale market;

- the need for timely, efficient and potentially frequent intervention to avoid adverse effects on the development of competition in this market;

- ex ante regulation would provide clarity to both BT and to the market with regard to the types of practices which would be regarded as compliant and non-compliant which can be achieved through appropriately drafted SMP remedies and, given their intended clarity and transparency, would be less costly to enforce in the event that enforcement was deemed necessary; and

- ex ante regulation allows for the imposition of specific SMP remedies to address the competition problems identified and for the subsequent monitoring of those remedies – e.g. we are also proposing the requirement to publish a reference offer, to not unduly discriminate and to publish quality of service information.

Retail market for low bandwidth TI leased lines in the Hull area

We consider there are high structural barriers to entry in this market

7.957 We consider that the sustained absence of retail competition indicates there are high and non-transitory barriers to entry.

7.958 The discussion above, in our assessment of the first criterion, of entry barriers in relation to the retail very low bandwidth TI market excluding the Hull area applies equally to this market.

7.959 In addition, some of OCPs' share of low bandwidth TI retail services in the Hull area is accounted for by cross-border circuits provided to customers with a national footprint of sites which includes some sites located in Hull. Our analysis of the retail low bandwidth TI circuits sold by KCOM to OCPs suggests that the majority of circuits sold span the Hull border. Therefore it is not clear to what extent OCPs compete to sell to customers whose connectivity requirements are entirely within the Hull area. We consider that the small and shrinking market is likely to mean that incentives for OCPs' to compete in this market are limited, as OCPs will face a high cost in developing business in the Hull area relative to available revenues.

7.960 We also refer to our SMP assessment in this market which also sets out the high structural barriers to entry we consider exist in this market.

We consider the structure of this market does not tend towards effective competition within the relevant time horizon

7.961 We do not consider there is clear evidence of dynamics in this retail market which would indicate it will reach the status of effective competition, either over the course of the review period of three years or indeed in the longer term, without ex ante regulation being imposed in this market.[1002]

[1002] This is consistent with the approach taken in the EC's Explanatory Note in relation to the application of this second criterion.

7.962 Our current market share estimate of 87% shows an increase from our estimate in the 2003/4 Review of 76%, suggesting that KCOM's market share is both high and stable over time.[1003] As set out in our SMP assessment, we do not consider this will change substantially over the course of the review period of three years. This is supported by the fact that previous wholesale remedies that have existed since the 2003/4 Review have not served to reduce KCOM's market share significantly.

7.963 The discussion above, in our assessment of the second criterion, in relation to the retail low bandwidth TI market excluding the Hull area applies equally to this market.

7.964 In addition, we note that the market is of a small size, which we consider further reduces the incentive for new entry over the duration of this review.

7.965 Finally, we refer to our SMP assessment in this market which, in our view, shows the structure of this market does not tend towards effective competition.

We consider competition law alone would be inadequate to address the market failure(s) concerned

7.966 We consider that even with ex ante regulation imposed at the wholesale level, in the absence of ex ante regulation in this retail market KCOM would have the ability and incentive to:

- engage in price and non-price practices that are unduly discriminatory;
- cease to provide some legacy services in the retail market (such as analogue leased lines) prematurely, in order force customers to migrate to newer and more profitable services; and
- charge consumers excessive prices.

7.967 Given the weakness of retail competition, excessive pricing is a particular concern. Comparing retail price levels in Hull with the rest of the UK is not easy or practical because leased lines are often only an input into a variety of downstream retail services such as VPNs. However, having compared KCOM's wholesale prices with a suitable benchmark of BT's prices we consider that some of KCOM's wholesale prices and by inference some of its retail prices are noticeably out of line with prices elsewhere in the UK. Given this we do not consider that reliance on competition law is sufficient to address our concerns about excessive pricing.[1004]

7.968 We consider ex ante regulation would be more effective than reliance on competition law in guaranteeing a timely and effective response in addressing the risk of KCOM engaging in these practices, in particular for the following reasons:

- ex ante regulation allows for the imposition of specific SMP remedies to address the competition problems identified and for the subsequent monitoring of those remedies – e.g. to address the risk of excessive pricing we consider it necessary to require KCOM to publish its maximum retail prices to provide transparency about KCOMs charges to enable us or others to assess whether these charges

[1003] As discussed in Section 7, we now consider that our estimates of market shares in the 2007/8 Review, where KCOM was found to have a market share of 25%, were inaccurate, as a significant number of circuits were missing from KCOM's submission.

[1004] As discussed in Section 15, we have accepted a voluntary undertaking from KCOM in relation to its wholesale charges.

are fair and reasonable. We are also proposing the requirement to supply retail leased lines, to not unduly discriminate and to publish a reference offer; and

- ex ante regulation would provide clarity to both KCOM and to the market with regard to the types of practices which would be regarded as compliant and non-compliant which can be achieved through appropriately drafted SMP remedies and, given their intended clarity and transparency, would be less costly to enforce in the event that enforcement was deemed necessary.

7.969 We also consider that there are specific characteristics about this market that requires the implementation of *ex ante* regulation. End-users often require a variety of leased lines services with a range of bandwidth and technical interfaces. In light of KCOM's SMP in this market and the evolution of technology, there is a risk that KCOM may not take end-users needs into account to a sufficient extent in making decisions about whether to discontinue provision of legacy products and/or to launch new ones.

