Annex A

Market definition

A.1 In this Annex, the Director describes his approach to market definition in this review and puts it in the wider context of broadband market reviews. He describes how he has reached the conclusion that symmetric and asymmetric broadband products and services are in separate markets. Then the Director focuses on the symmetric broadband markets and identifies the various relevant markets that cover symmetric broadband products and services both at the retail and at the wholesale level (see the remainder of this Annex, together with Chapter 2, for a detailed discussion of the services these definitions encompass).

Market definition

A.2 There are two dimensions to the definition of a relevant market: the relevant products to be included in the same market and the geographic extent of the market. Oftel's approach to market definition follows that used by UK competition authorities (see Office of Fair Trading Market Definition Guideline, OFT 403, March 1999, which is in line with those used by European and US competition authorities and can be found at: www.oft.gov.uk/html/compact/technical_guidelines/oft403.html). The market definition analysis looks first at the retail markets and subsequently at the wholesale markets.

Conducting a product market definition

A.3 Market boundaries are determined by identifying constraints on the price-setting behaviour of firms. There are two main competitive constraints to consider: how far it is possible for customers to substitute other services for those in question (demand-side substitution); and how far suppliers could switch, or increase, production to supply the relevant products or services (supply-side substitution) following a price increase.

A.4 The concept of the 'hypothetical monopolist test' is a useful tool to identify close demand-side and supply-side substitutes. A product is considered to constitute a separate market if a hypothetical monopoly supplier could impose a small but significant, non-transitory price increase (SSNIP) above the competitive level without losing sales to such a degree as to make this unprofitable. If such a price rise would be unprofitable, because consumers would switch to other products, or because suppliers of other products would begin to compete with the monopolist, then the market definition should be expanded to include the substitute products.

A.5 The Commission states in paragraph 42 of its Guidelines that in principle, the “hypothetical monopolist test” is relevant only with regard to products or services, the price of which is freely determined and not subject to regulation. Thus, the working assumption will be that current prevailing prices are set at competitive levels. If, however, a service or product is offered at regulated, cost-based price, then such price is presumed, in absence of indications to the contrary, to be set at what would otherwise be a competitive level and should therefore be taken as the starting point for applying the hypothetical monopolist test.

A.6 In order to apply the hypothetical monopolist test, the Director has therefore also attempted to identify prices at the competitive level, or reasonable proxies for such prices.

A.7 Throughout this consultation document, markets will be defined first on the demand side. The analysis of demand-side substitution will be undertaken by considering if other retail services could be considered as substitutes by consumers, in the event of the hypothetical monopolist introducing a SSNIP above the competitive level.

A.8 Supply-side substitution possibilities will then be assessed to consider whether they provide any additional constraints on the pricing behaviour of the hypothetical monopolist which have not been captured in the demand-side analysis. In this assessment, supply-side substitution will be considered as a low cost form of entry which could take place within a relatively short period of time (the OFT Guidelines on Market Definition, OFT 403, March 1999, consider the relatively short period to be within a year). That is, for supply-side substitution to be relevant, there would need to be additional competitive constraints arising from entry into the supply of the service in question, from suppliers who are able to enter quickly and at low cost, by virtue of their existing position in the supply of other services.

A.9 There might be suppliers who provide other services but who might also be materially present in the provision of demand-side substitutes to the service for which the hypothetical monopolist has raised its price. However, such suppliers are not relevant to supply-side substitution since they supply services already identified as demand-side substitutes. As such their entry has already been taken into account and so supply-side substitution cannot provide an additional competitive constraint on the hypothetical monopolist. However, the impact of expansion by such suppliers can be taken into account in the assessment of market power.

A.10 A third factor that is sometimes considered is whether common pricing constraints exist across customers, services or areas such that they should be included within the same relevant market even if demand- and supply-side substitution are not present.

A.11 In defining a relevant market, it is usual to begin with a fairly narrow view and then expand that market to include the relevant substitutes. The Director has set out in Chapter 2 the order in which he is conducting the definition of the various leased lines markets, the assessment of SMP in those markets, and the assessment of the regulation appropriate to each market in which there is SMP.

A.12 This consultation document will define the relevant markets both at the retail and the wholesale level. Consideration of the relevant retail markets logically precedes the analysis of the wholesale markets, since the demand for wholesale services is derived from the demand for retail services.

A.13 One objective of this analysis is to assess whether a provider has SMP in a wholesale market and to identify appropriate remedies in that market to counter the existence of market power. Given this objective, it is necessary for the definition of retail markets to be undertaken on the basis of an assumption of no regulation of the wholesale services being considered.

A.14 To do otherwise would mean that the wholesale market power assessment would depend on a retail market definition that relied on a wholesale remedy arising from the finding of wholesale market power. This would be a circular and incorrect approach to market definition. Therefore, the demand-side and supply-side substitution possibilities at the retail level will be considered only if they are viable in the absence of regulated wholesale inputs.

A.15 The second objective of this analysis is to identify relevant retail markets, and given any proposed wholesale remedies, assess whether any communications provider has SMP in them, and whether the imposition of any regulation is appropriate.

Conducting a geographic market definition

A.16 The geographic boundaries of the relevant market, like those of the product market, are defined by identifying all relevant competitive constraints. This is done firstly by the application of the hypothetical monopolist test. In his analysis the Director has therefore considered whether a price increase by a hypothetical monopolist in a narrowly defined area would encourage communications providers outside the area to begin to offer services to customers in the area, and whether customers could switch to suppliers located outside the area. If supply and/or demand-side substitution are feasible then it is appropriate to expand the geographic market boundary. Secondly, broadening of the geographic market would be appropriate where a common constraint applied to prices in different areas. Thirdly, considerations of feasibility and practicality need to be taken into account.

A.17 This chapter outlines the analysis used by the Director to conclude that it is appropriate to consider two broad market groupings, namely: (1) the UK excluding Hull; and, (2) the Hull area.

A.18 Although within the UK market, there may be local characteristics to competitive conditions the Director has chosen to adopt the above (relatively broad) definitions. Firstly, in some cases it is not feasible to clearly identify the geographic boundaries of narrower markets, which may be highly localised.

A.19 Secondly, the sheer number of possible localised markets suggests that such an exercise is impractical. When considered along with the dynamic nature of telecommunications markets, it would likely mean that the boundary between areas where there are different competitive pressures would be unstable and change over time, rendering the market definition obsolete. It is not clear that determining ex ante where the boundary would be is an exercise that could be carried out with any degree of accuracy.

A.20 Because of the difficulties associated with defining separate geographic areas, there is a risk that inappropriate decisions would be made about the imposition or removal of regulations, which could be detrimental to consumers and competition. In any case, even if separate narrow local markets were to be defined it is likely that BT would continue to have SMP in many of these markets. Therefore, such a detailed approach is unlikely to add significant benefit to the regulatory outcome being proposed. Since the purpose of market definition is to aid the assessment of market power, combining markets where the old incumbents BT and Kingston, which have traditionally possessed market power, operate seems appropriate.

A.21 Nevertheless, the Director recognises that the broad UK geographic market is characterised, to some extent, by local characteristics including some variation in the degrees of competitive pressure. The Director believes that such variations in competition within the broad market of the UK, excluding Hull, are best taken into account when assessing the extent of market power and deciding on the appropriate regulation to impose, if any. For example, Chapter 8 discusses the Director's proposal to permit geographic variation in trunk segment prices that would allow BT to respond to local variations in the level of competition.

Products and services considered

Symmetric broadband origination and leased lines

A.22 This review covers leased line services at the retail level and corresponding services and products at the wholesale level.

A.23 A leased line is defined as a permanently connected link between two premises dedicated to the customer's exclusive use. The corresponding services

and products at the wholesale level are the wholesale inputs required to offer this dedicated transparent transmission capacity at the retail level. One feature of this type of dedicated transparent capacity is that it must offer symmetric services. These wholesale inputs must therefore be capable of providing symmetric services. There are two broad categories of leased lines services at the retail level: those offered using traditional interfaces (typically based on SDH or PDH) and those offered using alternative interfaces (typically based on Ethernet).

A.24 The wholesale inputs required to provide retail leased lines can also be used to provide other symmetric services at the retail level, namely symmetric broadband Internet access and other symmetric data services. Since all these retail services offer some type of broadband service at the retail level, the Director has decided to refer to the corresponding wholesale inputs as symmetric broadband origination and wholesale trunk segments.

Symmetric broadband origination services

A.25 Symmetric broadband origination services provide symmetric capacity from a customer's premises to an appropriate point of aggregation, generally referred to as a node, in the network hierarchy. The capacity is symmetric because traffic is carried at the same rate in both directions between the customer and the node. Although they are referred to as origination services, traffic is also terminated over these services. There are a number of existing and potential relevant services. The definition of the specific service sometimes varies, depending ultimately on what retail services it is being used to provide. Symmetric broadband origination services are characterised by the functionality that they offer, independently of the technologies used to deliver it.

A.26 There are two broad sub-categories of symmetric broadband origination, namely traditional interface symmetric broadband origination ("TISBO") services and alternative interface symmetric broadband origination ("AISBO") services. The key differences between these categories and sub-categories are explained in full in Chapter 1. A brief description of the symmetric broadband origination services that are covered by this market review follows.

Traditional interface symmetric broadband origination services

A.27 Symmetric broadband origination services may be contended or uncontended. Uncontended services provide dedicated capacity from one end of the service to the other, while contended services are shared by a number of services or customers, so that the transmit and receive path data rates vary depending on the level of usage.

Uncontended traditional interface symmetric broadband origination services

A.28 These services include, but are not limited to, the following:

- terminating segments forming all or part of partial private circuits (PPCs) when supplied by BT to another communications provider, and terminating segments (equivalent to those that BT would provide as part of a PPC) supplied by communications providers to themselves or to other communications providers;
- local loop unbundling (LLU) backhaul services; and
- radio base station (RBS) backhaul circuits.

Wholesale terminating segment services

A.29 A communications provider can purchase a complete end-to-end leased line from another communications provider where it does not have its own network available for providing service to a customer. Alternatively, if it is able to provide the leased line partly using its own network, it has the option of purchasing the remaining parts or segments of leased lines from another communications provider. Figure 1.1 in Chapter 1 illustrates how this works in practice. A communications provider may also be in a position to supply the entire leased line on its network, ie to self-supply the terminating segments.

A.30 BT supplies PPCs to other communications providers where they do not have sufficient network available for providing service to a customer. The length of the PPC supplied will depend on the amount of own network used by the communications provider. PPCs are provided at a range of bandwidths. In relation to the provision of wholesale symmetric broadband origination it is therefore necessary to consider whether separate markets exist at different bandwidths. This is discussed later in this Annex.

LLU backhaul services

A.31 LLU backhaul services are another type of symmetric broadband origination services. Such services are the link that is used to convey digital data between a communications provider's LLU co-location facility and one of its core network nodes. Backhaul is required to connect the end users' local loop traffic to the communications providers' core network for subsequent connection to the relevant service provider. This is illustrated in Figure 1.2 in Chapter 1.

RBS backhaul circuits

A.32 A further form of symmetric broadband origination services are RBS backhaul circuits. These provide transparent transmission capacity between a mobile communications provider's radio base station premises and that

communications provider's point of connection (POC) with the BT network. Figure 1.3 in Chapter 1 illustrates how it works.

Contended traditional interface symmetric broadband origination services

A.33 The Director is aware that during the period covered by this market review, other forms of symmetric broadband origination which are contended are likely to be introduced. At the moment it is possible to provide contended services using SDSL technology, and BT has conducted some product trials for such a service.

Alternative interface symmetric broadband origination services

A.34 As well as the traditional interface symmetric broadband origination ("TISBO") services discussed above, the Director has identified a separate range of symmetric broadband origination services that have particular distinguishing characteristics. The Director is referring to these as alternative interface symmetric broadband origination ("AISBO") services.

A.35 AISBO services can be identified by the following distinguishing features:

- they have a different (usually Ethernet IEEE 802.3) interface;
- they cannot, in general, be used to carry voice traffic;
- they can be used to carry many types of data; and
- they can generally only be used over short distances without re-amplification – currently, up to a range of approximately 25-35km from the source signal.

A.36 It is worth clarifying some of the ways in which the Director envisages wholesale AISBO services might be used.

A.37 Firstly, at the simplest level, the services might be used by a communications provider to provide end to end leased line services to retail customers whose sites are located close together (ie typically, no more than 25-35km apart). Such services might consist of one link between two sites or a network of links between a collection of sites. AISBO services are currently used to provide an alternative form of LLU backhaul.

A.38 Secondly, it might be possible for a communications provider to use these services to provide longer links by combining the wholesale AISBO service with its own network. The communications provider might choose to join the service to an Ethernet-based or an SDH-based network, and a variety of connection methods are possible.

WDM services

A.39 In responses to the first consultation, communications providers asked the Director to clarify the position of Wave Division Multiplexed (WDM) services. These are services that can be used to provide transmission of multiple

wavelengths of light over short or long distances using wave division multiplexers.

A.40 The Director explains later in this annex that he considers WDM services to constitute an upstream input into the TISBO and AISBO markets identified above. This annex sets out why this is the case and gives economic clarification of where WDM sits in relation to the other markets.

Broadband trunk conveyance services

A.41 Trunk conveyance services are wholesale services that provide trunk conveyance across the core transmission network. These conveyance services are often used to provide a link between origination services where a communications provider does not have available network to its nearest point of connection. Trunk conveyance services are used to provide a wide range of downstream retail services. At present these retail services are the same as those provided by means of symmetric broadband origination services. PPCs, LLU backhaul services and RBS backhaul circuits may in particular circumstances involve some trunk conveyance services as part of the overall service. At the moment there are no stand alone trunk conveyance services sold to third parties.

Markets identified

A.42 In summary, the Director has identified the following product markets in the UK excluding Kingston upon Hull:

- retail low bandwidth traditional interface leased lines (up to and including 8Mbit/s) – this includes analogue circuits of relevant bandwidths, and incorporates the minimum set of retail leased lines up to and including 2Mbit/s identified by the Commission;
- wholesale low bandwidth traditional interface symmetric broadband origination ("TISBO") (up to and including 8Mbit/s);
- wholesale high bandwidth traditional interface symmetric broadband origination ("TISBO") (above 8Mbit/s up to and including 155Mbit/s);
- wholesale very high bandwidth traditional interface symmetric broadband origination ("TISBO") (above 155Mbit/s);
- wholesale alternative interface symmetric broadband origination ("AISBO"); and
- wholesale trunk segments (note that this market extends to the whole of the UK).

A.43 Although the Director has considered retail traditional interface leased lines at bandwidths above 8Mbit/s and retail alternative interface leased lines during his analysis, he does not consider it necessary to formally identify (for the purposes of section 79 of the Act) retail markets covering such products as he

considers that regulation at the wholesale level is sufficient to meet regulatory objectives in these areas.

A.44 In addition, the Director has identified the following product markets in the Kingston upon Hull area:

- retail low bandwidth traditional interface leased lines (up to and including 8Mbit/s) – this incorporates the minimum set of retail leased lines up to and including 2Mbit/s identified by the Commission;
- wholesale low bandwidth traditional interface symmetric broadband origination ("TISBO") (up to and including 8Mbit/s);
- wholesale high bandwidth traditional interface symmetric broadband origination ("TISBO") (above 8Mbit/s up to and including 155Mbit/s); and
- wholesale alternative interface symmetric broadband origination ("AISBO").

A.45 Although the Director has considered retail traditional interface leased lines at bandwidths above 8Mbit/s and retail alternative interface leased lines during his analysis, he does not consider it necessary to formally identify (for the purposes of section 79 of the Act) retail markets covering such products as he considers that regulation at the wholesale level is sufficient to meet regulatory objectives in these areas.

Issues discussed in identifying markets

A.46 The Director sets out below how he has arrived at the above market definitions. The Director discusses the following issues in arriving at these definitions:

1. retail symmetric vs asymmetric services
2. retail leased lines vs other data services
3. retail traditional interface leased lines vs retail alternative interface leased lines
4. retail leased lines bandwidth distinctions
5. retail leased lines analogue vs digital circuits
6. retail leased lines geographic markets
7. retail leased lines – Hull area
8. wholesale trunk vs symmetric broadband origination
9. wholesale trunk bandwidth distinctions
10. wholesale trunk geographic considerations
11. definition of symmetric broadband origination product markets
12. TISBO bandwidth distinctions
13. AISBO bandwidth distinctions
14. Wave Division Multiplexed services
15. SBO geographic considerations.

Retail markets

A.47 The European Commission (EC) has identified the following retail market:

- minimum set of retail leased lines up to and including 2Mbit/s.

A.48 The relevant retail product and geographic markets for the UK are considered in turn by the Director below. As described in Chapter 2, market definition in the absence of regulation is considered first. The market boundaries are then re-examined in the presence of proposed wholesale regulation to see if the regulation has any impact on the nature of the retail markets.

Retail product markets in the absence of retail or wholesale regulation

Issue 1: Symmetric vs asymmetric – rationale for separate markets for retail leased lines and asymmetric broadband products and services

A. 49 To assess if asymmetric broadband products and services are in the same market as retail leased lines, the Director must examine to what extent asymmetric broadband services put a competitive constraint on the pricing of retail leased lines.

A.50 On the demand side, the Director is of the view that retail leased line customers do not consider the currently available asymmetric broadband services to be close substitutes for leased lines. This is because the asymmetric broadband services that are sold at present do not offer dedicated capacity. Even if uncontended asymmetric broadband services were to become available within the lifetime of this market review, potential substitutability would be restricted. This is because the overlap between these uncontended asymmetric broadband services and leased lines would be limited, in that an asymmetric service can only be used to offer a leased line at a speed up to the lower of the speeds in each direction (usually upstream).

A.51 These two considerations combined make it unlikely that a sufficient number of customers would switch to asymmetric broadband services if there was a small but significant, non-transitory increase in the price of retail leased lines. Therefore the Director considers that from a demand-side point of view, asymmetric broadband services do not put a competitive constraint on the pricing of retail leased lines.

A.52 On the supply side, existing suppliers of asymmetric broadband services could constrain the suppliers of symmetric broadband services if they would start supplying retail leased lines quickly and at low cost in response to a price increase. To carry out the supply-side substitution analysis, existing suppliers of asymmetric broadband services are put in two categories: those using LLU and those who do not use LLU.

A.53 Suppliers of asymmetric broadband services using LLU may be able to supply-side substitute into low-bandwidth retail leased lines by using SDSL in

combination with LLU. However, currently the number of LLU consumers is small and the LLU communications providers already supply retail leased lines. Therefore, the Director considers that supply side substitution by suppliers of asymmetric services relying on LLU does not create any, or a sufficiently material, competitive constraint to justify broadening the market definition.

A.54 Suppliers of asymmetric broadband services that do not use LLU might be ready to supply retail leased lines if they could have access to the wholesale symmetric inputs. However in absence of wholesale regulation, the requisite inputs would not be available and this type of substitution would not be not possible.

A.55 The Director has thus reached the conclusion that supply-side substitution does not arise in the absence of wholesale remedies.

A.56 The above demand-side and supply-side substitution analysis leads the Director to consider that asymmetric broadband services do not put a competitive constraint on the pricing of retail leased lines in the absence of wholesale regulation. Therefore retail leased lines and asymmetric broadband services are in separate markets.

Forward look

A.57 The Director has considered the likelihood of competitive or technical developments that might affect the markets identified during the period covered by this review. The Director's view is that there are no developments that would affect these market definitions within an 2-3 year period. However, the Director will keep market conditions under review.

Issue 2: Retail leased lines and other data services

A.58 The Director considers that retail leased lines constitute a separate market from other data services. The rationale for this split is outlined below.

A.59 As discussed in the consultation document *Review of Wholesale Broadband Access* (www.oftel.gov.uk/publications/eu_directives/2003/eu_wholesale_broadband/index.htm), the Director considers that asymmetric and symmetric services are in separate markets. However, the director also considers that leased lines are in a separate retail market to other (symmetric) data products, such as broadband Internet access and VPNs. The rationale for sub-dividing symmetric services into separate markets is explained below.

Demand side substitution

A.60 A leased line offers dedicated transparent transmission capacity between two points. It therefore provides a guaranteed bandwidth that is available 24/7, ie

it is not shared with other users (contended). A leased line is highly flexible in that the user can determine and manage what services are carried over it. It also offers a secure communication channel. Further, it is normal for leased lines to be supplied with high levels of customer care, such as quick response times 24 hours a day, and these are often supported with service level guarantees (SLGs). Leased lines therefore represent one of the most versatile and highest quality services available to retail consumers.

A.61 In comparison, other managed data products, such as VPNs and Internet access, are generally contended/shared at some point, and thus do not provide guaranteed bandwidth. Further, the end user has less flexibility, as there is more third party management. Also, these products are not usually provided with a high level of customer care as standard and although it is possible for consumers to purchase enhanced service levels on some products, it normally falls short of leased line service levels.

A.62 Due to the versatility of leased lines they can, in some instances, be used as inputs into other data services, however the reverse is not the case. The use of retail leased lines in the provision of other data services is discussed further under supply side substitution below.

A.63 Given the unique characteristics of a leased line it is considered that consumers who require a leased line are unlikely to switch to an alternative data service if a hypothetical monopolist were to increase the price of leased lines 5 to 10 per cent above the competitive level. The Director therefore believes that other symmetric data products are not demand-side substitutes for leased lines.

Supply side substitution

A.64 In order to assess what would happen in the absence of wholesale regulation, it is important to understand how the existing suppliers of other symmetric data products provision for these.

A.65 A number of the existing suppliers of other symmetric data products (such as managed data products) supply these products by buying retail leased lines. This means that, if a hypothetical monopolist were to increase the retail leased lines prices by 5 to 10 per cent above its competitive price, these suppliers would have to buy their input at prices 5 to 10 per cent higher. They would therefore not be in a position to impose a competitive constraint on the hypothetical monopolist.

A.66 Although competitive cable access networks already exist in the UK they are not considered suitable for providing leased lines. This is because cable networks in the UK are inherently asymmetric and it would be inefficient to use them to provide symmetric services, such as leased lines, and although it is possible to upgrade them, doing so would take considerable time and cost. In

addition, leased lines tend to be purchased predominantly by businesses whereas cable networks in the UK have been deployed mainly in residential areas.

A.67 Therefore in the absence of wholesale regulation existing suppliers of other symmetric data products/services would not be able to constrain the activities of a hypothetical leased line monopolist to the competitive level through supply side substitution.

Conclusion

A.68 The above supply-side and demand-side analysis leads the Director to conclude that retail leased line services and other symmetric data services are in separate markets.

Issue 3: Retail traditional interface leased lines vs retail alternative interface leased lines

A.69 Responses to the previous consultation submitted by alternative network communications providers suggested that the Director's market definitions for the leased lines markets were too narrow, in that they did not fully consider the role of alternatives to SDH-based (traditional interface) retail leased line products (and their wholesale equivalents, including symmetric broadband origination) such as BT's *KiloStream* and *MegaStream* ranges.

A.70 Specifically, it was suggested that Ethernet-based LES (alternative interface) leased lines should be included within the relevant markets in addition to the SDH-based services discussed in the previous consultation. The following sections discuss the Director's views on this issue.

Demand side substitutability

A.71 As discussed in Chapter 1, the term 'LES circuits' refers to a broad category of products supplied by means of Ethernet[2] over fibre. These circuits have some similarities with SDH-based leased lines as outlined in paragraph 3.28 of the previous consultation. The key characteristics in question are that they offer dedicated transparent transmission capacity between two points, providing guaranteed bandwidth that is available 24/7, and is uncontended (ie it is not shared with other users). However, the Director has identified a number of limitations to the degree of substitutability between LES and SDH circuits. These are discussed below.

[2] Other interfaces are also used in some instances. While Ethernet is currently the most widespread, others (eg Fibre Channel) may increase in importance over time.

End user applications

A.72 Ethernet and SDH are different ways of packaging data. The relative merits of the two vary according to the required end user application, for example:

- Ethernet-based services cannot readily be used to convey certain types of traffic, eg conventional voice (although it can support Voice Over IP), ISDN, Centrex or national virtual private networks (VPN), or for transferring data based on protocols other than Ethernet; and
- SDH-based services are not suitable for use in certain data applications such as storage area networks.

A.73 On a forward-looking basis, it has been suggested to the Director that it may be important to note that customers are increasingly moving to IP virtual private networks (IPVPN) as a substitute for ATM and Frame (over SDH). It could be argued that on this basis the importance of the first difference (Ethernet services not supporting conventional voice) will diminish over time. However, the Director's view is that the demand for IPVPN-type solutions is currently not sufficiently widespread to alter the market definition, and that this position is unlikely to change to a sufficient extent during the period of this review to warrant the finding of an alternative definition.

Distance constraints

A.74 The provision of LES circuits is constrained to relatively short distances in certain cases. For example, the retail LES circuits sold by BT are in many cases restricted to a maximum radial distance of 25km (or 35km in certain cases).

A.75 The Director's view is that this factor is unlikely to be as significant a consideration in assessing substitutability as the functionality differences identified above. For example, while a LES circuit delivered by means of a direct fibre connection is mainly limited in distance to a maximum of 25km, longer end-to-end circuits can be provided using LES based tails plus a core (SDH/other) network. Such circuits are central to the plans of the communications providers who have requested that BT provide a wholesale network access version of LES circuits, and they fall within the retail alternative interface market since in all respects other than distance constraints they resemble LES circuits delivered direct over fibre. Additionally, Ethernet-based circuits can be supplied over WDM technology (see below), in which case distance constraints do not apply.

A.76 Notwithstanding the above, given the distance restrictions that currently apply to a significant proportion of the LES circuits that are currently in supply and that will be supplied for the foreseeable future, this issue will restrict substitutability to some extent.

Availability

A.77 Standard SDH circuits offer 99.95% availability, whilst Genus SDH circuits offer 99.995% availability. Standard LES circuits offer a slightly lower level of availability than standard SDH circuits, 99.9%, although dual provision LES circuits offer the same availability as Genus SDH circuits, 99.995%. Given the closeness of these figures, the Director's view is that considerations of service availability are unlikely to be a key factor in the analysis.

Criteria for demand side substitutability

A.78 The differences in functionality (traffic type and range restrictions) outlined above represent a significant barrier to demand side substitution between LES and SDH-based products. In analysing this issue it is useful to consider three groups of consumers, namely:

(a) customers whose preferences are such that either a LES or SDH-based solution will meet their needs (eg they want a solution to carry data traffic that can be routed over SDH or LES);
(b) customers whose preferences are such that only an SDH-based solution will meet their needs – a LES solution will not (eg they want to transmit voice (and possibly also data) traffic; and
(c) customers whose preferences are such that only a LES solution will meet their needs – an SDH-based solution will not (eg needing a high level of accuracy regarding data transfer times).

A.79 Customers in groups (b) and (c) would never switch between LES and SDH-based products following a SSNIP and would therefore never view the two as close substitutes.

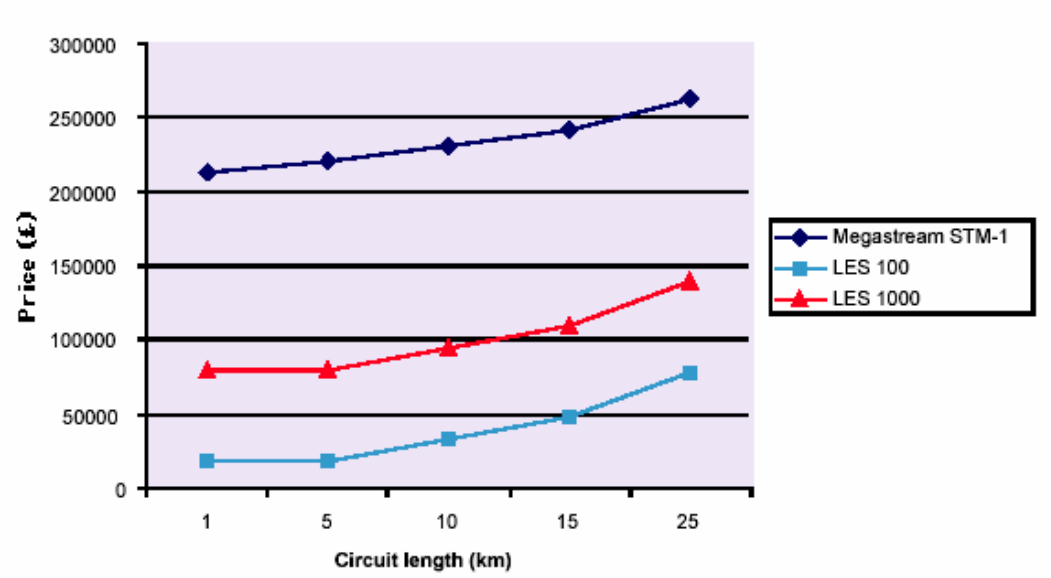
A.80 Some customers in group (a) might switch, depending on price and other considerations. The Director has considered attempting to assess the relative size of this group using survey evidence. However, he decided that such an exercise would be unlikely to be valuable or cost effective given the large number of end users that would need to be surveyed, and the technical nature of the required questions. The Director has therefore informed his analysis by means of a price comparison, as outlined below.

Price comparisons and conclusions on demand side substitutability

A.81 The extent to which demand-side substitution by group (a) would be likely to happen can be informed by a comparison of the retail prices of SDH-based and LES circuits. The alternative communications providers have supplied the Director with such a comparison, based on BT's published prices, which concludes that SDH-based circuits are considerably more expensive than LES circuits (see Figure A.1 below). In the light of these differences in price, it is

unlikely that the price of SDH-based circuits would constrain the price of LES circuits, since the preferences of any consumer whose technical requirements were satisfied by LES circuits would not be altered by a price increase of 5-10% to LES circuits, since these would remain considerably cheaper than the SDH-based alternative.

Figure A.1 – BT's SDH and LES based leased circuit prices compared



Source: Ovum
Assumes suitable fibre already exists at both ends
No CPE included

A.82 It does, however, seem possible that the price of LES circuits could constrain that of SDH-based circuits. If the prices of LES circuits were significantly below their SDH based equivalents, an increase in the price of SDH-based circuits might be expected to lead to customers switching away from SDH-based circuits. In view of the limitations of LES circuits described above, it is difficult to assess the proportion of consumers who would be likely to switch from SDH-based to LES circuits. In view of the similarities in functionality outlined above, it could be argued that at least a degree of substitution would occur.

A.83 An important caveat to this comparison is that the Director has no information to suggest that any of the prices in Figure A.1 above are cost orientated. However, the magnitude of the price differences shown above is such that it seems very unlikely that the conclusions of this comparison would be changed materially by the use of cost oriented prices. In other words, while it is not certain that a 1km Megastream STM-1 circuit costs something in the region of three times as much to deliver as a LES 1000 circuit of equal length, it seems clear that delivery of the STM-1 circuit is by some distance the more costly of the two.

A.84 However, the Director's view is that such substitution is unlikely to be widespread. This is because it is highly unlikely that a significant number of customers in group (a) would currently be using (or considering using) SDH-based solutions if their needs were met equally well by a LES solution, given the large price differential. While it is possible that there are consumers who have opted for SDH-based circuits because they were not aware of the availability and prices of LES circuits, the Director does not propose to rely on such an argument as LES circuits have been available for some time and he has received comments from various sources indicating that leased lines consumers are relatively well informed about the choices available. He is therefore of the view that SDH-based and LES circuits are not demand side substitutes. On a forward-looking basis the availability of LES-based circuits may increase, eg as distance restrictions become less important. However, the Director's view is that such a consideration is unlikely to be relevant within the timeframe of this review given that distance restrictions currently apply to the vast majority of LES-based circuits that have been sold.

Supply side substitutability

A.85 The Director has considered whether supply side substitutability at the retail level would lead to a widening of the existing market definition to include both SDH-based and LES circuits. Such supply side substitutability would exist if, in the absence of wholesale regulation, the suppliers of LES circuits were able to provide SDH-based circuits at low cost and within a relatively short period of time. However, since the majority, if not all, of the suppliers of LES circuits already supply SDH-based circuits (and vice versa), LES suppliers would not place any additional constraints on a hypothetical monopolist supplier of SDH-based circuits (and vice versa).

A.86 The Director's view is therefore that supply side substitution would not lead to a widening of the SDH market definition to include LES.

Conclusion on retail traditional interface leased lines vs retail alternative interface leased lines

A.87 As outlined above, the Director's view is that SDH-based (traditional interface) and Ethernet-based (alternative interface) circuits form distinct economic markets at the retail level. Nevertheless, as noted above, the Director does not consider it appropriate to identify retail markets for the purpose of section 79 of the Act, except in respect of traditional interface low bandwidth circuits.

Issue 4: Retail leased lines – bandwidth distinctions

A.88 The Director has considered the extent to which retail leased lines at different bandwidths are substitutes from an economic perspective. Given his

conclusion in paragraph A.84 above that there are separate economic markets for traditional and alternative interface retail circuits, it is necessary to assess the bandwidth distinctions for both markets.

Traditional interface retail leased lines

A.89 Traditional interface retail leased lines are currently available at a number of bandwidths, primarily:

- 64kbit/s and multiples thereof;
- 1Mbit/s;
- 2Mbit/s;
- 8Mbit/s;
- 34Mbit/s;
- 140 and 155Mbit/s; and
- 'very high' bandwidth, ie 622Mbit/s and higher

Demand-side substitution

A.90 Retail leased lines are sold to customers in order to provide broadband access capacity. Large amounts of bandwidth, ie higher bandwidth circuits or multiples of lower bandwidth circuits, are needed to serve high capacity requirements, for example linking headquarters or other major sites of large business users. On the demand side, the Director has investigated the extent to which traditional interface retail leased lines of different bandwidths (including multiples of lower bandwidth circuits) are substitutes for one another, ie whether there is a chain of substitution that links higher bandwidth leased lines to lower bandwidth leased lines and vice versa.

A.91 The question is whether a SSNIP by a hypothetical monopolist at a particular bandwidth would induce sufficient customers to switch to lower or higher bandwidth traditional interface circuits, so as to make that price increase unprofitable. The Director believes that there are breaks in the chain of substitution as follows:

- between 8Mbit/s and 34Mbit/s; and
- between 155Mbit/s and 622Mbit/s.

A.92 A description of the Director's reasoning is outlined below.

Functionality

A.93 In order to be demand-side substitutes, products must be substitutable from a functional perspective. The Director's view is that, in terms of pure functionality, multiples of low bandwidth circuits are in the majority of cases substitutes for circuits of higher bandwidth and vice versa.

A.94 One possible exception might be a break in a chain of substitution between 2Mbit/s and 34Mbit/s. This may be the case due to factors such as the fact that lower bandwidth traditional interface circuits can be provided over PDH technology, whereas higher (34Mbit/s and above) bandwidth traditional interface circuits are provided using SDH (or more recent) technology. Similarly, features such as the availability of end-to-end protection as a standard feature on higher bandwidth circuits but not on lower bandwidth circuits, may provide a barrier to demand-side substitution.

A.95 The Director is not entirely convinced by such arguments, however, since, for example, 2Mbit/s traditional interface circuits are now offered over SDH technology. He is therefore minded not to rely on these arguments as justification for the breakpoints in the chain of substitution, but is instead persuaded by other considerations, such as those discussed below.

Cost oriented prices

A.96 Substitutability in terms of functionality is necessary, but not *sufficient,* to demonstrate that two products are sufficiently close demand-side substitutes to be defined as being in the same market. That would require that a hypothetical monopolist was constrained not to set prices significantly above the competitive level. So, for example, the use of multiples of lower bandwidth traditional interface circuits must be economic for retail customers.

A.97 The Director has carried out an investigation of the likelihood of substitution of traditional interface leased lines of lower capacity by traditional interface leased lines of higher capacity and vice versa. For this exercise, cost oriented wholesale (service based PPC – see below for description) charges (with two local ends) have been assumed to be a reasonable proxy for retail prices at their competitive level. The reason is that competition at the retail level is expected over time to drive retail leased line prices in close relationship to their wholesale input prices.

A.98 The Director notes that this information source provides a lower bound proxy for competitive prices. It is a lower bound proxy because it possibly does not include the entire trunk-related costs and because it does not include other elements of retail pricing such as profit margin and retail costs. However, in this context the Director does not consider that this results in distortion of his analysis or conclusions, because the question considered here is the relativity of prices at different bandwidths and not their absolute level.

A.99 The Director has used this analysis to inform a number of issues relating to demand-side substitution.

Are Kilostream circuits at different bandwidths demand-side substitutes?

A.100 Table A.1 below shows the *service-based* PPC charges for all of BT's Kilostream products (taken from the Director's consultation on PPCs Phase 2, www.oftel.gov.uk/publications/broadband/leased_lines/ppc0902/ppc_ch1_2.htm). Under service-based charges, the recovery of equipment costs incurred up front is recovered over a period of time via rental charges. The PPC charges that were set by the Director in his PPCs Phase 2 Direction were calculated on a *capacity* basis, ie certain equipment costs were recovered via up-front charges. His opinion was that this cost recovery mechanism best reflected the principle of cost causation. However, service-based charges are useful for the exercise of comparing costs at different bandwidths, since the pricing structure is simpler it is consequently more straightforward to derive the costs of traditional interface circuits of different bandwidths.

Table A.1: Service-based cost oriented charges for Kilostream PPCs

	Connection fee per local end	Local end rental charge	Main link rental per km
64 kbps	£205	£427	£51
128 kbps	£341	£1,018	£8
192 kbps	£341	£1,073	£12
256 kbps	£454	£1,127	£16
320 kbps	£454	£1,182	£20
384 kbps	£454	£1,236	£25
448 kbps	£454	£1,291	£29
512 kbps	£454	£1,345	£33
576 kbps	£454	£1,400	£37
640 kbps	£454	£1,454	£41
704 kbps	£454	£1,509	£45
768 kbps	£454	£1,563	£49
832 kbps	£454	£1,618	£53
896 kbps	£454	£1,672	£57
960 kbps	£454	£1,727	£61

Source: *Consultation on a draft Direction to resolve a dispute concerning the provision of partial private circuits*, 10 September 2002.

A.101 The Director has considered the lowest cost circuit choice by end users with given bandwidth requirements, and has considered the extent to which these preferences are altered following the application of the SSNIP test. This analysis has informed his decision as to whether low bandwidth circuits at different bandwidths should be considered to be part of the same economic market. His analysis focused on marginal customers, specifically those making the decision whether to buy new circuits at a given bandwidth, rather than those

already renting circuits deciding whether to switch. This is because, in the latter case, relatively high up-front connection fees make it unlikely that a SSNIP would induce widespread switching among customers. With this in mind, the Director's analysis assumes the uniform application of a SSNIP of 10% to both connection and rental charges. His analysis has focused on comparing each individual pair of circuits within the list above (eg 640kbps, 704kbit/s and 896kbit/s; or 960kbit/s), over a range of bandwidth demands over which consumers are likely to purchase the circuits in question in preference to others at lower or higher bandwidth.

A.102 The Director has, using assumptions concerning average contract duration and circuit length, considered the extent to which the traditional interface circuit types in Table A.1 are likely to be demand-side substitutes. Such analysis, in the absence of information regarding, for example, the distribution of customers according to demand for bandwidth, cannot be completely definitive but remains a useful tool. The Director's analysis was carried out using the following two main steps for each pair of circuits:

- determine the most economic combination of circuits to satisfy a given bandwidth demand; and
- assess the extent to which this combination changes following a SSNIP to both the higher and lower bandwidth traditional interface circuit in each pair.

A.103 The base assumptions used by the Director in the comparison described above are (based on figures previously supplied by communications providers):

- an average circuit length of 40km; and
- converting connection fees into an annual charge by amortising them over three years.

A.104 The results of this analysis as described below are robust under a range of different assumptions. A possible exception relates to circuit lengths that exceed 50km, but the Director does not consider it likely that such circuits are sufficiently numerous or important to alter his conclusions. This is supported by the evidence on average PPC length that has been supplied to him.

A.105 The results of the Director's analysis (ie an examination of whether switching between higher and lower bandwidths is optimal, as outlined in paragraph A.90 above) in this case suggest that the demand-side characteristics of Kilostream products are such that they are best characterised as forming a single market due to the existence of a chain of substitution. This chain of substitution exists because of the wide range of bandwidths available at similar prices, which means that a price increase by a hypothetical monopolist at a particular bandwidth can be expected to induce customers to choose instead traditional interface circuits at other bandwidths (eg the next highest bandwidth).

Are 2Mbit/s traditional interface circuits and Kilostream circuits demand-side substitutes?

A.106 Table A.2 compares the cost oriented charges for BT's highest bandwidth Kilostream circuits with those for 2Mbit/s circuits (the Director's analysis has not considered 1Mbit/s circuits in detail due to these circuits being relatively new, meaning that reliable data concerning them has not yet been made available to the Director).

Table A.2: Service based cost oriented charges - Kilostream and 2Mbit/s PPCs compared

Circuit	Connection charge per local end	Connection charge per additional local end	Rental charge per local end	Main link rental per km	Main link fixed charge
960 kbps	£454	£0	£1,727	£61	£0
2048 kbps	£2,070	£631	£658	£139	£1,356

Source: *Consultation on a draft Direction to resolve a dispute concerning the provision of partial private circuits*, 10 September 2002.

A.107 New 8Mbit/s traditional interface circuits are no longer available (see below). It therefore follows that a large number of customers with bandwidth requirements in excess of 896kbit/s but below the level required to make the use of 34Mbit/s circuits economic will be to some extent reliant on (possibly multiples of) circuits at bandwidths around the 1-2Mbit/s level.

A.108 The Director has used the SSNIP test (as described above) to assess the extent to which 960kbit/s and 2Mbit/s traditional interface circuits may be demand-side substitutes.

A.109 The results of his analysis suggest that there is likely to be a significant proportion of customers for whom higher bandwidth Kilostream circuits and 2Mbit/s circuits are substitutes, and that the two should therefore be considered to be part of the same market.

A.110 This conclusion is to some extent reliant on the consideration of bandwidth demands in excess of 2Mbit/s. That is, the Director's analysis suggests that many consumers with bandwidth demands between 2Mbit/s and 3Mbit/s would be induced to switch. This is because the price differentials between a single 2Mbit/s traditional interface circuit and a single 960kbit/s circuit, and similarly the price differential between two 960kbit/s traditional interface circuits and a single 2Mbit/s traditional interface circuit, are sufficiently large that a SSNIP to either product would be unlikely to substantially influence consumers' choices between the two types of circuit. This assumption seems reasonable

since, as described below, a significant proportion of customers with capacity requirements in excess of 2Mbit/s would be unlikely to be in a position to use a 34Mbit/s circuit.

A.111 The assumptions concerning circuit length and amortisation period for connection fees used in this analysis are the same as those used in the comparison of the prices of Kilostream circuits at different bandwidths. Its results are similarly robust under a range of different assumptions regarding circuit length and amortisation period.

Are 2Mbit/s and 34Mbit/s traditional interface circuits demand-side substitutes?

A.112 2Mbit/s and 34Mbit/s traditional interface circuits differ substantially in terms of their cost and functionality. Table A.3 compares the cost oriented charges for 2Mbit/s circuits with those for 34Mbit/s circuits.

Table A.3: Service-based cost oriented charges - 2Mbit/s and 34Mbit/s PPCs compared

Circuit	Connection charge per local end	Connection charge per additional local end	Rental charge per local end	Main link rental per km	Main link fixed charge
2Mbit/s	£454	£0	£1,727	£61	£0
34Mbit/s	£2,070	£631	£658	£139	£1,356

Source: *Consultation on a draft Direction to resolve a dispute concerning the provision of partial private circuits*, 10 September 2002.

A.113 The Director's analysis suggests that, due primarily to the significant gap in bandwidth and price between 2Mbit/s and 34Mbit/s traditional interface circuits, the group of customers who would switch following a SSNIP is unlikely to be sufficiently large to make that price increase unprofitable. The Director's conclusion is that the two are therefore not sufficiently close demand-side substitutes to be defined in the same market.

Should 8Mbit/s traditional interface circuits be included in a low bandwidth or high bandwidth traditional interface market?