7.970 Furthermore, as discussed in the SMP assessment, KCOM's rivals often purchase its retail products instead of its wholesale products, which means that the distinction between the retail and wholesale is less clear than in larger geographic areas. Therefore, in the absence of *ex ante* regulation KCOM could still be in a position to engage in price and non-price discrimination against its rivals in the Hull area.

7.971 Lastly, absent ex-ante regulation, retail prices for business products are not likely to be very transparent, making it more difficult to detect undue discrimination or other anti-competitive practices.

Retail market for low bandwidth AI leased lines in the Hull area

We consider there are high structural barriers to entry in this market

7.972 The discussion above, in our assessment of the first criterion, of entry barriers in relation to the retail low bandwidth TI market excluding the Hull area applies equally to this market. The distinguishing factor is that, in contrast to low bandwidth TI services, the low bandwidth AI market is growing. Nevertheless we consider, given the small size of the Hull market, that the potential for growth is not sufficient enough to mitigate the existence of the high structural barriers to entry.[1005] In this respect, we refer to our SMP assessment in this market which also sets out the high structural barriers to entry we consider exist in this market.

We consider the structure of this market does not tend towards effective competition within the relevant time horizon

7.973 We do not consider there is clear evidence of dynamics in this retail market which would indicate it will reach the status of effective competition, either over the course of the review period of three years or indeed in the longer term, without ex ante regulation being imposed in this market.[1006]

[1005] As with TI services, some of OCPs' share of the retail low bandwidth AI services in the Hull area is accounted for by cross-border circuits provided to customers with a national footprint of sites which includes some sites located in Hull. It is not clear to what extent OCPs compete to sell to customers whose connectivity requirements are entirely within the Hull area.

[1006] This is consistent with the approach taken in the EC's Explanatory Note in relation to the application of this second criterion.

7.974 The discussion above, in our assessment of the second criterion, in relation to the retail low bandwidth TI market excluding Hull applies equally to this market. Again, the distinguishing factor is that this market is growing. However, our market share estimate for KCOM is no lower than 75% and possibly over 90%, with our lower bound estimate in and itself giving rise to a presumption of dominance.

7.975 Secondly, as set out in our SMP assessment, whilst we consider this is a growing market and we note that MS3 has recently rolled out network in parts of Hull, given KCOM's market share and the advantages it derives from being the incumbent operator, we do not consider there is evidence of dynamics in this retail market which would indicate it will reach the status of effective competition over the next three years, without ex ante regulation being imposed.

We consider competition law alone would be inadequate to address the market failure(s) concerned

7.976 We consider that even with ex ante regulation imposed at the wholesale level, in the absence of ex ante regulation in this retail market KCOM would have the ability and incentive to:

- engage in price and non-price practices that are unduly discriminatory; and
- charge consumers excessive prices in comparison with national UK prices.

7.977 Given the weakness of retail competition, excessive pricing is a particular concern. Comparing retail price levels in Hull with the rest of the UK is not easy or practical for two reasons. Firstly, BT has had no retail pricing obligations except for TI leased lines at 8Mbit/s and below. Secondly leased lines are often only an input into a variety of downstream retail services such as VPNs. However, having compared KCOM's wholesale prices with a suitable benchmark of BT's prices we consider that some of KCOM's wholesale prices and by inference some of its retail prices are noticeably out of line with prices elsewhere in the UK. Given this we do not consider that reliance on competition law is sufficient to address our concerns about excessive pricing.[1007]

7.978 We consider ex ante regulation would be more effective than competition law in guaranteeing a timely and effective response in addressing the risk of KCOM engaging in these practices, in particular for the following reasons:

- ex ante regulation allows for the imposition of specific SMP remedies to address the competition problems identified and for the subsequent monitoring of those remedies – e.g. to address the risk of excessive pricing we consider it necessary to require KCOM to publish its maximum retail prices to provide transparency about KCOMs charges to enable us or others to assess whether these charges are fair and reasonable. We are also proposing the requirement to supply retail AI leased lines, to not unduly discriminate and to publish a reference offer; and
- ex ante regulation would provide clarity to both KCOM and to the market with regard to the types of practices which would be regarded as compliant and non-compliant which can be achieved through appropriately drafted SMP remedies and, given their intended clarity and transparency, would be less costly to enforce in the event that enforcement was deemed necessary.

[1007] As discussed in Section 15, we have accepted a voluntary undertaking from KCOM in relation to its wholesale charges.

7.979 Furthermore, as discussed in the SMP assessment, KCOM's rivals often purchase its retail products instead of its wholesale products, which means that the distinction between the retail and wholesale is less clear than in larger geographic areas. Therefore, in the absence of *ex ante* regulation KCOM could still be in a position to engage in price and non-price discrimination against its rivals in the Hull area. We also note that retail prices for business products are unlikely to be very transparent, making it difficult to detect undue discrimination or other anti-competitive practices.

Conclusions

7.980 Taking into account all of the above, we consider we have shown how, in our view, the three criteria are cumulatively satisfied for each of the following markets:

- the retail market for very low bandwidth TI leased lines in the UK excluding the Hull area;
- the wholesale market for TI regional trunk segments in the UK;
- the retail market for low bandwidth TI leased lines in the Hull area; and
- the retail market for low bandwidth AI leased lines in the Hull area.