A.114 New 8Mbit/s traditional interface circuits are no longer offered by BT, or by other communications providers at either the retail or wholesale level. This is because:

- 8Mbit/s circuits cannot be supported by SDH networks and therefore have to be carried over PDH networks, which have, to some extent, been superseded; and

- manufacturers no longer supply 8Mbit/s PDH equipment required for the access network.

A.115 Despite the obsolescence described above, existing suppliers continue to earn revenue from a number of legacy 8Mbit/s traditional interface retail circuits. These circuits, for the purpose of market definition, are clearly not able to constrain the price of other circuits, since it is not possible for customers to purchase new 8Mbit/s circuits. The relevant question is therefore to consider which other traditional interface circuits constrain the prices of 8Mbit/s circuits. The Director was unable to fully replicate the type of analysis outlined above since cost based PPC charges have not been derived for 8Mbit/s circuits (since PPCs at this bandwidth are not available).

A.116 The analysis he was able to conduct suggested that, under certain circumstances, notably in London where retail 8Mbit/s traditional interface circuits are relatively inexpensive, 2Mbit/s traditional interface circuits are likely to constrain the price of 8Mbit/s circuits, whereas this is less likely in the case of 34Mbit/s. This is explained below.

A.117 BT's standard charges for retail 8Mbit/s traditional interface circuits are very expensive relative to PPC charges, ie the rental charge is more expensive than even that (including an amortised connection charge) for a single 34 Mbit/s symmetric broadband origination service, or four 2 Mbit/s symmetric broadband origination services. In this context, all customers with an 8Mbit/s circuit would, if offered the opportunity, switch to a symmetric broadband origination service, even without the 8Mbit/s charge being increased. This could be interpreted as suggesting that 8Mbit/s circuits might form a distinct economic market.

A.118 However, such a situation is not intuitively appealing. Given that the above comparison between retail prices for end-to-end traditional interface leased lines and service-based wholesale charges for traditional interface symmetric broadband origination is a simplified assumption, the Director has considered other approaches. With this in mind, the Director has analysed BT's London (020 7) retail charges for 8Mbit/s circuits (which are low relative to BT's national charges). Doing so avoids the possibility of reaching the non-meaningful conclusion that symmetric broadband origination 'dominates' 8Mbit/s retail circuits without a SSNIP.

A.119 The Director's analysis suggested that a relatively large group of customers would be likely to, following a SSNIP, switch from the use of a single 8Mbit/s traditional interface retail circuit for multiples of 2Mbit/s traditional interface symmetric broadband origination services. However, the likelihood of customers switching from the use of multiples of 8Mbit/s retail circuits to the use of 34Mbit/s symmetric broadband origination appears to be considerably smaller.

A.120 The Director therefore considers that the price of 8Mbit/s traditional interface circuits is likely to be constrained by the availability of 2Mbit/s traditional interface circuits, and not by that of 34Mbit/s traditional interface circuits, and that 8Mbit/s/ circuits should therefore be considered to be part of the low bandwidth market.

A.121 The assumptions concerning circuit length and amortisation period for connection fees used in this analysis are the same as those used in the comparison of the prices of Kilostream circuits at different bandwidths. Its results are similarly robust under a range of different assumptions.

Are 34/45 and 140/155Mbit/s traditional interface circuits demand-side substitutes?

A.122 The Director has carried out an analysis similar to that outlined above in the context of BT's Megastream circuit PPC charges. These are shown in the table below.

Table A.4: Service-based cost oriented charges – 34Mbit/s to 622Mbit/s

Circuit	Connection charge per local end	Connection charge per additional local end	Rental charge per local end	Main link rental per km	Main link fixed charge
2 Mbit/s	£2,070	£631	£658	£139	£1,356
34 Mbit/s	£3,514	£1,220	£8,521	£323	£12,058
45 Mbit/s	£3,514	£1,220	£17,810	£404	£0
140 Mbit/s	£7,174	£4,880	£40,963	£928	£0
155 Mbit/s	£7,174	£4,880	£40,963	£928	£0
622 Mbit/s	See text below				

Source: *Consultation on a draft Direction to resolve a dispute concerning the provision of partial private circuits*, 10 September 2002.

A.123 The Director's analysis has been analogous to that outlined from paragraph A.101. The range of available bandwidths, and range of prices, is considerably more varied for Megastream circuits than is the case for Kilostream circuits. This makes such analysis less straightforward. However, he has been able to reach the following conclusions, which appear to be robust to a range of assumptions regarding circuit length and contract duration:

- the likelihood of widespread switching between 2Mbit/s and 34Mbit/s traditional interface circuits following a SSNIP appears to be very small (as described above);
- following a SSNIP, the Director would expect widespread switching between 34Mbit/s and 45Mbit/s traditional interface circuits. This is

unsurprising given that the two are close together in terms of price and functionality;

- following a SSNIP, the Director would expect relatively widespread switching between 45Mbit/s and 140Mbit/s traditional interface circuits (or between 45Mbit/s and 155Mbit/s). This conclusion relies on a comparison between a comparison of a multiples of 45Mbit/s circuits being substitutes for two 140Mbit/s (155Mbit/s) circuits;
- following a SSNIP, the Director would expect very widespread switching between 140Mbit/s and 155Mbit/s traditional interface circuits. This is unsurprising given that the two are priced identically; and
- following a SSNIP, the Director would expect to see limited switching between 155Mbit/s and 622Mbit/s traditional interface circuits (as described in the next section).

A.124 The assumptions concerning circuit length and amortisation period for connection fees used in this analysis are the same as those used in the comparison of the prices of Kilostream circuits at different bandwidths. Its results are similarly robust under a range of different assumptions.

Is there a separate market for 'very high bandwidth' traditional interface circuits?

A.125 It has previously been suggested to the Director that 2.5GB/s circuits might form a distinct economic market, based on supply-side considerations. The Director disagrees with this view (see his discussion of supply-side substitution at the retail and wholesale levels below), but has considered whether a further split might be appropriate based on demand-side considerations. In particular, the Director has considered whether 622 Mbit/s and above traditional interface circuits might form a distinct economic market.

A.126 The significant bespoke element of pricing (which exists at both the wholesale and retail level) complicates any attempt to compare the service based PPC charges of 155 and 622 Mbit/s traditional interface circuits.

A.127 However, the Director's analysis, using various sets of assumptions (see below), suggests that there is a relatively narrow range of bandwidth demands within which a SSNIP would induce switching between 155Mbit/s and 622Mbit/s. This has led the Director to conclude that a break in the chain of substitution occurs here for retail traditional interface circuits.

A.128 The availability of cost oriented 622Mbit/s PPCs is a relatively new phenomenon, as indeed is the use of leased lines at very high bandwidths. This means that the Director has been obliged to make certain assumptions concerning the appropriate figures to use in his price comparison, since 622Mbit/s traditional interface circuits are to some extent priced on a per network hop basis, and have certain modularity in those aspects of prices that are charged on a per km basis. However, the Director is satisfied that, on balance,

the decision that the two are not demand-side substitutes is the most appropriate, and the one that holds over the widest range of plausible assumptions.

A.129 The assumptions concerning circuit length and amortisation period for connection fees used in this analysis are the same as those used in the comparison of the prices of Kilostream circuits at different bandwidths. Its results are similarly robust under a range of different assumptions.

Supply-side substitution

A.130 Demand-side factors suggest that the breakpoints in the chain of substitution between low and high bandwidth traditional interface circuits occurs between 8Mbit/s and 34Mbit/s circuits and above 155Mbit/s – otherwise all other traditional interface circuits are linked to those of higher and lower bandwidth by a chain of substitution. The key question in terms of supply-side substitution is therefore whether these breakpoints are removed by supply-side substitution - if so, the Director's market definition needs to be broadened accordingly.

A.131 The Director notes that suppliers of traditional interface leased lines generally supply circuits at a variety of bandwidths. The aggregation of current suppliers of low bandwidth traditional interface circuits – the hypothetical monopolist - therefore already includes all significant suppliers of high bandwidth traditional interface circuits, and vice versa. Switching on the supply side from one bandwidth to another would not therefore constitute new entry or an additional competitive constraint. Therefore, such suppliers are not relevant to supply-side substitution since they supply services already identified as demand-side substitutes.

A.132 In addition, in the absence of wholesale regulation, the Director considers that supply-side substitution of this type at the retail level is unlikely, because the costs of local access to a new site that would be incurred by a new entrant are significant and include sunk costs, such as digging and ducting. The absence of access to cost based wholesale inputs therefore means that other communications providers would not be able to quickly or cheaply commence the supply of these services to undermine the price increase of a hypothetical monopolist.

A.133 The Director therefore concludes that there is no supply-side substitution between high and low bandwidth traditional interface leased line markets.

Responses to previous consultation – bandwidth distinctions

A.134 Energis suggests in its response that there is little distinction between high and very high bandwidth services, particularly on a forward looking basis. It suggests that communications providers can use the cheaper SHDS (alternative

interface) circuits at higher (622Mbit/s) bandwidths, reducing or removing the price differential between 155Mbit/s and 622Mbit/s and placing the two bandwidths in the same market. Communications providers observe that customers do use multiples of 155Mbit/s circuits as substitutes for 622Mbit/s circuits. Going forward, Energis suggests that flexible bandwidth Ethernet and SHDS services will make a distinction between high and very high bandwidth unsustainable.

A.135 The Director has re-assessed the extent of the symmetric broadband origination market in the light of communications provider's responses (see above), concluding that SHDS based services are in a different market.

A.136 At the retail level, the Director considers that the most appropriate way to analyse LES-based SHDS circuits is in the context of an economic market that is distinct from those previously defined. This is carried out in Issue 3 above. In the light of his proposed treatment of LES based circuits, the Director remains of the view that the bandwidth split previously applied to SDH based circuits remains appropriate.

Conclusion on traditional interface bandwidth distinctions

A.137 Considerations of demand-side substitution have been key in the Director's market definition analysis. These have led him to conclude that there are the following retail traditional interface leased lines product markets:

- bandwidths up to and including 8Mbit/s;
- bandwidths from 34Mbit/s to 155Mbit/s inclusive; and
- bandwidths of 622Mbit/s and above.

Alternative interface retail leased lines

A.138 The Director has carried out a substitution analysis to determine whether the bandwidth distinctions identified in the traditional interface retail leased lines markets apply equally to the alternative interface retail leased lines market.

A.139 The costs of provision of LES-based circuits do not vary significantly by bandwidth. This is because the costs of duct and fibre, which are generally variant with bandwidth, form a very high proportion of the total cost of provision, even at higher bandwidths. This is supported by confidential information submitted by communications providers during the first consultation period. This information suggested that the one-off capital expenditure required to provide a retail product equivalent to BT's LES 1000 (1Gbit/s) product was less than 1% greater than that required to provide an equivalent to a 10Mbit/s product. It is therefore not appropriate to define distinct markets according to bandwidth, as has been done in other leased lines markets, because the higher bandwidth LES circuits do competitively constrain the prices of lower bandwidth LES circuits.

Conclusion on bandwidth distinctions for alternative interface retail leased lines

A.140 The Director has therefore concluded that in the retail alternative interface market there are no identifiable bandwidth distinctions, and that this therefore forms only one market.

Forward look

A.141 The Director has considered the likelihood of competitive or technical developments that might affect the markets identified during the period covered by this review. The Director's market definition has taken into account the anticipated technological advances highlighted in communications providers' responses, in order to ensure that the definition remains robust on a forward looking basis. The Director's view is that there are no further developments that would affect these market definitions within an 2-3 year period. However, the Director will keep market conditions under review.

Justification for inclusion of 8Mbit/s circuits in low bandwidth market against the requirements in the Commission's Recommendation

A.142 As noted above, the inclusion of 8Mbit/s circuits in the retail low bandwidth leased lines market has the effect of requiring the Director, in his assessment of the regulatory options for the retail market in Chapter 5, to conduct regulatory option appraisals of both the Commission's minimum set of retail leased lines up to and including 2Mbit/s, and 8Mbit/s retail leased lines. It also represents a departure from the Commission's Recommendation on markets, and as a consequence the Director is required to justify the departure specifically against the three criteria set out in the Recommendation, namely:

1. barriers to entry and the development of competition;
2. 'dynamic aspects' ie whether the market is dynamically moving towards effective competition with new entrants and increased innovation; and
3. the relative efficiency of competition law.

1. Barriers to entry and the development of competition

A.143 The provision of 8Mbit/s circuits is characterised by very high barriers to entry (sunk costs).

A.144 This is reflected by BT's high market share in low bandwidth circuits, which is in the region of 70% by revenue at the retail level (and in the region of 50% by revenue in the case of 8Mbit/s circuits alone).

A.145 As discussed in Chapter 6, in the interests of proportionality and the fact that the 8Mbit/s standard is becoming obsolete, the Director has not mandated the availability of cost based symmetric broadband origination/PPCs at this

bandwidth. This means that barriers to entry in the 8Mbit/s segment of the retail leased lines market will remain very high.

2. Dynamic aspects

A.146 Since no new 8Mbit/s circuits are being sold, this product is characterised by very high barriers to expansion since there are no new customers available over which alternative retail (or wholesale) providers will be able to compete with existing suppliers.

A.147 This is due to the technical obsolescence of the 8Mbit/s standard.

A.148 These factors, together with the barriers to entry alluded to above, mean that there is no prospect of competition developing in this segment of the low bandwidth market.

3. Relative efficiency of competition law

A.149 The relative efficiency of competition law is discussed in detail in Chapter 4.

Issue 5: Retail leased lines – analogue and digital distinction

Introduction

A.150 An important issue to be addressed as part of the retail low bandwidth leased lines market definition exercise is whether there are two distinct retail markets for analogue leased lines and for low bandwidth digital leased lines.

Product description

A.151 Analogue leased lines are provided using analogue technology, specifically analogue customer premises equipment. All analogue leased lines are capable of supporting direct voice transmission, and offer a 64kbit/s capacity for voice services.

A.152 Most are capable of supporting low speed data applications, at different capacities depending on the type of line and whether or not it goes through the core network. If it does, than the capacity offered for data transmission is about 50kbit/s. However, within the same exchange and in the 020 7 area, Baseband analogue leased lines can be used to carry up to 2Mbit/s using DSL technology. This is because Baseband analogue leased lines are an end-to-end copper connection (essentially two local loops joined together).

A.153 The table below shows how the volumes and revenues of low bandwidth leased lines offered by all communications providers (including BT) have evolved over the most recently available five years.

Table A.5: Low bandwidth (up to and including 8Mbit/s) leased lines volumes (000s) (not including Kingston)

	Analogue	Low bandwidth digital	Low bandwidth total
97/98	285	209	494
98/99	217	252	469
99/00	185	278	463
00/01	158	303	462
01/02	147	259	406

Source: Oftel Market Information

Table A.6: Low bandwidth (up to and including 8Mbit/s) leased lines revenues (£m) (not including Kingston)

	Analogue	Low bandwidth digital	Low bandwidth total
97/98	306	1076	1381
98/99	288	1231	1519
99/00	253	1343	1596
00/01	212	1420	1632
01/02	204	1503	1707

Source: Oftel Market Information.

A.154 It is important to bear in mind that the figures in Table A.5 refer to the number of leased lines, independently of their capacity. Analogue leased lines offer, on average, a lower capacity than digital low bandwidth leased lines (the capacity of which varies between 2.4kbit/s and 8Mbit/s). More detailed data for 00/01 and 00/02 indicate that about 30% of low bandwidth digital leased lines are 2Mbit/s, slightly over 40% are less than 64kbit/s, and slightly over 25% between 64 and 1984kbit/s.

A.155 Two further factors should be borne in mind when interpreting the figures. First, double counting occurs whenever a leased line is bought from BT by another communications provider and then re-sold as a leased line to an end user. This means that the same leased line can appear twice in the statistics, magnifying any trends. Provision and cessation of one such leased line would also be reflected twice. Second, communications providers have been able to migrate digital leased lines to PPCs since August 2001. Migration data submitted by BT as part of this leased line market review show that about 34,000 low bandwidth leased lines were migrated to PPCs by March 2002. This means that

a significant part of the reduction in the number of digital leased lines supplied by BT in 2001/02 reflects migration to PPCs and not cessation.

A.156 During the five-year period 1997-2002, numbers of analogue leased lines showed an overall decreasing trend, whereas numbers of digital leased lines increased overall. The revenue (volume) share of analogue leased lines for all low bandwidth leased lines has declined steadily from 22% to 12% (from 58% to 36%). The effect of double counting may be significant for analogue leased lines as well as for low bandwidth digital leased lines, since many communications providers reported in the course of the market review investigation that they supply analogue leased lines by simply reselling BT's, and that they buy a significant proportion of the required local access for low bandwidth digital leased lines from BT, either as a PPC or as a leased line. In total, however, the number of low bandwidth retail leased lines has fallen.

Buyer description

A.157 Analogue leased lines are used by large firms as well as by many small and medium enterprises. In large firms, analogue leased lines tend in the main to be legacy installations, although some customers have indicated to the Director that their continued use of analogue leased lines is driven by cost. City institutions, for example, form a large group of analogue leased line buyers. A niche group of analogue leased line customers are those that use Baseband analogue lines within the 020 7 zone or within the same exchange which enables them to achieve 2Mbit/s capacity for data transmission.

A.158 In addition, before August 2001, a large number of BT's retail leased lines were bought by other communications providers, either to re-sell in the retail leased lines market, or to provide other products and services in other retail markets. Since August 2001, this number has decreased as other communications providers have migrated to PPCs.

Supplier description

A.159 The suppliers of analogue leased lines are a subset of the suppliers of leased lines, including BT, some cable companies, and some other communications providers.

Market definition

A.160 To establish whether or not analogue and low bandwidth digital leased lines should be identified as separate markets, the hypothetical monopolist test is used to identify possible supply-side and demand-side substitutes. In the rest of this discussion, the words 'low bandwidth' in front of digital leased line shall be omitted, unless there is a risk of confusion.

A.161 In carrying out the supply-side and demand-side substitution analysis, it will be implicitly assumed that the focus will be on analogue and digital leased lines offering roughly the same capacity. In particular, the analysis will concentrate on lines of 56kbit/s because most of the analogue leased lines can only provide a maximum of 64kbit/s of data. In other words, most of the analogue leased lines are not of the Baseband type.

A.162 As described in Chapter 3 and the introduction of this annex, the market definition exercise will first be carried out in the absence of regulation at both the retail and the wholesale levels. Then, taking into account the proposed wholesale regulation, the market definition is carried out a second time in order to assess whether or not the retail market definition is affected by the wholesale regulation.

Demand-side substitution in the absence of regulation at either the wholesale or the retail level

A.163 Analogue leased lines and low bandwidth digital leased lines can only be considered as being part of the same market at the retail level if low bandwidth digital leased lines provide a competitive constraint on the pricing of analogue leased lines and/or vice versa. In addition to the price constraining effect between the two types of leased lines, the issues of functionality and switching costs have to be addressed.

Functionality

A.164 From a technical point of view, analogue and digital leased lines do not differ significantly for the following reasons:

- It is straightforward to adapt an analogue leased line to transmit digital information and to adapt a digital leased line to transmit analogue signals; and
- 64kbit/s digital leased lines and analogue leased lines are provided using the same PDH technology in the core network with the only real difference being the equipment at either end of the local end.

A.165 In terms of capacity, an analogue leased line offers 64kbit/s for voice transmission. For data transmission most types of analogue leased lines offer 40-50kbit/s or any multiple thereof (ie multiplying the number of analogue leased lines going through the core network). Digital leased lines may offer more or less than 64kbit/s. Among analogue leased lines the exception is Baseband circuits, which can be adapted with use of modems to provide digital leased lines with capacities of 64kbit/s to 2Mbit/s within the 020 7 area or within the same exchange.

A.166 If offered at the same price, a 64kbit/s digital leased line is viewed as offering a better deal than an analogue line because it offers more flexibility in

terms of voice and data usage. In other words, a digital line offers a higher quality of service than an analogue line. While a digital line guarantees 64kbit/s for data and can carry voice traffic if a digital phone is used, an analogue line guarantees voice but can only support speeds below 64kbit/s for data (typically 50 kbit/s), and needs a modem to do so. An exception is Baseband analogue lines that can be used to carry up to 2Mbit/s using SDSL technology.

Conclusion on functionality

A.167 Analogue leased lines (excluding Baseband lines) and 64kbit/s digital leased lines appear to be substitutes in terms of functionality, although the digital product offers a higher quality service than the analogue. A 64kbit/s digital leased line is required in order to offer voice services. A pair of Baseband-type analogue leased lines within the 020 7 area or within the same exchange offer similar functionality to a higher capacity digital leased line, up to 2Mbit/s.

Switching costs

A.168 In his analysis of demand-side substitution between circuits of different bandwidths, the Director considers it most appropriate for this market review to define the market on the basis of purchasers of new circuits. In doing so, the Director is guided by the forward-looking nature of the market analysis.

A.169 However, the Director notes that existing customers of analogue circuits face some costs of switching to digital leased lines, as set out below. Although not decisive to the Director's market definition, this feature is taken into account in his analysis of remedies (see Chapter 5).

A.170 If an end user wants to migrate its analogue leased lines to digital leased lines, its supplier will need to carry out engineering work (the most expensive part of the migration) and to install new network terminating equipment (NTE).

A.171 If an analogue leased line user decides to migrate to a digital leased line product keeping the same supplier, it will incur the following switching costs:

- changes to end user terminal equipment;
- a migration charge to cover the communications provider's migration costs, ie a (possibly reduced) connection fee; and
- a possible short break in the leased line service.

A.172 If an analogue leased line user decides to switch from analogue leased lines from one supplier to digital leased lines from a different supplier, it will incur the following switching costs:

- changes to end user terminal equipment;
- penalty for early termination of analogue leased line contract;

- connection fee to the new supplier; and
- a break in service.

Conclusion on switching

A.173 There are barriers to switching from analogue to digital (and vice versa) for existing end users which are not faced by purchasers of new circuits. The extent to which these barriers will prevent switching following a price increase will depend on the magnitude of the price increase, how long the price increase is expected to last, and the contract minimum period.

Hypothetical monopolist test

A.174 As part of the demand-side substitution analysis, the hypothetical monopolist test assesses whether or not a hypothetical monopolist can profitably raise the price 5 to 10% above its competitive level. The demand-side substitution analysis will look in turn at whether or not digital leased lines can constrain analogue leased lines.

A.175 The relativity of prices of analogue and digital leased lines at their competitive level can be derived by considering the underlying costs. This is because competitive level prices closely reflect costs. It cannot be expected that analogue costs are systematically lower than digital costs since many analogue and low bandwidth digital leased lines run on the same network using the same technology. For example, BT can use identical main links and local access ends to provide either a 64kbit/s digital leased line or, adding the appropriate modem equipment, a 56kbit/s analogue leased line.

The main link

A.176 When the circuit is longer than 15km, both main links are on the DPCN network and both local ends are provided on copper (BT provides local access on copper for digital leased lines with a capacity up to 256kbit/s). The cost of a 64kbit/s main link will thus be the same whether the circuit is analogue or digital.

Local access

A.177 The cost of the local access network will be the same or similar in both cases as both analogue and digital 64kbit/s leased lines can use one or two copper pairs. There will be a difference in the network terminating equipment (NTE) costs (with digital NTE more expensive than the analogue equivalent). However the costs of local access are significantly more than those for NTE, particularly where the local ends are long. The overall costs of the local ends will therefore be fairly similar in both cases, with the digital ends possibly costing 5 to 10% more. This example supports the conclusion that analogue leased line costs

cannot be viewed as significantly and systematically lower than digital leased line costs.

A.178 The above shows that there are no technical reasons why the costs of analogue leased lines should be systematically lower than the costs of digital leased lines. This leads the Director to conclude that prices of analogue leased lines at the competitive level will not be systematically lower than the competitive level price of digital leased lines.

Can digital leased lines constrain the price of analogue leased lines?

A.179 It will not be profitable for a hypothetical monopolist to raise the price of analogue leased lines 5 to 10% above the competitive level if enough end users switch away from analogue digital leased lines in response to a small but significant lasting price increase.

A.180 As noted above, the competitive price of analogue leased lines is not expected to be significantly lower than the competitive price of digital leased lines. It is therefore believed that the price of an analogue leased line after a 5 to 10% increase would be about the same as that of a digital leased line, if not higher. Because digital leased lines offer a higher quality than analogue leased lines, new end users would buy a digital leased line instead of an analogue leased line. Thus digital leased lines constrain the price of analogue leased lines and so both should be included in the same market.

Supply-side substitution in the absence of regulation at either the wholesale or the retail level

A.181 The supply-side substitution analysis identifies the extent to which existing suppliers of other products and services are likely to start producing the relevant products or services following a price increase and whether this would be sufficient to make the price increase unprofitable. Only entry within a relatively short period of time and without incurring significant costs is relevant for supply-side substitution considerations.

A.182 Analogue and low bandwidth digital leased lines are normally provided using the same technology in the core network, and often the same core network. The access network is where the services differ as different equipment is installed at the Digital Local Exchange (DLE) and the customer premises.

A.183 This means it is fairly easy for a supplier of digital leased lines to transform an existing analogue leased line into a digital line and vice versa. An analogue leased line can be converted to transmit digital information with the use of modem equipment at either end. Likewise, a digital leased line can be converted to transmit analogue signals with the use of a combination of analogue to digital converters at either end. This can be done by the customer. The other

option is to change the equipment at the DLE and customer premises, which could easily be done by the supplier. This also suggests that if a supplier has spare capacity to a site, it could start supplying analogue (digital) leased lines to that site in response to a digital (analogue) price increase within a relatively short period of time and without incurring significant costs.

A.184 However it is unlikely that an existing supplier of analogue (digital) leased lines would be able to start supplying to new premises as a response to a 5 to 10% increase in the price of digital (analogue) leased lines. The reason is that the costs of local access (especially digging and ducting) to a new site are significant, include sunk costs and are likely to involve a significant time delay in responding to the price increase. Since the Director considers that the likelihood that a communications provider may already be serving the premises is very low, quick and inexpensive entry is therefore not feasible on a scale sufficient to constrain the prices of a hypothetical monopolist. As a consequence there is no supply-side substitution between analogue and digital leased lines.

Conclusion of market definition analysis in absence of regulation at either the wholesale or the retail level

A.185 The Director has taken a forward-looking view and so focused on the choices available to purchasers of new circuits. He has also considered the relativity of competitive prices for analogue and digital leased lines. The Director has reached the conclusion that the competitive price of analogue would not be systematically lower than the competitive price of digital, while digital provides a higher quality. Therefore digital leased lines constrain the price of analogue leased lines, and the two types of leased lines are in the same relevant market from a demand point of view.

Conclusion of retail product market analysis in the absence of wholesale regulation

A.186 The Director has concluded from the above analysis that the following product markets exist in the UK:

- low bandwidth traditional interface retail leased lines (including analogue circuits and digital circuits at bandwidths up to and including 8Mbit/s);
- high bandwidth traditional interface retail leased lines (at bandwidths above 8Mbit/s up to and including 155Mbit/s); and
- very high bandwidth traditional interface leased lines (at bandwidths above 155Mbit/s); and
- alternative interface retail leased lines (at all bandwidths).

A.187 The product market analysis will now be revisited in the presence of the proposed wholesale regulation.

Retail product markets in the presence of wholesale regulation

A.188 The purpose of this section is to assess whether the retail market definitions derived above change if wholesale remedies are taken into account. The assessment of the relevant market, SMP and remedies at the retail level need to take account of the impact of wholesale remedies.

A.189 For the purposes of this section it is assumed that cost oriented PPCs are available on regulated terms and conditions. These wholesale remedies do not affect the conclusions above about demand-side substitution. The possible impact on supply-side substitution is discussed below.

Issue 1: Symmetric vs asymmetric – rationale for separate markets for retail leased lines and asymmetric broadband products and services

A.190 The introduction of wholesale remedies is not expected to modify the conclusion of the demand side substitution analysis. This is because the demand-side substitution analysis is not influenced by the presence or absence of PPC regulation at the wholesale level.

A.191 The presence of wholesale regulation could make it easier for suppliers of asymmetric broadband services to enter the supply of symmetric broadband services and of leased lines in particular. This is because existing suppliers of asymmetric broadband services might then purchase leased line wholesale inputs, such as PPCs, in order to offer leased lines.

A.192 However the Director has identified factors that are likely to limit the speed at which these asymmetric broadband services suppliers can enter the supply of leased lines and win customers from the existing suppliers. Such factors reduce the strength of the competitive constraint these potential entrants would impose on the hypothetical monopolist in case of a SSNIP, so that they do not satisfy the criteria for supply-side substitution. These factors are of two types: factors affecting the time needed to acquire and organise PPCs in a network capable of delivering retail leased lines, and factors influencing the time needed to attract a sufficiently large number of customers. The latter relates to the various barriers to switching (eg contract lengths, customers averse to forgoing volume discounts, customer inertia) and barriers to expansion identified as part of the market power assessment (see Annex B). The former type of factor refers to the lead times needed to acquire PPCs and Point Of Connection (POC) equipment, that can last up to 110 working days if there has been appropriate forecasting or 165 working days in the absence of forecasting, ie more than 7 months. In addition, for a new entrant there would be the time needed to organise these wholesale inputs in a functioning network and to start offering commercial services.

A.193 For a class of new entrants to constitute supply side substitutes, it is necessary that they would be able to enter sufficiently quickly and at sufficiently low cost to make a SSNIP by the hypothetical monopolist in leased lines unprofitable. The above considerations show that this requirement is not fulfilled by potential entrants into leased lines from asymmetric broadband services. The possibility of entry into retail leased lines by such suppliers is, however, included as part of the assessment of market power (under criteria such as potential competition and entry barriers).

A.194 The Director concludes, therefore, that in the presence of the proposed wholesale remedies, retail leased lines and asymmetric broadband services are in separate markets.

Issue 2: Retail leased lines and other data services

A.195 The presence of wholesale regulation could make it easier for suppliers of other symmetric data services to enter the supply of retail leased lines. This is because existing suppliers of other symmetric data products might then purchase leased line wholesale products, such as PPCs, in order to offer retail leased line products. However, almost all existing suppliers of other symmetric data products are also suppliers of retail leased lines and cannot therefore be considered a new and additional competitive constraint on the hypothetical monopolist.

A.196 The Director is therefore of the view that the other existing suppliers of other symmetric data products, if any, are not in a position to impose a competitive constraint on the hypothetical monopolist. This is why he considers that in the presence of the proposed wholesale remedies, supply-side substitution between retail leased lines and other symmetric data products is not present.

A.197 The above considerations show that in the presence of the proposed wholesale remedies, retail leased line services and other symmetric data services are in separate markets.

Issue 3: traditional interface retail leased lines vs alternative interface retail leased lines

A.198 The Director's view is that the presence of wholesale regulation by means of PPCs (or indeed cost oriented AISBO) does not modify the conclusion of the analysis carried out in the absence of any regulation.

A.199 As described previously, the demand side analysis is unaffected since the availability of cost based wholesale inputs would not affect consumer preferences.

A.200 On the supply side, the presence of wholesale regulation could make it easier for suppliers of one symmetric data service (SDH or LES based) to enter the supply of the other. This is because existing suppliers of the one product (eg LES-based alternative interface retail leased lines) might use wholesale inputs (such as PPCs), in order to offer the other product (eg traditional interface retail leased lines). However, all the major suppliers of LES products are also suppliers of traditional interface retail leased lines and cannot therefore be considered a new and additional competitive constraint on the hypothetical monopolist.

A.201 The market defined in the absence of regulation is therefore not broadened by considering the impact of upstream regulation.

Issue 4: Retail leased lines – bandwidth distinctions

Traditional interface

A.202 As noted above, consideration of demand-side substitution has identified two break points in the chain of substitution from the lowest (including analogue) to highest bandwidth traditional interface retail leased lines.

A.203 In the light of the Director's proposed wholesale regulation at the trunk and traditional interface symmetric broadband origination levels (see Annex B) , it is appropriate to investigate whether or not the availability of traditional interface symmetric broadband origination at cost oriented prices is likely to alter the previous conclusion on market definition. The focus of this analysis is on supply-side substitution, since the (non-) existence of wholesale regulation does not influence demand-side issues in this case.

A.204 A hypothetical monopolist supplier of high bandwidth traditional interface leased lines is not constrained by supply-side substitution from a low bandwidth supplier because there is no supplier that only sells low bandwidth leased lines. In other words, all low bandwidth suppliers are also high bandwidth suppliers and vice versa. Supply-side substitution is therefore not relevant.

Alternative Interface

A.205 As noted above, consideration of demand-side substitution has led the Director to conclude that there is a single chain of substitution for all bandwidths of alternative interface retail leased lines.

A.206 In the light of the Director's proposed wholesale regulation at the alternative interface symmetric broadband origination level (see Annex B) , it is appropriate to investigate whether or not the availability of alternative interface symmetric broadband origination at cost oriented prices is likely to alter the previous conclusion on market definition. The focus of this analysis is on supply-side substitution, since the (non-) existence of wholesale regulation does not

influence demand-side issues in this case. However, as all bandwidths of alternative interface leased lines are held to be in the same market, supply-side substitution is not relevant either.

Issue 5: Retail leased lines – analogue and digital distinction

A.207 The presence of wholesale regulation by means of PPCs is not expected to modify the conclusion of the analysis carried out in the absence of any regulation, given that it was already concluded that analogue and low bandwidth digital leased lines are in the same relevant market, based on demand side consideration. This relatively broad market could not be narrowed any further by the presence or absence of PPC regulation at the wholesale level.

Conclusion of retail product market analysis

A.208 The Director has concluded from the above analysis that the following product markets exist in the UK for retail leased lines:

- low bandwidth traditional interface retail leased lines (including analogue circuits and digital circuits at bandwidths up to and including 8Mbit/s);
- high bandwidth traditional interface retail leased lines (at bandwidths above 8Mbit/s up to and including 155Mbit/s); and
- very high bandwidth traditional interface retail leased lines (at bandwidths above 155Mbit/s); and
- alternative interface retail leased lines (at all bandwidths).

A.209 These market definitions apply whether or not wholesale remedies are taken into account.

Retail geographic market analysis

Retail geographic markets in the absence of retail or wholesale regulation

Issue 6: The UK

A.210 At the retail level the narrowly defined market from which to start might be on a line by line basis, ie a permanent connection providing capacity between any two points forming a distinct economic market. In the text below, the Director considers the extent to which this narrow market definition might be broadened by demand and supply-side substitution.

Demand-side substitution

A.211 In response to an increase in the price above the competitive level it seems clear that other retail leased lines (linking different end points), would not

be perceived as substitutes by customers, so demand-side substitution does not broaden the previous 'premises-specific' market definitions.

Supply-side substitution

A.212 On the supply side, if the hypothetical monopolist raises retail prices above the competitive level it may be possible for another communications provider to enter and invest in the infrastructure necessary to supply an end-to-end retail leased line between the same points. However this is likely to be time consuming and costly relative to the likely gains from supplying the service. There may be some scope for supply-side substitution within a local area with the result that it is possible to extend market definition somewhat but this is likely to be limited.

Practical considerations and conclusion

A.213 As stated above, demand- and supply-side substitution would not constrain the pricing behaviour of a hypothetical monopolist of retail leased lines products in a local area (or even on a line by line basis). Additionally, in the absence of regulation there is not likely to be a national common pricing constraint, since markets would probably be characterised by bespoke pricing.

A.214 There may be some scope for identifying local areas which exhibit uniform pricing but this is not likely to broaden the geographic market significantly. However, practical considerations suggest that defining a very large number of geographic markets would not be feasible or helpful, for the reasons set out in paragraphs A.18 to A.21 above. Consequently, with the exception of Hull (in which supply conditions are very different to the rest of the UK) the most sensible option available to the Director is to define a national market. This has been done in the knowledge that localised characteristics are likely to be present, and is reflected in the Director's proposed regulation at the retail level.

Issue 7: Kingston upon Hull area

A.215 As noted above the Director is minded to consider the Hull area separately from the rest of the UK. In this context a leased line is a permanent connection providing capacity between any two end users in Hull (although this may be part of a longer leased line between a point in Hull and a point elsewhere in the UK). For the purposes of this market definition the hypothetical monopolist can be considered to be the sole supplier of retail leased lines in the Hull area.

Demand-side substitution

A.216 On the demand side, in response to an increase in the price above the competitive level it seems clear that retail leased lines outside the Hull area would not be perceived as substitutes.

Supply-side substitution

A.217 On the supply side, although no other communications provider owns a local access network in the Hull area it may be possible for a communications provider to enter and invest in the infrastructure necessary to supply end-to-end retail leased line services within the area following a price increase by the hypothetical monopolist. However this is likely to be time consuming and costly relative to the likely gains from supplying an end-to-end leased line product, since there are likely to be relatively low numbers of customers requiring a leased line in Hull. As a result there is little scope for supply-side substitution. The potential for new entry will, however, be taken into account in the SMP assessment.

Practical considerations and conclusion

A.218 Demand and supply-side substitution would not constrain the pricing behaviour of a hypothetical monopolist of retail leased lines products in the Hull area. In addition, there is no common pricing constraint to link Hull and the rest of the UK.

A.219 As described above it is not practical for the Director to identify a large number of local markets, which together constitute the broad UK market. The exception appears to be the Hull area, since it is feasible and practical to clearly define the boundaries of this geographic market. Significantly, supply conditions in Hull are clearly different from the rest of the UK, as evidenced by Kingston's position as virtually the sole supplier of leased lines in the area. This is a relevant consideration given that the purpose of the market definition exercise is to assist in the assessment of SMP.

Conclusion on retail geographic markets in the absence of regulation

A.220 The Director has taken the view that it is appropriate to define UK retail markets excluding the Hull area and retail markets for the Hull area. This conclusion has, as described above, been reached on the basis of demand-side, supply-side and practical considerations.

Retail geographic markets in the presence of upstream wholesale regulation, but no retail regulation

A.221 Defining retail markets in the presence of wholesale remedies is important since the existence of the upstream remedies may impact on the definition of retail markets and the subsequent SMP analysis and need for retail remedies.

A.222 In particular, the existence of wholesale regulation may have the effect of broadening a retail market defined in the absence of regulation.

A.223 The extent of demand-side substitution is not likely to depend on the terms of access to wholesale inputs. However, on the supply side, the availability of cost-based wholesale services strengthens the argument for defining national retail markets for leased lines. In this case, in response to a price rise by a hypothetical monopolist in one area, it is feasible that a communications provider supplying leased lines in other areas might shift resources into supplying retail leased lines in the area characterised by the prices which exceed the competitive level. This move would be feasible, in particular, in the presence of cost-based access to symmetric broadband origination.

A.224 This supply-side argument might also be applicable to the Hull area, which would have the effect of broadening the geographic retail market to cover the UK as a whole including Hull. This would be the case were it possible that suppliers of retail leased lines services outside the Hull area would move into supplying retail leased lines in the Hull area in response to a price rise by the hypothetical monopolist in Hull. A necessary condition for this type of supply-side substitution would be the availability of cost-based symmetric broadband origination in the Hull area. But, while a general access obligation is proposed, no regulated wholesale services currently exist.

A.225 However, although supply-side substitution may be feasible in terms of having cost based wholesale inputs available, other barriers to supply-side substitution may exist. Barriers to entry to the Hull area at the retail level are discussed in Annex B. In the Hull area, no communications provider has, to date, entered the market on a widespread basis, which supports the existence of such barriers.

A.226 The above arguments suggest that a national market definition including the Hull area is not appropriate. Consequently the Director's conclusion that there are two geographic markets in the UK is not altered by consideration of the impact of his proposed wholesale regulation, and remains as it is outlined above.

Conclusion on the relevant markets for retail leased lines in the presence of wholesale regulation and in absence of any retail regulation

A.227 The Director's analysis has defined the following markets:

- low bandwidth (up to and including 8Mbit/s) traditional interface retail leased lines (including analogue leased lines) in the UK apart from Kingston upon Hull;
- high bandwidth (defined as above 8Mbit/s up to and including 155Mbit/s) traditional interface retail leased lines in the UK apart from Kingston upon Hull;
- very high bandwidth (defined as above 155Mbit/s and above) traditional interface retail leased lines in the UK apart from Kingston upon Hull;

- low bandwidth (up to and including 8Mbit/s) traditional interface retail leased lines (including analogue leased lines) in the Kingston upon Hull area; and
- high bandwidth (defined as above 8Mbit/s up to and including 155Mbit/s) traditional interface retail leased lines in the Kingston upon Hull area.
- alternative interface retail leased lines (at all bandwidths – in practice these are now offered at 10Mbit/s and above and are based on Ethernet) in the UK apart from Kingston upon Hull;
- alternative interface retail leased lines (at all bandwidths) in the Kingston upon Hull area.

A.228 The Director has concluded that no change to these market definitions is required as a result of wholesale regulation.

A.229 The above list does not include markets, or parts of markets, that correspond to 8Mbit/s circuits or 622Mbit/s+ circuits, in relation to the Kingston upon Hull area. This is because these products are not currently offered in the Kingston area, meaning that any regulation relating to them would be disproportionate.

A.230 Although the Director has defined seven retail leased lines markets in paragraph A.227 above, the only two that he intends to identify for the purposes of section 79 of the Act are:

- low bandwidth (up to and including 8Mbit/s) traditional interface retail leased lines (including analogue leased lines) in the UK apart from Kingston upon Hull; and
- low bandwidth (up to and including 8Mbit/s) traditional interface retail leased lines (including analogue leased lines) in the Kingston upon Hull area.

The Director does not consider it necessary to identify (for the purposes of section 79 of the Act) retail markets covering traditional interface leased lines at bandwidths above 8Mbit/s and alternative interface leased lines as he considers that regulation at the wholesale level is sufficient to meet regulatory objectives in these areas.

Wholesale markets

Symmetric broadband origination and trunk conveyance markets

A.231 This section discusses the relevant wholesale market definitions in the light of the retail markets identified above.

A.232 The Director considers that a definition along the following lines is appropriate:

- a market for trunk segments;
- a market for low bandwidth traditional interface symmetric broadband origination up to and including 8Mbit/s;

- a market for high bandwidth traditional interface symmetric broadband origination above 8Mbit/s up to and including 155Mbit/s;
- a market for very high bandwidth traditional interface symmetric broadband origination over 155Mbit/s; and
- a market for alternative interface symmetric broadband origination.

A.233 His reasoning is set out below.

Issue 8: wholesale trunk vs symmetric broadband origination

A.234 The Director has previously, in the context of both broadband and leased lines markets, identified distinct economic markets relating to core conveyance. The diagram in chapter 2 illustrates the breakpoint between trunk segments and symmetric broadband origination that has been previously used by the Director. In the context of wholesale leased lines, the Director proposes to retain this distinction (see the Director's review of the wholesale broadband access market at www.oftel.gov.uk/publications/eu_directives/2003/eu_wholesale_broadband/index.htm), based on the criteria outlined below.

Demand-/supply-side analysis

A.235 On the demand side, trunk and symmetric broadband origination are complements: they cannot be demand-side substitutes since they relate to dedicated capacity provided across different elements of BT's network.

A.236 On the supply side a hypothetical monopolist in the provision of either trunk segments or symmetric broadband origination would not be able to substitute into the other input without incurring the significant sunk costs (and amounts of time) required to build a distinct network.

A.237 Given the lack of demand and supply-side substitution described above, and the apparent absence of a common pricing constraint, trunk and symmetric broadband origination constitute distinct wholesale markets.

Location of the breakpoint between trunk and symmetric broadband origination

A.238 The choice of Tier 1 as the breakpoint is based on evidence supplied to the director 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 to a level whereby they have points of presence at a relatively close proximity many of BT's Tier 1 nodes (on BT's SDH network) (see, for example, BT's response to the first consultation for details), whereas a relatively small number reach other nodes. Given the high sunk costs involved in extending a network to get closer to customer sites, the Director does not expect this situation to alter in the foreseeable future. This has

led him to consider that BT's Tier 1 nodes provide the appropriate cut-off point. These nodes are located at differing distances from customer sites, meaning that a market definition based on an average length of circuits demonstrably fails to reflect actual market conditions.

A.239 In the light of this boundary between trunk and symmetric broadband origination, the following sections discuss the need for any narrower market definitions by bandwidth and geography.

A.240 It is important to note that, for concreteness and clarity, the trunk market has been described in terms of BT's network hierarchy, but that equivalent functionality, ie conveyance between the most important (in terms of traffic/capacity requirements) network nodes on other networks is also included in the relevant market.

Responses to previous consultation – location of breakpoint

A.241 BT considers the Tier 1 breakpoint to be somewhat arbitrary and unsustainable going forward, and suggests that it might be appropriate to define the breakpoint based on centres of population. Cable & Wireless agrees that the Tier 1 breakpoint is an imperfect proxy, but states that adoption of an alternative would hinder market development since communications providers are currently adjusting their networks to take account of the recent decision by the Director on the Tier 1 breakpoint, and need a period of stability in order to make appropriate investment decisions. Communications providers agree strongly with the latter viewpoint.

A.242 The Director agrees with those communications providers which argue that, while the Tier 1 breakpoint is not a perfect proxy, it is nevertheless the best and most transparent proxy available at the current time. Crucially, any change to the proxy at this time would reduce certainty and could have a significant adverse effect on market development. The Director has obtained from BT its methods of determining the definition of a particular node as Tier 1 or otherwise, and is satisfied that these definitions are sufficiently robust to enable the Tier 1 breakpoint to remain appropriate at least for the period of this review.

Responses to previous consultation – symmetric trunk versus asymmetric wholesale broadband access

A.243 Communications providers suggest that there is a potential conflict in the definition for, and consequently the remedies applied to, the "core" markets in the leased lines and wholesale broadband access reviews, ie trunk conveyance and broadband conveyance respectively. SPC Network, on behalf of the competing operators, argued that, if its understanding was correct, then as ADSL and SDSL based services use the same ATM core infrastructure, that ADSL and SDSL

conveyance may be substitutable and that the two types of conveyance could therefore be regarded as being in the same market (on the demand side).

A.244 The Director agrees with SPC Network's view that the broadband conveyance service that supports ADSL is technically the same product as the core conveyance that supports SDSL services. Conveyance across the ATM network used to support asymmetric end user applications is not itself restricted to being "asymmetric", since the degree of symmetry of traffic to and from end users is determined at the DSLAM. It is therefore the case that, when supplying core conveyance for a number of end users, a solution based on conveyance across the ATM network (using SDSL tails) may be substitutable with one based on conveyance across, for example, BT's tiered SDH network (using TISBO tails).

A.245 The two could arguably be considered to be in the same market, and the SMP assessment relating to that conveyance across the ATM network that is used to support SDSL might therefore arguably be conducted in either or both of the leased lines or broadband market reviews. The Director's view is that it is only appropriate to assess the market for these services in one market review. Since SDSL-based products are symmetric and hence relate to this market review, the Director's view is that this is the appropriate place to consider such conveyance.

A.246 The Director considers that the potential substitutability of conveyance across the ATM network used to support SDSL-based services with conveyance across an SDH-based network that supports, for example, SDH-based leased line services does not remove the previously identified distinction between the markets for broadband conveyance and leased lines trunk segments. This is because SDSL downstream services do not currently constitute a significant part of the associated leased lines trunk markets, and therefore the prices of broadband conveyance (mostly used to support ADSL-based services) is unlikely to be constrained by the price for the trunk segments, and vice versa. The Director considers that this is unlikely to change over the period of this review.

Forward look

A.247 The Director has considered the likelihood of competitive or technical developments that might affect the markets identified during the period covered by this review. The Director's view is that there are no developments that would affect these market definitions within an 2-3 year period. However, the Director will keep market conditions under review, in particular the continued relevance of the Tier 1 breakpoint as the most appropriate proxy available.

Issue 9: Trunk segments at different bandwidths

Product market for wholesale trunk segments in the absence of retail or wholesale regulation

A.248 The Director has additionally considered whether a distinction between trunk segments at different bandwidths is appropriate.

A.249 The Director does not consider it appropriate to define distinct markets for trunk segments at different bandwidths. This is because, unlike in the leased lines access market, in which the bandwidth of symmetric broadband origination is determined by the bandwidth of the relevant retail leased line, trunk segment traffic can be aggregated so that higher order systems can be used at the trunk level.

Responses to previous consultation – trunk at different bandwidths

A.250 BT considers that very high bandwidth trunk segments should be viewed as a separate market, since the Director proposed not to find SMP in very high bandwidth symmetric broadband origination. However, as the Director has previously noted, it would be neither theoretically nor practically appropriate to attempt to subdivide the trunk market by bandwidth, in view of the potential for substitution between bandwidths. If SMP is found in the combined trunk market then it is necessary for regulation to be applied throughout. PPCs will not be available at 622Mbit/s, making it unlikely that there will be a demand for trunk segments.

Product market for wholesale trunk segments in the presence of upstream wholesale regulation

A.251 The Director does not anticipate that his definition of the market for trunk segments will be affected by the presence of wholesale regulation of symmetric broadband origination. On the demand side, as noted above, trunk and symmetric broadband origination are complements rather than substitutes. Moreover the Director does not expect wholesale regulation of symmetric broadband origination to increase the effectiveness of supply-side substitution, since a communications provider would still incur substantial sunk costs in order to build a distinct network.

Issue 10: Geographic markets for wholesale trunk segments

Geographic markets for wholesale trunk segments in the absence of retail or wholesale regulation

The UK

A.252 As for the retail markets there appears to be very limited scope for supply- and demand-side substitution between trunk segments in different areas of the UK.

Demand-side substitution

A.253 On the demand side it is clear that a trunk segment connecting, for example, Tier 1 nodes in Leeds and London is not substitutable for a trunk segment connecting Tier 1 nodes in Bristol and Manchester.

Supply side substitution

A.254 Supply-side substitution is similarly unfeasible, given the substantial sunk cost barriers to entry that exist in the supply of trunk segments between a given pair of nodes. Moreover in the absence of regulation there is not likely to be a common pricing constraint since it is expected that the markets would be characterised by bespoke pricing.

Practical considerations and conclusion

A.255 The implication is that it is appropriate to define markets individually on a route-by-route basis. This may be feasible in that distinguishing the boundaries of each market is relatively straightforward, each corresponding to individual theoretical routes across communications providers' networks. However this would result in several thousand markets to consider. Since BT is likely to operate in most of the active markets it seems appropriate to consider a single national market comprising all trunk segments, and take account of local variations in the assessment of SMP and in any remedies.

Kingston upon Hull area

A.256 In this case a separate market for the Hull area is not defined because the size of the area does not appear to warrant the functionality provided by trunk segments. The fact that an end-to-end leased line between two premises in the Hull area is provided using two symmetric broadband origination services illustrates this. Kingston has provided information confirming that essentially its end-to-end leased lines service is made up of two local ends.

Geographic markets for wholesale trunk segments in the presence of upstream wholesale regulation

A.257 The Director's geographic market definition spans the UK as a whole. Trunk segments are not relevant to the Hull area, since Kingston's network is small relative to BT's, and not organised in a hierarchical fashion. It is therefore clear that the Director's geographic market definition for trunk segments is not

affected by the existence of wholesale regulation of symmetric broadband origination.

Responses to previous consultation – geographic wholesale trunk market

A.258 BT states that it does not agree with the Director's inclusion of the Hull area in the wholesale trunk segments market. BT has no Tier 1 node in the Hull area and, it states, cannot therefore supply trunk segments in that region.

A.259 The Director notes BT's confirmation that it does not have a Tier 1 node in the Hull area and on this basis confirms that unless a Tier 1 node is set up in the Hull area at some point in the future, BT's obligations under the wholesale trunk segments market will not apply in respect of the Hull area. As stated above, a single national trunk market is, in the Director's view, the definition that best combines analytical robustness and practicability.

Conclusion on the relevant markets for wholesale trunk segments

A.260 The Director's analysis has identified the following market:

- trunk segments in the UK

A.261 Moreover this market definition is not expected to broaden in the presence of any regulation of symmetric broadband origination.

Forward look

A.262 The Director has considered the likelihood of competitive or technical developments that might affect the markets identified during the period covered by this review. The Director's view is that there are no developments that would affect these market definitions within an 2-3 year period. However, the Director will keep market conditions under review, in particular the continued relevance of the Tier 1 breakpoint as the most appropriate proxy available.

Issue 11: Definition of symmetric broadband origination product markets

A.263 As described earlier in this Annex, symmetric origination services provide symmetric capacity from a customer's premises to an appropriate point of aggregation, generally referred to as a node, in the network hierarchy.

Traditional interface symmetric broadband origination vs alternative interface symmetric broadband origination

A.264 As discussed in Chapter 1, symmetric broadband origination can itself be further subdivided between the traditional interface symmetric broadband origination ("TISBO") services such as wholesale terminating segments (PPCs),

RBS and LLU backhaul and SDSL, and alternative interface symmetric broadband origination ("AISBO") services such as LES.

A.265 LES circuits are often supplied over short distances by means of a single direct end-to-end fibre. However, other configurations are possible, as has been discussed by BT and some communications providers in their negotiations regarding the availability of a wholesale product enabling communications providers to replicate services such as BT's retail SHDS product line. In the light of his retail market analysis set out above, the Director considers it appropriate to define distinct markets for the access portion of end to end circuits delivered using LES based technology.

A.266 AISBO services can be identified by the following distinguishing features, discussed in more detail in "Issue 5: Retail leased lines vs retail LES circuits" above:

- end user applications; and
- distance constraints.

A.267 The AISBO market would potentially include wholesale equivalents of end to end LES circuits (currently constrained to distances up to 25km although this may change over time and as noted above this is not the defining feature of this market), as well as the access segments of longer end to end circuits, delivered using LES based technology.

A.268 The Director's substitution analysis carried out in respect of the equivalent retail markets (see Issue 5 above) translates through to the corresponding wholesale markets, since there is a derived demand for the wholesale services.

A.269 Even with the availability of a cost based TISBO/AISBO input, the pricing of a hypothetical monopolist supplier of either TISBO or AISBO services would not be constrained by the availability of the other service.

A.270 Given the technical differences between AISBO and TISBO, the two are likely not to be cost effective substitutes for one another in the majority of cases.

A.271 The Director has considered whether supply side substitutability at the retail level would lead to a widening of the existing market definition to include both SDH-based and LES circuits. Such supply side substitutability would exist if, in the absence of wholesale regulation, the suppliers of LES circuits were able to provide SDH-based circuits at low cost and within a relatively short period of time. However, since the majority, if not all, of the suppliers of LES circuits already supply SDH-based circuits (and vice versa), LES suppliers would not place any additional constraints on a hypothetical monopolist supplier of SDH-based circuits (and vice versa).

A.272 The Director considers that the same reasoning applies to supply side substitution at the wholesale level as the demand for wholesale products is derived from the demand for the retail products. The Director does not, therefore, consider that supply side substitution would lead to a widening of the TISBO market to include AISBO.

Contended and uncontended traditional interface symmetric broadband origination services are in the same market

A.273 The Director is aware that if a forward looking approach is taken, contended and uncontended TISBO services are available although contended TISBO is not currently present on a significant scale.

A.274 There appears to be a strong case for arguing that a chain of substitution exists between uncontended and contended TISBO services. On the demand side, many end-user applications (eg VPNs) may use but do not always require an uncontended link. Therefore if contended services were available and there was a small but significant, non-transitory increase in the price of uncontended services, it is reasonable to assume that a sufficient number of customers would switch to a contended service. This is especially true given that there is a continuum of contention levels. As an example the DataStream symmetric service that is currently on trial is capable of being configured by the customer for any level of contention (including 1, ie uncontended). From this demand-side substitution analysis, there appears to be strong evidence that contended and uncontended TISBO services are in the same market.

A.275 On the supply side, it would be reasonably easy for a supplier to switch between offering contended and uncontended services as there appears to be no major cost or barrier to doing so. This is because the main difference between contended and uncontended services is the ratio of end-user access connections to core network bandwidth and this ratio is easily controllable by the suppliers. As a result a supplier of uncontended services can easily switch into providing contended services and vice-versa. To the extent that there are different suppliers of contended and uncontended TISBO, supply-side substitution is present. This leads the Director to consider that contended and uncontended TISBO are part of the same market.

A.276 This is why the product market for TISBO covers the following uncontended and contended services:

- terminating segments, forming all or part of partial private circuits (PPCs) when supplied by BT to another communications provider and terminating segments (equivalent to those that BT would provide as part of a PPC) supplied by communications providers to themselves or to other communications providers;
- local loop unbundling (LLU) backhaul services;
- radio base station (RBS) backhaul circuits; and

- contended services using SDSL technology

Responses to previous consultation – RBS backhaul

A.277 In its response, BT disagreed with some of the Director General's conclusions concerning TISBO (which, as described above, was termed symmetric broadband origination in the first consultation). In particular, BT considers that RBS backhaul circuits should not be regulated and that SDSL-based TISBO services should not be included in this review.

A.278 As described in paragraph 1.36, RBS circuits are wholesale inputs required for the provision of retail mobile telephony services. These circuits may include an element of trunk if the mobile communications provider requires RBS backhaul circuits that pass through trunk network to the mobile base station (see figure 1.3).

A.279 RBS backhaul circuits can be delivered using either copper, fibre, or radio. This market definition focuses on RBS backhaul circuits as a function, regardless of the technology by which they are delivered.

A.280 The Director has considered, using the two different approaches set out below, whether RBS backhaul circuits and PPCs are in the same relevant market. Both approaches reach the conclusion that they are part of the same market.

A.281 Firstly, RBS backhaul circuits and PPCs are technically equivalent. A radio base station can be viewed as equivalent to an end user's premises, with traffic being carried to the appropriate point of interconnection on the mobile communications provider's network. Because they are technically equivalent, these services are essentially the same product and ought therefore to be part of the same relevant product market, however they are labelled.

A.282 Secondly, the Director has also considered RBS backhaul circuits and PPCs as if they were different products and assess the relevant market by identifying the demand- and supply-side constraints that may apply to a hypothetical monopolist in the provision of RBS backhaul circuits.

Demand-side substitution

A.283 If a hypothetical monopoly provider of RBS backhaul circuits were to raise its prices by 5-10% above the competitive level, customers of RBS backhaul circuits would have the option of switching away from these RBS backhaul services in favour of PPCs, possibly including a trunk segment. PPCs are wholesale products that offer the functionality of transparent transmission capacity by means of a permanently dedicated link between a customer's

premises and a point of connection between the two communications providers' networks.

A.284 In addition, because they are technically equivalent, the costs of RBS backhaul circuits and PPCs are not expected to be significantly different and their prices at the competitive level are likely to be the same or close. If a hypothetical monopolist of RBS backhaul circuits were to raise its price by 5 to 10% above the competitive level, the customers of these circuits would find it attractive to switch to PPCs priced at a competitive level. In a competitive environment, a supplier of PPCs is unlikely to refuse to supply a PPC for the purpose of linking a radio base station to the mobile switch. This means that RBS backhaul circuits and PPCs are viewed as substitutes by consumers and are therefore in the same relevant wholesale market.

Supply-side substitution

A.285 Supply-side substitution (ie the potential for entry by other suppliers, at low cost, that could take place within a relatively short period of time) provides an additional constraint on the pricing behaviour of the hypothetical monopolist that has not been captured in the demand-side analysis.

A.286 The Director has considered whether there are any other suppliers who could exert an *additional* constraint by entering rapidly and without significant sunk costs into the supply of RBS backhaul circuits. The Director considers that the cost structure of a supplier doing so would be similar to that of a new entrant into PPCs and would generally involve significant sunk costs to supply circuits to particular locations. Therefore there is no additional constraint on the supply side that has not already been considered on the demand side or been taken into account in the assessment of barriers to entry and market power.

Conclusion on RBS backhaul

A.287 The conclusions reached by the Director in the first consultation document that the TISBO market includes RBS backhaul circuits has not been modified by consideration of the responses he received concerning RBS backhaul circuits.

Responses to previous consultation - SDSL

A.288 The Director considers that SDSL-based services should be included in the TISBO market. This is because he wants to clarify that the TISBO market is defined on a technology-neutral basis and therefore also includes any new technology that emerges as capable of providing symmetric transparent transmission capacity. The Director General is committed to addressing the issue of emerging technologies as part of his investigation into market power and competitive conditions. On the basis of his findings

he will then determine which appropriate *ex ante* remedies, if any, are appropriate – as discussed in Chapter 6.

A.289 The Director wishes to draw attention to the fact that uncontended SDSL-based services can provide the same functionality as a terminating segment. In fact, uncontended SDSL can be used in the local access network to provide dedicated transparent transmission capacity up to a maximum of 8Mbit/s. This means that uncontended SDSL-based services are in the same market as low bandwidth terminating segments, that is, low bandwidth TISBO.

A.290 Paragraphs A.274 and A.275 describe the chain of substitution between uncontended and contended SDSL-based products on the demand side as well as on the supply side. It is because of this chain of substitution that the Director considers it appropriate that all SDSL-based symmetric broadband origination services should be included in the same relevant market. It would be inappropriate for the Director to specify a contention threshold to separate contended and uncontended SDSL services into two markets.

A.291 Given that contended and uncontended SDSL-based services should be in the same market, and that uncontended SDSL-based services are in the same market as low-bandwidth terminating segments, the Director concludes that he should include contended SDSL-based services in the low bandwidth TISBO market.

Conclusion on SDSL

A.292 Having taken into consideration responses received in response to the first consultation document, the Director has not changed his conclusion that the relevant market should include SDSL-based services.

Responses to previous consultation - LLU backhaul

A.293 Some communications providers have disagreed with the conclusion that LLU backhaul is part of the TISBO market (which, as described above, was termed symmetric broadband origination in the first consultation). In particular, BT says that LLU backhaul should not be considered in this review because it is also used for supplying asymmetric broadband services. Video Networks Ltd considers that LLU backhaul might form a separate market because it believes that there is no demand-side and supply-side substitution with TISBO. This is because LLU backhaul originates at a BT MDF site. Further, Video Networks Ltd also believes that the evidence currently available indicates that SDH-based LLU backhaul and LES-based LLU backhaul should be in separate markets.

A.294 To address these responses, the Director has considered the definition of two products, namely TISBO and LLU backhaul, in order to clarify the relationship between them.

TISBO

A.295 TISBO services are defined as services that provide symmetric capacity from a customer's premises (without any restriction concerning location) to an appropriate point of aggregation, generally referred to as a node, in the network hierarchy. There is no pre-subscribed distance limits imposed on these services and they can be used to support voice and data applications.

A.296 TISBO is defined independently of technology and therefore any service that meets the TISBO criteria will be covered. For example, the following technologies are used at the local access level to supply TISBO based services: HDSL/SDSL over copper, PDH/SDH over fibre and microwave radio. Beyond the access level technologies such as: PDH/SDH over fibre and microwave radio are used. The technology or mix of technologies used in a given situation will depend on a number of factors, including; the infrastructure available, local geography and level of demand.

LLU backhaul

A.297 The definition of LLU backhaul is set out in the Annex to relevant Directions, except for the Direction made pursuant to the wholesale trunk market where the definition is the definition as set out in BT's contract. This was done as there was no need to split the LLU products by bandwidth. This means that LLU backhaul provides transparent transmission capacity between an appropriate LLU communications provider's equipment at a BT MDF site and an appropriate point of aggregation/connection (a node). LLU backhaul is used in combination with unbundled local loops to supply symmetric and/or asymmetric broadband services.

A.298 Strictly speaking LLU backhaul is a regulated product that BT has been directed to supply. However, other communications providers can supply the same product/service using their own infrastructure. LLU backhaul functionality can therefore either be self-supplied or purchased from BT. In this document LLU backhaul will refer to the backhaul functionality that exists between an LLU communications provider's equipment at a BT MDF site and an appropriate point of aggregation/ connection.

A.299 Two separate LLU backhaul elements are to be distinguished:

a) **LLU backhaul trunk,** the element between a BT Tier 1 node and the communications provider's point of connection (POC); and

b) **LLU backhaul link,** the element between a BT MDF site and a BT Tier 1 node or a communications provider's POC (whichever is closer). BT has been directed to offer these links based on SDH and LAN extension services (LES) technology.

LLU backhaul market definition

A.300 The first consultation document did not explicitly discuss the LLU backhaul market definition. In the paragraphs below, the Director exposes the analysis he carried out in order to derive his conclusions.

A.301 It is important that any existing upstream regulation is taken into account when determining whether or not *ex ante* regulation is justified in a related downstream market. For this market review it is therefore necessary to take into account the EC Regulation (No 2887/2000) on unbundled access to the local loop. Note: a similar approach is being taken in the Review of the Wholesale Broadband Access Market (see paragraph 2.11 of the consultative document, dated 28 April 2003).

Market definition for LLU backhaul trunk

A.302 LLU backhaul trunk is similar to the trunk segment of a leased line. It is therefore a demand-side substitute for trunk segments, and *vice versa*. Some respondents have confirmed that LLU backhaul trunk and leased line trunk segments are indeed substitutes. The two products therefore form part of the same relevant product market, namely wholesale trunk segments.

Market definition for LLU backhaul links

A.303 As described above LLU backhaul links provide transparent transmission capacity between a BT MDF site and a BT Tier 1 node or a communications provider's POC. It can therefore be viewed as the terminating segment of a leased line without the local end, ie without the connection between the consumer's premises and the MDF site.

A.304 There are two options for the market definition of LLU backhaul links. For both options, the analysis must distinguish between SDH-based/traditional technologies and LES-based/alternative technologies. This is because on the basis of the evidence he received, mainly that LES-based services cannot carry voice traffic and feature distance constraints (see Issue 3 above for more details), the Director has reached the conclusion that SDH-based and LES-based services are not substitutes at the retail level. This is also valid for LLU backhaul links.

A.305 The first option consists of carrying out a standard demand-side and supply-side substitution analysis of the two technologies.

A.306 The demand-side analysis proceeds separately for SDH-based and LES-based services. SDH-based LLU backhaul links are not substitutes for TISBO products since the LLU backhaul links do not include the local end and thus do not provide access to the consumer premises. Equally, although it is possible that a communications provider who uses unbundled local loops may be able to use TISBO as a substitute for SDH-based LLU backhaul links, it is unlikely to be economically viable to do so, as the provider will be required to pay for unnecessary elements, such as the local end. Similar reasoning applies when considering LES-based LLU backhaul services and AISBO as demand-side substitutes.

A.307 On the supply-side, a supplier of SDH-based LLU backhaul links could not easily enter the market for TISBO, as to do so would require the provision of local ends. It is however possible for a supplier of TISBO to start supplying SDH-based LLU backhaul links relatively quickly and at low costs. There is thus an asymmetry in the supply-side substitutability of TISBO and SDH-based LLU backhaul links. However the potential for supply-substitution from TISBO to SDH-based LLU backhaul link would not provide a competitive constraint on TISBO services. Similar reasoning applies when considering LES-based LLU backhaul links and AISBO as supply-side substitutes.

A.308 This first option therefore leads to the conclusion that SDH-based LLU backhaul links are not in the same market as TISBO and that LES-based LLU backhaul links are not in the same market as AISBO.

A.309 Such an approach also reflects the fact that in some circumstances LLU backhaul links are an input, rather than a substitute, for certain broadband origination services. Indeed when LLU backhaul links are combined with unbundled local loops that are upgraded with SDSL or HDSL technology, they can become substitutes for certain symmetric and asymmetric broadband origination services, namely the low-bandwidth ones. The existence of an input relationship would confirm the finding that LLU backhaul links are part of different relevant product market which is situated upstream of broadband origination markets.

A.310 The second option puts the emphasis on the similarity of competitive conditions prevailing for SDH-based LLU backhaul links and TISBO on the one hand and for LES-based LLU backhaul links and AISBO on the other hand. This is apparent, as SDH-based LLU backhaul links and TISBO provide transparent transmission capacity between a point in the local access network (either a end-user premise or a BT MDF site) and a BT Tier 1 node or a communications provider's POC using the same SDH technology. As a result, TISBO and SDH-based LLU backhaul links feature the same high barriers to entry, generated by high sunk costs and economies of scale and scope, especially those relating to digging and ducting. Since competitive conditions vary according to bandwidth

categories, similarity of competitive conditions also implies that SDH-based LLU backhaul links and TISBO should be looked at per bandwidth category (low/high/very high).

A.311 A similarity of competitive conditions argument can also be run for LES-based LLU backhaul links and AISBO since they feature the same high barriers to entry due to high sunk costs and economies of scope and scale, especially those relating to digging and ducting. It is to be noted that competitive conditions for the LES technology do not vary with bandwidth.

A.312 This second option therefore leads to the conclusion that TISBO and SDH-based LLU backhaul links can be considered to be in the same market (by bandwidth category). Similarly, AISBO and LES-based LLU backhaul links can be considered to be in the same market..

A.313 The Director is aware that the first option reflects the fact that LLU backhaul links are an input to broadband origination, whether symmetric or asymmetric. However, LLU backhaul links are in essence a sub-portion of symmetric broadband origination, and hence face the same competitive conditions. The Director also notes that when taking into account the EC Regulation on unbundled access to the local loop (that requires notified operators, BT and Kingston Communications in the UK, to make available their metallic access networks (local loops) at a cost oriented charge), SDH-based LLU backhaul links – which are *de facto* only used with an upgraded unbundled local loop – can be used to offer the same functionality as certain, namely low-bandwidth, TISBO products.

A.314 Given the similarity in functionality and competitive conditions, and recognising that the EC Regulation on unbundled access to the local loop is already in place as a practical matter, the Director prefers the second option. This leads him to conclude that SDH-based LLU backhaul links falls in the TISBO market (by bandwidth category) and that LES-based LLU backhaul links fall in the AISBO market.

Conclusion on LLU backhaul

A.315 The Director's further analysis concerning LLU backhaul leads him to conclude that:

- LLU backhaul trunk segments are in the wholesale trunk segment market;
- SDH-based LLU backhaul links at bandwidths up to 8Mbit/s are part of the low-bandwidth TISBO market;
- SDH-based LLU backhaul links at bandwidths above 8 Mbit/s up to and including 155 Mbit/s are part of the high bandwidth TISBO market;
- SDH-based LLU backhaul links at bandwidths above 155 Mbit/s are part of the very high-bandwidth TISBO market;
- LES-based LLU backhaul links are part of the AISBO market.

Forward look – symmetric broadband origination product markets

A.316 The Director has considered the likelihood of competitive or technical developments that might affect the markets identified during the period covered by this review. The Director's view is that there are no developments that would affect these market definitions within an 2-3 year period. This is because the competitive conditions in the market mainly result from the existence of high barriers to entry, such as high sunk costs, economies of scale and of scope, that the Director does not anticipate to diminish. However, the Director will keep market conditions under review.

Justification for definition of wholesale symmetric broadband origination market against the requirements in the Commission's Recommendation

A.317 As noted above, the definition of a symmetric broadband origination market differs from the Commission's Recommendation on markets, which discusses only a narrower market for wholesale terminating segments of leased lines. As a consequence, the Director is required to justify the departure specifically against the three criteria set out in the Recommendation, namely:

1. barriers to entry and the development of competition;
2. 'dynamic aspects' ie whether the market is dynamically moving towards effective competition with new entrants and increased innovation; and
3. the relative efficiency of competition law.

A.318 Before looking specifically at the three criteria in turn, the Director is minded to clarify in more general terms why he considers it appropriate to adopt a slightly broader market at the wholesale level. Firstly, he wants to ensure that the remedies do not discriminate unduly between the technologies used to provide retail leased lines. Secondly, he wishes to include all other wholesale services (that is, services sold to communications providers) that are technologically equivalent substitutes or that should not be considered as part of a separate market for pragmatic reasons.

1. Barriers to entry and the development of competition

A.319 Symmetric broadband origination covers symmetric transparent transmission capacity from a customer's premises to an appropriate point of aggregation. This functionality is supplied by using the same network components and technologies as the more specific wholesale terminating segments of leased lines. These network components, especially the local access (and to a lesser extent the main link) network, are characterised by high barriers to entry. These barriers to entry are of a structural type and arise because of high sunk costs, and large economies of scale and of scope. In particular the digging and ducting required by SBO services are very expensive and are at the source of these features.

A.320 The existence of high entry barriers, especially the high sunk costs, creates asymmetric conditions between the incumbent and entrants to the market, impeding or restricting the entry of the latter. Entrants will not be in a position to compete at the wholesale level until they have sunk a significant percentage of their costs.

A.321 Even if entry would intensify over the period covered by the review, the Director is of the view that the ubiquity advantage of the incumbent is unlikely to be sufficiently eroded as a result of that entry.

2. Dynamic aspects

A.322 The Director does not anticipate that the high barriers to entry mentioned above will be significantly reduced in the coming 18 to 24 months through market dynamism. On the one hand these barriers mainly reside in the deployment of local access (and main link) networks that is known to be exorbitant. On the other hand demand is not expected to be strong enough to justify significant investment in these networks by non-incumbent players and/or new entrants. In addition there is no evidence at the moment that technological progress would generate a commercially acceptable alternative enabling entrants to provide SBO without needing an access (and link) network similar to that of the incumbent.

3. Relative efficiency of competition law

A.323 The relative efficiency of competition law is discussed in detail in Chapter 4.

Issue 12: Bandwidth distinctions for traditional interface symmetric broadband origination

A.324 The Director has concluded that the separate markets by bandwidth at the retail level, defined on the demand side, also apply to traditional interface symmetric broadband origination ("TISBO"). The Director's analysis of demand-side substitution in retail markets for end-to-end leased lines is, in many cases, applicable to the market for wholesale TISBO.

A.325 In particular, the Director considers that the arguments outlined in his retail market definition concerning bandwidth distinctions all read across directly into TISBO markets. This is because TISBO is a derived demand, reflecting retail demands, and the bandwidth of the origination circuit is determined by the bandwidth of the retail leased line (unlike trunk segments).

A.326 Therefore, as described above, the Director is of the view that (on the demand side) there is a chain of substitution (multiples of lower bandwidth circuits constraining the price of higher bandwidth circuits) that links:

- TISBO segments at speeds up to and including 8Mbit/s;
- TISBO segments at speeds between 34Mbit/s and 155Mbit/s; and
- TISBO segments at 622Mbit/s and above.

Supply side analysis

A.327 The relevant question here is whether the definition on the demand side can be broadened by supply side substitution. Specifically, the question is whether a supplier of 8Mbit/s (or lower) TISBO services would enter the market for 34Mbit/s TISBO services in response to a significant price increase by a hypothetical monopolist supplier. However, the Director considers that the likelihood that a communications provider may already be serving the premises is very low, due to the relatively low penetration of these services (there are currently only a small number of thousands of these circuits in the UK). A communications provider would therefore be likely to need to incur the significant and sunk costs of network build, including digging and ducting. Supply side substitution (ie quick, inexpensive entry) is therefore not feasible on a scale sufficient to constrain the prices of a hypothetical monopolist.

A.328 In addition, for supply-side substitution between bandwidths to be present there would need to be communications providers that supplied, for example, TISBO segments at high bandwidths but not at low bandwidths, but would enter the supply of low bandwidth if the price of high bandwidth were to rise. However, as for retail leased lines, the biggest communications providers already provide both low and high bandwidth segments, so there is little or no additional competitive constraint beyond that already captured in the demand-side market definition, and supply side substitution is not relevant.

A.329 Therefore, the Director believes that supply-side substitution on this basis is so limited that it does not represent an effective constraint and, as such, does not justify the inclusion of high (defined as 34Mbit/s and above) and low (defined as 8Mbit/s and below) bandwidth TISBO services in the same market.

A.330 The Director does not consider that supply-side substitution exists to justify the inclusion of very high (defined as 622Mbit/s and above) bandwidth TISBO services in the same market as those of lower bandwidths. This is because of the sunk costs that communications providers would need to incur, and in particular the degree of overlap between the existing suppliers of high and very high bandwidth TISBO.

The market for wholesale TISBO in the presence of upstream wholesale regulation

A.331 As described in Chapter 2, TISBO services are the 'furthest upstream' of the various retail and wholesale products considered in this review. It is therefore only necessary to consider the (product and geographic) market definition for

TISBO services once, regardless of any regulation imposed on any other leased lines product, since the Director has not reviewed any of the possible markets that are further upstream than TISBO.

Issue 13: Bandwidth distinctions for alternative interface symmetric broadband origination

A.332 The Director has carried out a substitution analysis to determine whether the bandwidth distinctions identified in the retail leased lines and TISBO services markets apply equally to the AISBO market.

A.333 The costs of provision of LES based circuits do not vary significantly by bandwidth. This is because the costs of duct and fibre, which are generally variant with bandwidth, form a very high proportion of the total cost of provision, even at higher bandwidths. This is supported by confidential information submitted by communications providers during the first consultation period. This information suggested that the one-off capital expenditure required to provide a retail product equivalent to BT's LES 1000 (1Gbit/s) product was less than 1% greater than that required to provide an equivalent to a 10Mbit/s product. It is therefore not appropriate to define distinct markets according to bandwidth, as has been done in other leased lines markets, because the higher bandwidth LES circuits do competitively constrain the prices of lower bandwidth LES circuits.

Conclusion on bandwidth distinctions for alternative interface symmetric broadband origination

A.334 The Director has therefore concluded that in the AISBO market there are no identifiable bandwidth distinctions, and that this therefore forms only one market.

Issue 14: Wave Division Multiplexed services

A.335 Responses to the April 2003 consultation suggested that Wave Division Multiplexed (WDM) circuits (such as BT's *WaveStream* products) should be included within the relevant markets identified by the Director, in addition to the SDH-based services discussed in the previous consultation. The text below discusses the Director's views on this issue.

A.336 BT offers a number of retail products (the *WaveStream* product set) which are characterised by use of WDM in the access segment. WDM services are services that can be used to provide transmission of multiple wavelengths of light over short or long distances using wave division multiplexers. At present, there are three broad types of wave division multiplexers available, Coarse Wave Division Multiplexer (CWDM), Dense Wave Division Multiplexer (DWDM) and Ultra Dense Wave Division Multiplexer (UDWDM).

A.337 CWDM uses lower frequency lasers and a wide spread of frequencies to enable transmission of up to 18 wavelengths over distances up to 60km. DWDM uses higher frequency lasers and a lower range of frequencies in order to enable transmission of up to 32 to 128 wavelengths nation-wide. CWDM is therefore cheaper and more cost effective for certain applications where fewer wavelengths and/or smaller transmission distance is needed. UDWDM, meanwhile, uses high frequency lasers and a very narrow spread of frequencies to carry a greater number of wavelengths.

A.338 The use of WDM is well established within core networks. However, its use in communications providers' access networks to offer products such as BT's WaveStream range is a relatively new innovation.

A.339 The distinguishing characteristics of WDM when used as an access technology are as follows:

- WDM based access circuits are mainly used for emerging very high bandwidth requirements such as data warehousing, and Storage Area Networking (SAN) applications;
- WDM (currently) uniquely, supports multiple delivery of different interfaces as the service is transparent to what technology each wavelength provides. Each wavelength can be used to supply SDH, Ethernet, or other protocols such as Fibre Connection (FICON) or Enterprise Systems Connection (ESCON).
- WDM based access can provide a combination of Metropolitan area ring and longer haul city-to-city connectivity to meet resilience requirements between sites such as data centres and head offices;
- above 1.25Gbit/s per second, bandwidth is not a significant cost driver for WDM based circuits (it remains a significant cost driver for SDH circuits of all bandwidths), due to the ability to add extra wavelengths/bandwidth at low cost; and;
- as an access technology WDM remains very expensive relative to other technologies, although this need not be true on a per Mbit/s basis, and the incremental cost of providing additional wavelengths is likely to be relatively small.

The Director's view

A.340 WDM is a technology used by communications providers to supply various types of circuits, and is not itself bought as a standalone product. It can be used as an input to provide a number of products in retail leased lines markets, including:

(a) SDH over WDM over fibre;
(b) Ethernet over WDM over fibre; and
(c) other protocols over WDM over fibre, for example:

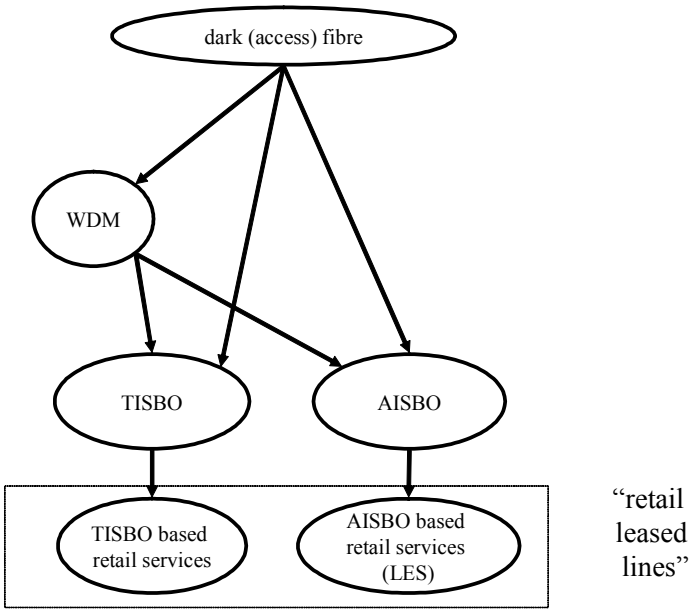
- fibre channel;
- FICON; and
- ESCON.

A.341 The Director's view is that it is clear that the most appropriate way to characterise retail products such as (a) to (c) above is to view them as being in the same market as equivalent end user applications delivered over fibre, rather than a separate market of applications delivered over WDM over fibre. This approach focuses on the characteristics of the retail product, not the technology used to deliver it and so is technologically neutral.

A.342 For example, based on a demand side substitution argument, all products which offer Ethernet-presented dedicated transmission capacity are likely to be in the same market, whether they are delivered over WDM over fibre (eg BT's *WaveStream* product range) or directly over fibre (eg BT's *Shorthaul data services (SHDS)* product range).

A.343 The WDM element of the service is therefore an *upstream* characteristic of the products described above. It can be used as an input into different products that are in distinct (downstream) economic markets – see Figure A.2 below.

Figure A.2 – Leased lines markets



A.344 Based on these findings, the Director does not propose to conduct a review of the WDM market, in the same way as no review will be conducted of any other input markets into TISBO or AISBO that may exist, such as access fibre.

A.345 Consequently, the presence of wholesale regulation by means of PPCs would not influence the conclusions of the analysis carried out in the absence of any regulation. WDM remains an upstream input into a range of wholesale and retail services regardless of any regulation imposed on its provision.

Issue 15: Wholesale symmetric broadband origination geographic markets

Geographic markets for wholesale symmetric broadband origination in the absence of retail or wholesale regulation

The UK

A.346 As for the retail and trunk segment markets there appears to be limited scope for supply- and demand-side substitution between symmetric broadband origination services in different parts of the UK.

A.347 On the demand side, it seems implausible that symmetric broadband origination between a given pair of locations is likely to be a substitute for symmetric broadband origination between another pair of locations.

A.348 On the supply side, if the hypothetical monopolist raised prices above the competitive level it might be possible for another communications provider to enter and invest in the infrastructure necessary to supply wholesale symmetric broadband origination in a particular area. However this is likely to be time consuming and costly relative to the likely gains from supplying the service. There may be some scope for supply-side substitution within an area with the result that it is possible to extend market definition somewhat but this is unlikely to result in the definition of a national market.

A.349 As a result it seems clear that demand and supply factors will not constrain the pricing behaviour of a hypothetical monopolist of wholesale symmetric broadband origination in an area (or on a line by line basis). In addition in the absence of regulation there is not likely to be a national common pricing constraint since it seems clear that markets would be characterised by bespoke pricing. Again there may be some scope for identifying local areas which exhibit uniform pricing but this is not likely to extend to the whole of the UK, or even broaden the geographic scope substantially. This would tend to suggest that markets are segmented on a regional basis (or even a route by route basis).

A.350 However, as noted for the other leased line services, this would involve defining several thousand individual markets. It is not practical to define this number of local markets. Moreover it may not be feasible to define markets individually since the boundaries of each market, probably determined by the existence of a common pricing constraint, are likely to be blurred.

Kingston upon Hull area

A.351 On the demand side, in response to an increase in the price above the competitive level in the Hull area, it seems clear that wholesale symmetric broadband origination services outside the Hull area would not be perceived as substitutes.

A.352 On the supply side, the relevant consideration is whether a firm without a fixed local access network in the Hull area could enter the market and develop its own network in order to provide wholesale leased line services. A communications provider would need to incur significant fixed costs to develop a local network relative to the likely gains in terms of demand for wholesale leased lines services in the Hull area. Given that a large proportion of these costs are likely to be sunk and that the process of installing infrastructure is time-consuming, supply-side substitution is unlikely to be possible within the timescale relevant to the hypothetical monopolist test. The possibility of new entry is reflected in the analysis of SMP.

A.353 Demand and supply-side factors point to the conclusion that there are distinct symmetric broadband origination markets for the Hull area. Supply conditions in Hull are different from the rest of the UK. In addition, unlike other areas within the UK, in this case it is feasible and practical to clearly define the boundaries of the market.

A.354 Since the purpose of the market definition exercise is to facilitate an assessment of whether communications providers possess market power it seems appropriate to define a national market (excluding the Hull area). Moreover it seems clear that defining markets for the Hull area is useful given Kingston's position as the sole supplier of wholesale leased lines services in the area. This facilitates an assessment of exactly what factors constrain the ability of Kingston to raise prices in the Hull area.

Geographic markets for symmetric broadband origination in the presence of wholesale regulation

A.355 As described in Chapter 3, symmetric broadband origination are the 'furthest upstream' of the various retail and wholesale products considered in this review. It is therefore only necessary to consider the (product and geographic) market definition for symmetric broadband origination once, regardless of any regulation imposed on any other leased lines product.

Responses to previous consultation – separate market for Kingston

A.356 Kingston states in its response that it accepts that the Hull area forms “a distinct geographic market”, and that the degree of competition should therefore be reviewed separately.

A.357 Kingston does question the Director’s precise definition of the Hull area, suggesting that it should be refined through consultation between Oftel, the DTI and Kingston.

A.358 The Director remains of the view that the definition previously used, namely “the area defined as the 'Licensed Area' in the licence granted on 30 November 1987 by the Secretary of State under section 7 of the Telecommunications Act 1984 to Kingston upon Hull City Council and Kingston Communications (Hull) plc”, does ensure that the current regulatory regime, which sets different obligations in Hull from those in the rest of the UK, is maintained as transparently as possible. The Director is currently working with industry to create a new definition for the new regime, but this work has not been concluded in time for any new definition to be included in this review. The Director will consult on any change to the definition of the 'Hull Area' in due course, although it is not anticipated that any such change would substantially affect the geographical definition of the area.

Conclusion on market definition

A.359 In summary, the Director has defined the following leased line product markets in the UK excluding Kingston upon Hull:

- retail low bandwidth traditional interface leased lines (up to and including 8Mbit/s) – this includes analogue circuits of relevant bandwidths, and incorporates the minimum set of retail leased lines up to and including 2Mbit/s identified by the Commission;
- retail high bandwidth traditional interface leased lines (above 8Mbit/s up to and including 155Mbit/s);
- retail very high bandwidth traditional interface leased lines (above 155Mbit/s);
- retail alternative interface leased lines (at all bandwidths);
- wholesale low bandwidth traditional interface symmetric broadband origination (up to and including 8Mbit/s);
- wholesale high bandwidth traditional interface symmetric broadband origination (above 8Mbit/s up to and including 155Mbit/s);
- wholesale very high bandwidth traditional interface symmetric broadband origination (above 155Mbit/s);
- wholesale alternative interface symmetric broadband origination; and
- wholesale trunk segments (note that this market extends to the whole of the UK).

A.360 In addition, the Director has defined the following leased line product markets in the Hull area:

- retail low bandwidth traditional interface leased lines (up to and including 8Mbit/s) – this incorporates the minimum set of retail leased lines up to and including 2Mbit/s identified by the Commission;
- retail high bandwidth traditional interface leased lines (above 8Mbit/s up to and including 155Mbit/s);
- retail alternative interface leased lines (at all bandwidths);
- wholesale low bandwidth traditional interface symmetric broadband origination (up to and including 8Mbit/s);
- wholesale high bandwidth traditional interface symmetric broadband origination (above 8Mbit/s up to and including 155Mbit/s); and
- wholesale alternative interface symmetric broadband origination.

A.361 The aspects of the above list that represent a change from the list of markets outlined in the Director's first consultation are:

- the identification of "new" markets for retail alternative interface leased lines and the corresponding wholesale (alternative interface symmetric broadband origination) market; and
- the introduction of the of the term "traditional interface" in order to distinguish the above new markets from those previously identified by the Director.

A.362 In Annex B, the Director sets out his analysis of SMP in the wholesale markets identified above, and in the retail low bandwidth leased lines market which contains the minimum set of retail leased lines identified by the Commission. The Director is not conducting an assessment of SMP in other retail markets, preferring instead to regulate at the wholesale level where possible, in line with the Commission's Recommendation.

Annex B

Assessment of significant market power

B.1 Under the new Directives, SMP has been redefined so that it is equivalent to the competition law concept of dominance. The Framework Directive and the Commission's SMP Guidelines state that a market shall be deemed effectively competitive if no communications provider in that market has SMP.

B.2 Article 14 of the Framework Directive states:

> "An undertaking shall be deemed to have significant market power 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."

B.3 SMP may be held by only one company in the market (single dominance) or by more than one company (collective dominance). This assessment focuses on single dominance as the Director does not consider that SMP is held by more than one company in any of the UK leased lines markets (for example, overall in sales of retail traditional interface leased lines (sum of low to very high bandwidths), no communications provider other than BT has a share as high as 10%). As a consequence, none of the criteria to assess collective dominance will be reviewed in this analysis.

B.4 Market share is an important factor in the assessment of SMP. The Competition Act guideline *The Chapter II prohibition3* states that:

> "The European Court has stated that dominance can be presumed in the absence of evidence to the contrary if an undertaking has a market share persistently above 50 per cent.4 The Director General considers it unlikely that an undertaking will be individually dominant if its market share is below 40 per cent, although dominance could be established below that figure if other relevant factors (such as the weak position of competitors in that market) provided strong evidence of dominance."

B.5 Given the equivalence between SMP and dominance, the Director will apply these guiding principles in the following consideration of SMP.

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3 See http://www.oft.gov.uk/NR/rdonlyres/esmzu5igdeetjdh4b55az2zqex5rmrct7d5cugokx7eaikls45z4qwuvlthsgbjceericejju37ssom5ifmrgh6coih/oft402.pdf

4 Case C62/86, *AKZO Chemie BV v Commission* [1993] 5 CMLR 215.

B.6 Where possible, the Director has considered market shares by revenue (value) as well as by volume. This is because revenue shares capture the effects of any premiums above competitors that communications providers are able to charge. However, a higher share by revenue is not necessarily indicative of market power – it could be due to compositional effects: for example, the supply of more costly services than competitors would also be consistent with a higher market share by revenue than volume.

B.7 Market share alone does not determine whether a firm has SMP, although it is an important criterion. It is therefore important to consider market shares over time, the size of other suppliers and the other SMP criteria outlined in the Commission's SMP Guidelines, including barriers to entry and growth.

B.8 In assessing whether SMP exists, the following review takes account of the EC and Oftel guidelines described in Chapter 1. The EC guidelines set out criteria for the assessment of single dominance. These are reproduced in Oftel's guidelines, which also set out a number of additional criteria.

B.9 In the sections that follow, the retail and wholesale markets are reviewed against these criteria. This discussion considers the markets in the UK excluding the Hull area, followed by (where applicable) the markets in the Hull area, for:

- low bandwidth traditional interface retail leased lines;
- wholesale trunk;
- wholesale low bandwidth traditional interface symmetric broadband origination;
- wholesale high bandwidth traditional interface symmetric broadband origination;
- wholesale very high bandwidth traditional interface symmetric broadband origination; and
- wholesale alternative interface symmetric broadband origination.

B.10 The single dominance criteria set out by the Commission and by Oftel are all reviewed for each market in turn. If the criterion is viewed as relevant, evidence is provided. If the criterion is not viewed as relevant for the SMP assessment, an explanation is provided.

B.11 The criteria have been grouped by theme:

- specificity of the firm: its technology and its production process, its marketing and its strategies;
- customers' role;
- market entry;
- intensity of competition (remaining aspects);
- quantitative information concerning market share, excess pricing and profitability; and
- international benchmarking.

B.12 Evidence was gathered in various ways. Questions were added to Oftel's quarterly omnibus surveys of small and medium enterprises. A common questionnaire followed up by a meeting was used several times to obtain information from large business users and communications providers. Specially drafted letters were sent to seek information on specific issues. In addition, the Director has made use of statistics collected by Oftel as part of its general data gathering function, and has drawn on internal expertise, especially for technical aspects of the discussion.

The relationship between the market reviews and Competition Act 1998 and Enterprise Act 2002 investigations

B.13 The economic analysis carried out in this consultation document is for the purposes of determining whether an undertaking or undertakings have SMP in relation to this market review. It is without prejudice to any economic analysis that may be carried out in relation to any investigation or decision pursuant to the Competition Act 1998 or the Enterprise Act 2002.

B.14 The fact that economic analysis carried out for a market review is without prejudice to future competition law investigations and decisions is recognised in Article 15(1) of the Framework Directive which provides that: "…The recommendation shall identify …markets …the characteristics of which may be such as to justify the imposition of regulatory obligations …without prejudice to markets that may be defined in specific cases under competition law…"

B.15 This intention is further evidenced in the European Commission's SMP guidelines, which state:

- Paragraph 25 *"… Article 15(1) of the Framework Directive makes clear that the market to be defined by NRAs for the purpose of ex ante regulation are without prejudice to those defined by NCAs and by the Commission in the exercise of their respective powers under competition law in specific cases."* (This is repeated in paragraph 37.)
- Paragraph 27: *"…Although NRAs and competition authorities, when examining the same issues in the same circumstances and with the same objectives, should in principle reach the same conclusions, it cannot be excluded that, given the differences outlined above, and in particular the broader focus of the NRAs' assessment, markets defined for the purposes of competition law and markets defined for the purpose of sector-specific regulation may not always be identical"*.
- Paragraph 28: *"…market definitions under the new regulatory framework, even in similar areas, may in some cases, be different from those markets defined by competition authorities."*

B.16 In addition, it is up to all communications providers to ensure that they comply with their legal obligations under all the laws applicable to the carrying out of their businesses. It is incumbent upon all communications providers to

keep abreast of changes in the markets in which they operate, and in their position in such markets, which may result in legal obligations under the Competition Act 1998 or Enterprise Act 2002 applying to their conduct.

Low bandwidth traditional interface retail leased lines for the UK apart from Kingston upon Hull

B.17 Using the criteria listed above, the Director has undertaken an analysis of SMP in the market for retail low bandwidth traditional interface leased lines. As explained in Chapter 3, the Director will assess the existence of SMP in this market in the context of the remedies proposed in the markets for traditional interface symmetric broadband origination ("TISBO") and trunk segments, in particular PPCs at cost oriented charges, a prohibition on vertical discrimination and cost orientation for trunk segments. This analysis assumes an absence of regulation at the retail level, since the purpose is to contribute to the assessment of whether and what retail regulation is appropriate.

B.18 The analysis starts by looking at quantitative information and then goes on to review the other SMP criteria.

Low bandwidth traditional interface retail: summary of conclusions

B.19 The Director's findings lead him to expect that the introduction of remedies at the wholesale level will significantly weaken BT's SMP.

B.20 However, since the remedies proposed at the wholesale level are new or relatively new, the Director does not expect that they will remove BT's SMP within the timeframe of the market review, ie between two and three years. BT's persistently high market share provides evidence of SMP. Further evidence supporting the Director's conclusion that BT has SMP is provided by the following criteria: barriers to switching and expansion and, to a lesser extent, economies of scale and of scope, profitability and pricing, and vertical integration.

Low bandwidth traditional interface retail: quantitative information criteria

Market shares

B.21 Market shares can be expressed in terms of revenues or of volumes. Although both are relevant, revenue figures take into account that products can be differentiated. The EC Guidelines explicitly mention leased lines as a product for which revenue market share is likely to be useful because leased lines can be differentiated in various ways.

B.22 Paragraph 77 of the Guidelines state that:

"As the Commission has indicated, the mere number of leased lines termination points does not take into account the different types of leased lines that are available on the market – ranging from analogue voice-quality to high-speed digital leased lines, short distance to long distance international leased lines. Of the two criteria, leased lines revenues may be more transparent and less complicated to measure."

B.23 Volume market shares refer to the number of leased lines, independently of their capacity, quality, and length. However, prices vary according to these criteria. Revenue market shares will take these elements into account.

B.24 Although analogue and digital low bandwidth traditional interface leased lines are in the same market, the tables below provide data for three categories (analogue, low bandwidth digital, and total low bandwidth) to avoid giving detailed tables in Chapter 5. The tables show how the volumes and revenues for these three categories have evolved over the last five years.

B.25 It is important to bear in mind that the figures in Table B.1 refer to the number of traditional interface leased lines, independently of their capacity. Analogue leased lines offer, on average, a lower capacity than digital low bandwidth traditional interface leased lines (the capacity of which varies between 2.4kbit/s and 8Mbit/s).

B.26 Two further factors should be borne in mind while interpreting the figures. First, double counting occurs whenever a leased line is bought from BT by another communications provider and then resold as a leased line to an end user. This means that the same leased line can appear twice in the statistics, magnifying any trends. Provision and cessation of one such leased line would also be reflected twice. Second, other communications providers have been able to migrate traditional interface leased lines to PPCs since August 2001.

Table B.1: Low bandwidth (up to and including 8Mbit/s) traditional interface leased lines volumes (thousands) (not including Kingston)

	Analogue		Low bandwidth digital		Low bandwidth total	
	Total	BT	Total	BT	Total	BT
97/98	285	262 (92%)	209	146 (70%)	494	408 (83%)
98/99	217	193 (89%)	252	164 (65%)	469	358 (76%)
99/00	185	161 (87%)	278	200 (72%)	463	361 (78%)
00/01	158	150 (95%)	303	249 (82%)	462	400 (87%)
01/02	147	140 (95%)	268	202 (75%)	415	342 (82%)
02/03	156	146 (94%)	275	207 (75%)	431	354 (82%)

Figures in parentheses indicate BT's share (including Concert).

Source: Oftel Market Information

Table B.2: Low bandwidth (up to and including 8Mbit/s) traditional interface leased lines revenues (£m) (not including Kingston)

	Analogue		Low bandwidth digital		Low bandwidth	
	Total	BT	Total	BT	Total	BT
97/98	306	272 (89%)	1076	768 (71%)	1381	1040 (75%)
98/99	288	254 (88%)	1231	881 (72%)	1519	1135 (75%)
99/00	253	218 (86%)	1343	950 (71%)	1596	1168 (73%)
00/01	212	184 (87%)	1420	1069 (75%)	1632	1253 (77%)
01/02	204	187 (91%)	1513	1134 (75%)	1718	1321 (77%)
02/03	181	163 (90%)	1320	987 (75%)	1501	1149 (77%)

Figures in parentheses indicate BT's share (including Concert).

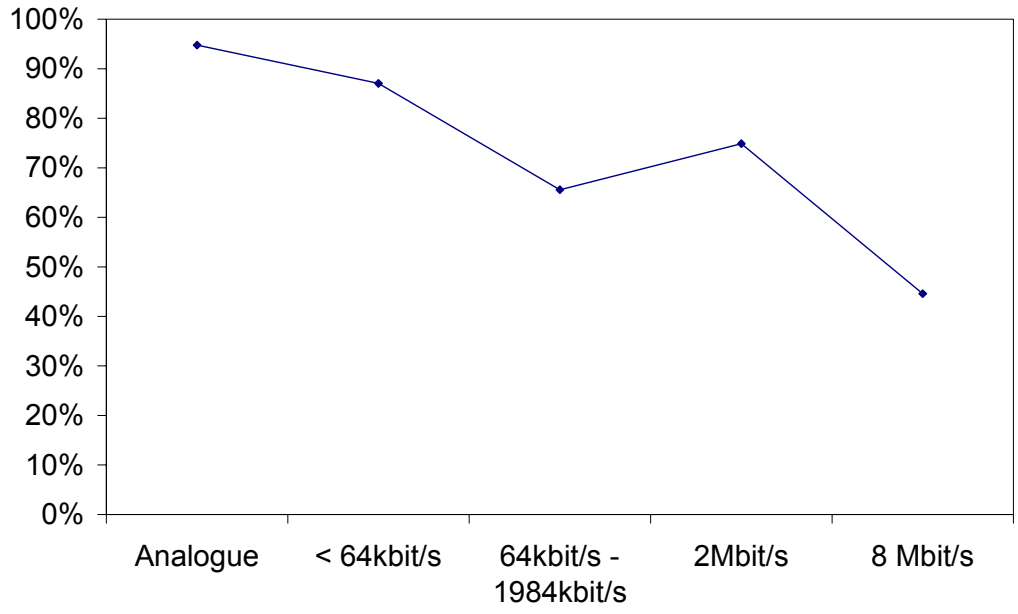
Source: Oftel Market Information.

B.27 While analysing the data, the Director noticed a sharp reduction in the number of low bandwidth traditional interface leased lines between 2000/01 and 2001/02. According to BT, about 39,000 leased lines had migrated to PPCs by March 2002. This implies that a significant percentage (67%) of the reduction in the number of leased lines supplied by BT in 2001/02 reflects migration and not cessation. BT explained that the remaining decrease (about 20,000) was caused by migration to other products (within BT) and by losses to competitors.

B.28 The general impression is that BT's market share in the low bandwidth traditional interface leased line market is very high and relatively stable at around 75% or more for revenues and at least as large by volume. BT's share of traditional interface analogue leased lines is even higher, at about 85-90%.

B.29 A substantial part of the difference between BT's volume and revenue market shares can be explained by the composition of BT's portfolio of circuits relative to that of other communications providers. Specifically, within the low bandwidth traditional interface market, BT's share of each type of circuit is at its highest in the provision of analogue circuits, and becomes progressively lower as bandwidth is increased, being at its lowest in the provision of 8Mbit/s circuits. This is illustrated by the fact that, based on 2001/02 volume data, BT's share of the total volume of different types of circuits is shown in Figure A.1 below:

Figure B.1: BT's share of the total volume of low bandwidth retail leased lines varies by bandwidth (average for total market is 78%)



Source: Oftel market information

B.30 The Director's consideration of the market share criterion suggests that BT has SMP. This is because of the very high level of BT's market share over the last five years and the absence of a rapid declining trend. This is in line with the Commission's Guidelines, which states in paragraph 75 that:

"According to established case-law, very large market shares – in excess of 50% – are in themselves, save exceptional circumstances, evidence of the existence of a dominant position. An undertaking 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."

B.31 The Director believes that the introduction of remedies at the wholesale level will lead to increased competition and a fall in BT's market share in the retail low bandwidth traditional interface leased line market. However, the Director considers that in the next 2-3 years, this increase in competition is unlikely to be significant enough to imply that market share can no longer be viewed as an indicator of BT's market power.

B.32 The Director has identified at least three factors that are likely to limit the speed at which other communications providers can win customers away from BT. First, the full effect of the remedies proposed as part of the PPC Phase 1 and Phase 2 Directions might not be felt immediately because some of them involve multi-month processes (eg forecasting profiles, lead times). Second, the Director is aware that there are barriers to switching that are likely to slow the pace at

which end users switch away from BT (see paragraphs B.69-B.75). Third, data on migration shows that BT's market share remains very high even though a significant proportion of the low bandwidth traditional interface leased lines bought by other communications providers have been migrated to PPCs. Migration of low bandwidth traditional interface leased lines to PPCs between August 2001 and March 2002 is estimated at about 30,000 on the basis of the data submitted by BT. By end January 2003, this number was estimated at about 44,500. Even though the migration process is not completed, these figures suggest that a significant share of migration had already taken place by end March 2002. However, BT's 02/03 market share remained at more than 75% both in terms of revenues and volume.

Excess pricing and profitability

B.33 BT has provided the following figures on its Return on Capital Employed (ROCE).

Table B.3: BT's ROCE for traditional interface leased lines

ROCE	98/99	99/00	00/01	01/02
Analogue	18%	19%	12%	6%
Digital – Kilostream and n*	41%	41%	37%	25%
Digital – Megastream (for 2 Mbit/s)	32%	37%	35%	40%
Digital – Megastream (above 2 Mbit/s)	n/a	n/a	27%	32%

B.34 The Director considers that the above figures represent potentially useful evidence in assessing the competitiveness of the traditional interface leased lines market. It is important to note the following regarding these figures:

- the Director has some concerns regarding the reliability of the above figures because he has not received sufficient information about the basis of preparation used by BT to derive these figures and about how these figures can be reconciled to BT's Financial Statements. This makes it difficult for the Director to appreciate the significance of the figures, notably the description of analogue returns as being below BT's cost of capital (13.5%); and
- notwithstanding the concerns outlined above, ROCE figures for digital circuits remain well above BT's cost of capital. Indeed, even if analogue returns for 2001/02 were to be increased to 13.5% by the re-allocation of costs from analogue to digital circuits, the ROCE for high bandwidth traditional interface circuits would remain as high as 25% (assuming all costs were re-allocated to high bandwidth circuits), and the corresponding figure for low bandwidth

traditional interface circuits would remain as high as 35% (assuming all costs were re-allocated to low bandwidth circuits)

B.35 The Director has considered whether retail leased line prices provide evidence of SMP. The only prices that are readily accessible are BT's published prices, which the Director does not consider to be representative of the effective prices paid by customers. BT offers various discount schemes, which means that the price paid per leased line is in effect lower than the corresponding published price. The price varies between customers, depending on volume and contract length.

B.36 In addition, the Director has been unable to obtain useful or representative data on other communications providers' prices, because they are generally not published and traditional interface leased lines are often provided at bespoke prices. The Director does not, therefore, have published evidence to indicate whether, or the extent to which, BT charges higher prices than its competitors for similar leased lines.

B.37 However, customers have reported to the Director that other communications providers quote prices lower on average than BT's. Two customers told the Director that when there is some competition (ie where BT is not the only supplier of traditional interface leased lines in an area), other communications providers tend to quote a price that is '5% cheaper than BT'. Consequently, although the available published information on prices does not enable the Director to draw any meaningful conclusion about market power, the Director suspects that on average BT's traditional interface leased line prices are higher than those of other communications providers.

B.38 The above considerations lead the Director to conclude that he can rely on the information and evidence relating to excess price and profitability when reaching his conclusion on BT's market power.

Low bandwidth traditional interface retail: firm-related criteria

Technological advantages or superiority

B.39 The Director does not believe this criterion to be relevant, because the technology used to supply traditional interface leased lines is mature (communications providers and customers comment that leased lines are a "commodity product"), and because suppliers of leased line inputs to the incumbent can and do also supply to other communications providers. For example, communications providers sub-contract digging and ducting to construction firms and buy cable and fibre from manufacturing companies: none of these firms were reported to have exclusive business with one particular communications provider.

Control of infrastructure not easily duplicated

B.40 The network on which retail low bandwidth traditional interface leased lines are carried is not easy to duplicate, as discussed under the criterion 'barriers to entry' for the TISBO and trunk segment markets. The objective of the proposed remedies at the wholesale level (mainly PPCs) is precisely to address this matter and to reduce this hurdle. The Director is of the view that the availability of PPCs will substantially reduce the need to duplicate infrastructure. This is why the Director considers that in the presence of PPCs the 'control of infrastructure not easily duplicated' criterion is no longer a relevant factor on which to rely for attributing market power to BT at the retail level.

Economies of scale

B.41 Economies of scale at the retail traditional interface level derive from economies of scale at the wholesale level and from economies of scale specific to retail activities.

B.42 The Director is of the view that the introduction of PPCs at cost oriented charges will partly remedy the problems. The reason is that the cost orientation of the PPCs charges (ie charges set to reflect average costs) will incorporate the scale economy benefits that can be enjoyed at the wholesale level. Therefore the Director believes that the wholesale remedy should largely prevent BT from gaining advantage at the retail level from its wholesale economies of scale.

B.43 The Director considers that various activities specific to the retail level feature economies of scale, ie marketing, advertising, after-sales service, management and administration. Since the data show that BT sells much larger volumes of leased lines than any other communications provider (the two other communications providers selling the most after BT sell only a few per cent of BT's volume), the Director considers that BT benefits from significant scale economy advantages derived from retail-specific activities.

B.44 From the work done to derive PPCs charges, the Director is aware that the costs of these retail-specific activities amount to a much smaller share of the final traditional interface leased line price than wholesale activities. This is why the Director believes that the availability of PPCs at cost oriented charges reduces the scale economy advantage that BT enjoys at the retail level, but does not remove it completely. As a result, the Director considers that economies of scale at the retail level contribute to BT's market power position at the retail level.

Economies of scope

B.45 Economies of scope arise in the retail low bandwidth traditional interface leased lines market if the costs of supplying leased lines can be shared with

other products. These scope economies can derive from economies of scope at the wholesale level and from economies of scope specific to retail activities.

B.46 The Director believes that cost orientation of PPC charges (ie charges set to reflect average costs) will incorporate the scope economy benefits that can be enjoyed at the wholesale level. Therefore the Director believes that the wholesale remedy should largely prevent BT from gaining advantage at the retail level from its wholesale economies of scope.

B.47 Several activities specific to the retail level feature economies of scope, ie marketing, advertising, after-sales service, management and administration. Because of its incumbent position, BT sells a much higher number of different products and services than any other communications provider. This is why the Director considers that BT benefits from larger scope economy advantages derived from retail-specific activities than other traditional interface leased lines suppliers.

B.48 The Director is aware that the costs of these retail-specific activities amount to a much smaller share of the final traditional interface leased line price than wholesale activities. This is why the Director is minded to believe that the advantages that can be derived from scope economies from retail specific activities are likely to be of a smaller magnitude than those from wholesale activities. This leads him to think that cost oriented PPC charges reduce the scope economy advantage that BT enjoys at the retail level, but do not remedy it completely. This is why the Director is of the view that, even in the presence of wholesale remedies, BT enjoys larger economies of scope at the retail level than other traditional interface leased lines suppliers. In the Director's view this contributes to BT's market power position at the retail level, although to a lesser extent than other criteria.

Product/services diversification

B.49 This criterion does not initially seem to be significant for the assessment of SMP in the retail low bandwidth traditional interface leased lines market, as BT does not generally bundle other products with traditional interface retail leased lines, although the Director understands that BT offers more attractive conditions for certain types of private circuits packages (Netstream or Prime) when they are taken in combination with other products.

B.50 Traditional interface retail leased lines are priced independently of other products or services. The pricing depends on the volume of a customer's private circuit business and on the term over which that business is committed. Before wholesale remedies were in place, the ubiquity of BT's network meant that in many areas customers had no alternative to BT. If these customers also needed leased lines in other areas where other communications providers also provided leased lines, they were likely to buy these leased lines from BT in order to

maximise their volume discounts. This point was made by competing operators. The wholesale remedies are likely to remove this effect to a large extent since they enable other operators to purchase the necessary wholesale inputs to compete anywhere. However customers that have accumulated a stock of traditional interface leased lines before the wholesale remedies were implemented might still prefer to buy from BT in order to maximise their volume discounts. One operator explained how its hope to start supplying traditional interface leased lines to mobile operators for the purpose of linking radio-base stations to mobile telephone exchanges using PPCs collapsed when it realised that mobile operators were locked into volume discounts schemes with BT. These schemes made it unattractive to buy new leased lines of that type from alternative suppliers. In such circumstances communications providers would be forced to compete against BT's marginal price of leased lines, which is lower, and sometimes significantly so, than BT's average price. It can thus be inferred that BT's discounts may make entry and growth by other communications providers more difficult.

B.51 Customers say that the discounts offered by BT make them less likely to consider other traditional interface leased lines suppliers, whose average prices are cheaper, in areas where these suppliers are active. If they used other, cheaper suppliers for some of their leased lines, it would mean a possibly significant reduction in the discount obtained from BT, which is calculated on the basis of total purchased volume and which applies to the whole purchase. Communications providers have also commented on this issue.

B.52 As noted in Chapter 5, the Director is investigating one complaint from a communications provider relating to BT's volume discounts for its traditional interface retail leased lines, and will give appropriate consideration in the usual way to any other fully substantiated evidence-based complaints submitted on this issue.

Vertical integration

B.53 BT's vertical integration may generate greater efficiency as it enables the avoidance of various transaction costs. BT's vertical integration also creates potential for BT to leverage market power into downstream markets. In this context, BT's dominance at the wholesale level (in the markets for trunk segments and low bandwidth TISBO) give BT an advantage in the traditional interface *retail* market. Vertical leveraging can take place because of the significant difference between average costs, on which regulated PPC charges are based, and marginal costs, which are incurred by BT on an end-to-end basis for additional leased lines. In theory, this type of vertical leveraging can be prevented by controlling for margin squeeze, for investigating discrimination on non-price factors, and by imposing accounting separation on BT. However, the Director is aware that because of practical difficulties it is likely that these wholesale remedies will alleviate, rather than entirely eradicate, such competition

problems. The Director is of the view that the vertical integration criterion is relevant to his assessment of BT's market power as vertical integration is likely to add to the sources of market power for BT.

Distribution and sales network

B.54 In deciding whether BT's distribution and sales network gives it an advantage over other communications providers, it is worth remembering that retail leased lines are mainly corporate products and that customers are aware of alternative communications providers.

B.55 The Director is thus of the view that this criterion is not a significant source of BT's market power at the retail level.

Access to capital markets and financial resources

B.56 The Director is of the opinion that this criteria is unlikely to be a major determinant of SMP in markets for traditional interface retail leased lines given that very significant investment (eg in network infrastructure) is not necessary in order for communications providers to enter the market.

Low bandwidth traditional interface retail: customer-related criteria

Countervailing buying power

B.57 BT's current obligation to stick to published prices limits the extent to which customers can exercise buyer power. Even in the presence of this regulation, customers, especially large ones, try to negotiate with BT and other communications providers for the provisioning of their low bandwidth traditional interface leased lines. During the market review customers reported that negotiation is fruitless where there is no alternative supplier to BT. This has led some large leased line end users to engage in self-provision. One large end user told the Director that it actively negotiates on price and non-price terms when contracting leased lines. It added that the two key factors in any negotiation are the volume/volume growth and the availability of genuine alternative suppliers, and highlighted that while competition on major city routes is well developed, competition to provide 2Mbit/s traditional interface lines overall (urban and rural areas together) only really exists in respect of self-provision. In other words, BT is the only realistic traditional interface leased line provider in many cases.

B.58 In addition, customers indicated that even where there are alternative suppliers, room for exerting buyer power is limited. Most negotiations with other communications providers do not generate more than a five per cent reduction on BT's prices. This was explicitly mentioned by a very large user of leased lines. All the large business customers participating in a meeting to discuss the markets under review believed that this is partly caused by BT's obligation to

publish its prices, which enables other communications providers to target the most profitable customers by slightly undercutting BT's published prices.

B.59 This suggests that until now there has been very little scope for countervailing buyer power to act as an influence on the traditional interface retail leased lines market, and that buyer power has not acted as a curb on BT's market power.

B.60 For the purpose of this market power assessment the Director must adopt a forward-looking approach and try to assess what is likely to happen in presence of the proposed wholesale remedies but in absence of any retail obligation (in particular, no price publication obligation). In these circumstances, the Director believes that large leased line customers would try to exert countervailing buyer power and would have more ability to do so.

B.61 The Director is also aware that a significant proportion of low bandwidth leased line buyers are SMEs. He believes that SMEs might on average be slower at trying to exert countervailing buyer power and be less successful at exploiting it. The reasons that back his view are that PPCs are a relatively recent innovation, and that SMEs might not consider it worth attempting to exert buyer power, especially when leased line expenditures may represent a small proportion of their total costs. This is why the Director is minded to explore the possibility of offering protection to more vulnerable leased line buyers until they are in a position to negotiate prices and conditions.

B.62 This leads the Director to think that the availability of PPCs at the wholesale level will stimulate the development of competition and will encourage leased lines customers to exert some buyer power. But, given that currently buyer power is weak, the Director considers it very unlikely that the increase in buyer power would be sufficiently large to curb BT's market power. This is why he does not consider this criterion as significant for his market power assessment.

Low bandwidth traditional interface retail: market related criteria

B.63 There are several criteria relating to the market and its characteristics, which offer a picture of market entry and related behaviours.

Ease of market entry

B.64 As discussed above, this discussion will focus on those barriers to entry that will apply in the presence of proposed wholesale remedies. The Director's discussion of the markets for TISBO describes the existence of network related barriers to entry. His proposed wholesale remedies are intended to mitigate the effects that these barriers might have at the retail level. However, as described

earlier, it appears unlikely that their full impact will be seen in alternative interface retail markets in the immediate future.

B.65 Communications providers may face additional barriers to entry depending on how they plan to enter the market. For firms that resell services provided by BT and other communications providers, the main costs are the sales and marketing required to establish a presence. Their scope for undercutting existing competitors is limited, because their only source of lower costs would be in the retail costs and they are likely to be disadvantaged in terms of the network costs.

Absence of potential competition

B.66 Potential competition refers to the prospect of new competitors entering the market within the timeframe considered for the market review.

B.67 In the light of the remaining barriers to entry in the traditional interface retail market (see above), the Director believes that the likelihood of widespread entry is low. As stated above, the Director's belief is that his proposed wholesale TISBO market remedies will not entirely or immediately remove barriers to entry at the retail level.

Barriers to switching

B.68 The Director has identified several barriers to switching, differing in nature as well as in importance.

B.69 First, the Director assesses the existence and importance of technological barriers to switching. Communications providers told the Director that there are no technological barriers to switching. Interruption of service when switching from one supplier to another is not viewed as a barrier to switching: as communications providers explained to the Director, service interruption occurs on a regular basis anyway for maintenance purposes.

B.70 Second, there exist contractual barriers to switching. Traditional interface retail leased lines are often purchased in contracts that last several years. This means that in any one year only a proportion of the total market is available to be won by competitors. It also implies that customers willing to switch earlier face a cancellation fee as a penalty. One large leased line customer told the Director that leaving BT would be difficult because of the high penalty charges for exiting existing contracts. Other large business customers told the Director that other communications providers offer contracts without any penalty for early termination. The speed at which competitors can win business from BT is subject, therefore, to limitations. However, communications providers agree that the share of contracts lasting more than one year is falling. BT reports that it observed a fall from 36% to 31% between 2001 and 2002.

B.71 Third, there exist financial barriers to switching. One is having to pay a (possibly reduced) connection fee to the new supplier, while another is the forgoing of discount advantages when an end user moves part of its sales away from a supplier offering a volume discount scheme. BT offers this type of discount scheme. A further barrier derives from the pricing structure at the retail level. In particular, the example of BT's new pricing structure at the retail level was mentioned. This price structure features high up-front cost and lower rental charges; it was suggested that this might make switching more difficult. As wholesale prices are structured in a similar way, there may be a natural tendency in the market to converge towards such a pricing scheme. The possibility of sharing infrastructure is likely to mitigate the trend. It is too early to collect evidence from end users on how they feel their switching behaviour will be affected by this new pricing structure.

B.72 Fourth, customers' perceptions and attitudes can act as a barrier to switching. The former category includes the issue of multi-vendor circuits, which are traditional interface leased lines that run on more than one network. For some customers, the problems experienced when something goes wrong (lack of communication between the different vendors, or 'passing the buck' for fault repair) are significant enough to lead them to prefer single-vendor circuits. Such preference works in favour of BT, which always offers single-vendor circuits. However, evidence gathered on this issue is mixed and cannot lead to a definitive conclusion that multi vendor circuits discourage switching.

B.73 Customer inertia can act as a barrier to switching, ie customers are happy with the service and do not think that it is worth their while to shop around and face the inconvenience that switching is likely to generate. The evidence gathered on this issue seems to suggest that customer inertia varies with customer size. Paragraphs 7.12 to 7.14 of Oftel's *Small and Medium Business Survey Q11 November 2002*, published on 27 January 2003, reported on the reasons for or against changing suppliers and highlighted the existence of customer inertia among small and medium business. Large business customers made it clear during a meeting that they are actively shopping around and sometimes even consider switching to build part of the network they require.

B.74 Finally, BT has developed a strong brand, which is likely to work in its favour when it comes to reaching and attracting firms that do not employ one particular person to manage the firm's telecommunications needs. This is particularly likely to be the case among small and medium enterprises. The strength of BT's brand also means that if a customer is unhappy with an alternative supplier it is more likely to go back to BT than to try another alternative supplier.

B.75 The combination of these barriers to switching is perceived as important by some customers, and not significant by others. The Director considers that the existence of contracts, and some other evidence of barriers to switching, place

some limitations on the rate at which the greater competition promoted by wholesale remedies will undermine BT's SMP at the retail level.

Customers' ability to use and access information

B.76 Customers' views on use of and access to information relating to traditional interface leased lines differ. Some customers reported that they were happy. One large end user reported in its response to the Director that it had generally been satisfied with the level of information provided by suppliers about leased line services. However, another large user said that it was difficult to calculate BT's tariffs. The Director considers that on average the evidence received as part of the market review process does not indicate that this is an area from which BT derives market power.

Low bandwidth traditional interface retail – Intensity of competition criteria

Barriers to expansion

B.77 The Director's market information (see Tables B.1 and B.2) suggests that growth in the size of the market for low bandwidth traditional interface retail leased lines has been minimal in recent years by revenue (and declining by volume). The Director anticipates that this situation, combined with barriers to entry and switching (see above), would, in the absence of regulation in the traditional interface retail market, contribute towards BT's ability to behave independently of competitors and consumers in this market, since competitors will be obliged to compete for a share of a relatively small addressable market.

Active competition on non-price factors

B.78 A firm may derive market power from successfully differentiating its product, either vertically (on the basis of quality) or horizontally (on the basis of diversity).

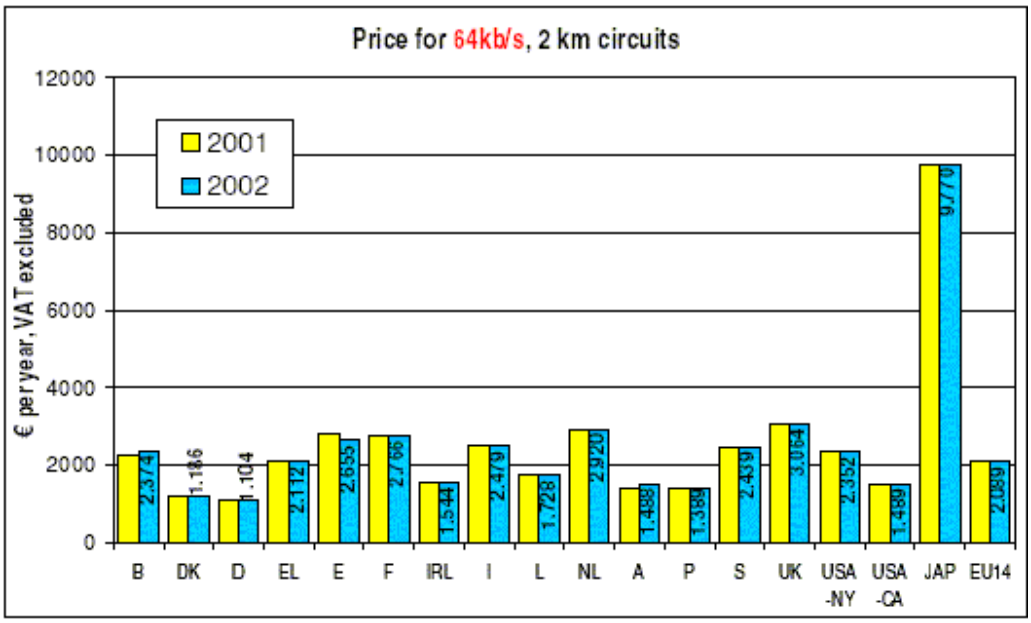
B.79 Low bandwidth traditional interface retail leased lines do not offer much scope for differentiation, as the underlying technology is standard, and customers focus more on price. Most communications providers seem to be offering roughly the same range of leased line products and services. Some vertical differentiation can be observed in terms of quality of service and of reliability. However the evidence received from end users and other communications providers seems to suggest that perception of quality and reliability varies sufficiently to prevent any conclusion on this issue.

B.80 The Director is accordingly of the view that issues related to differentiation do not confer additional market power on BT in this market.

International benchmarking

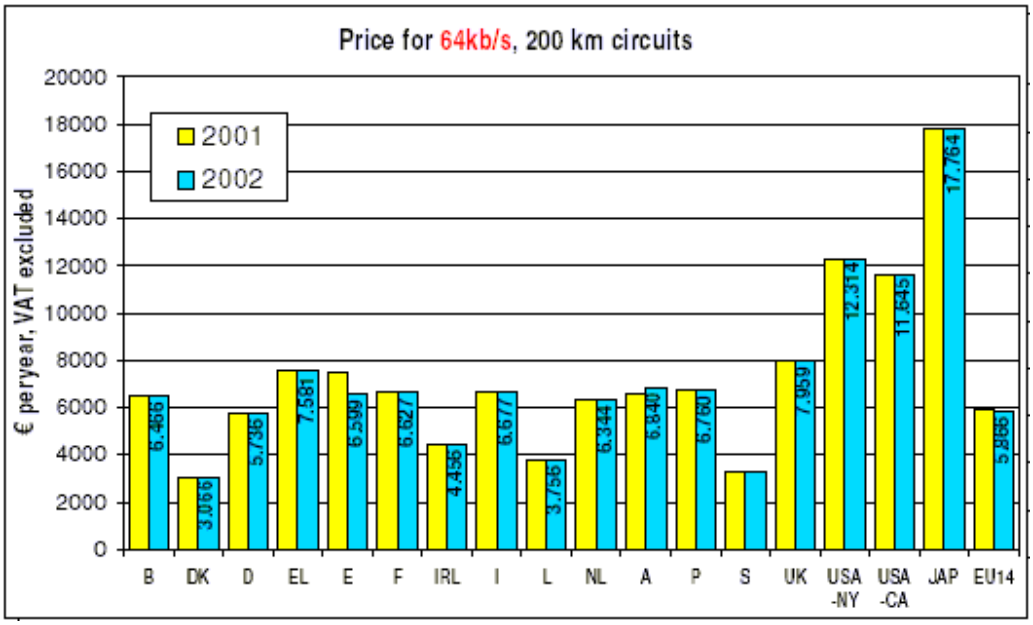
B.81 The European Commission's *Eighth Report on the Implementation of the Telecommunications Regulatory Package* (December 2002), provides several charts comparing the prices of leased lines of different lengths and different bandwidths offered by incumbents in Europe, North America and Japan. Concerning low bandwidth traditional interface retail leased lines, the comparisons cover 64kbit/s and 2Mbit/s circuits for 2001 and 2002 (all EU countries are covered except Finland):

Figure B.2: Prices for 64Kb/s, 2km circuits



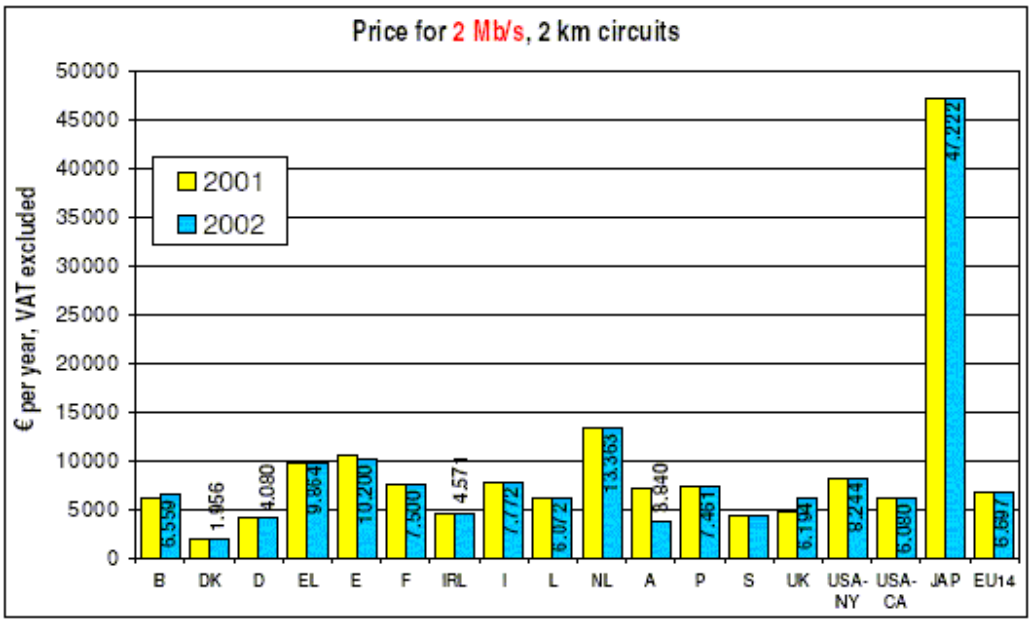
Source: European Commission

Figure B.3: Prices for 64Kb/s, 200km circuits



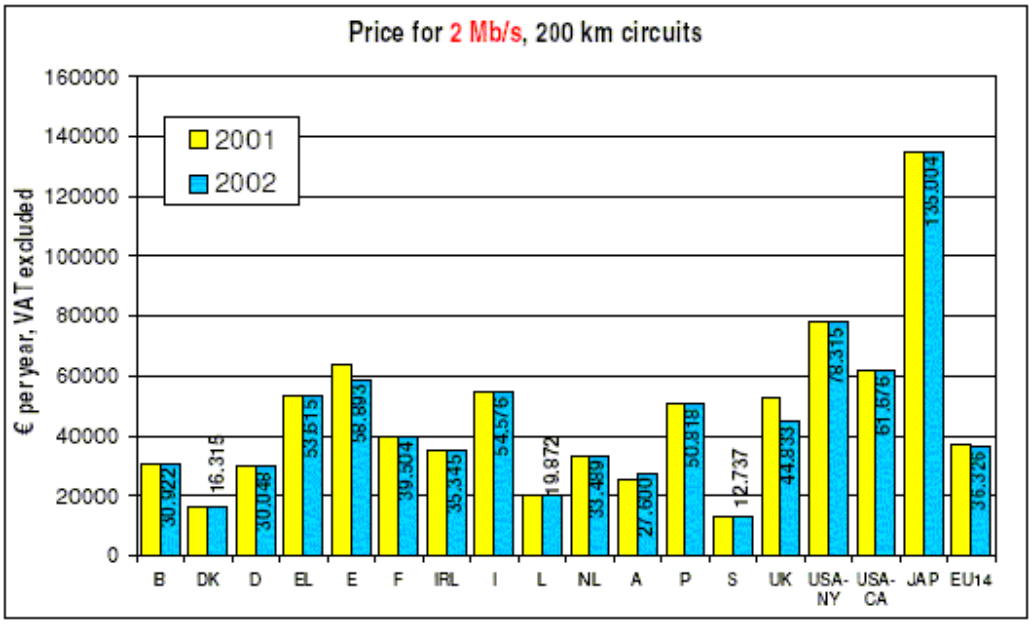
Source: European Commission

Figure B.4: Prices for 2Mb/s, 2km circuits



Source: European Commission

Figure B.5: Prices for 2Mb/s, 200km circuits



Source: European Commission

Comparison with other EU countries

B.82 For 64kbit/s traditional interface circuits, the charts indicate that the UK incumbent, BT, offers the highest price for both 2km and 200km length circuits among the EU incumbents. BT's prices have not changed between 2001 and 2002 for these circuits. For short circuits, BT's price is about €1,000 more expensive than the EU average price whereas for long circuits, BT's price exceeds the EU average price by more than €2,000.

B.83 For 2Mbit/s traditional interface circuits, BT's prices have decreased between 2001 and 2002 for short circuits but have increased for long circuits. Looking at BT's 2002 prices, it can be seen that for short circuits, BT's price is about €500 cheaper than the EU average price (six EU incumbents offer cheaper prices and seven EU incumbents offer higher prices). For long circuits, BT's price exceeds the EU average price by about €8,500 (nine EU incumbents offer cheaper prices and four EU incumbents offer higher prices).

B.84 Notwithstanding the usual caveats of such a comparison exercise (incumbents price their circuits differently with varying, often unpublished, discount structures; they rarely offer identical products; and they may have different approaches to cost recovery), BT appears to be offering high prices for low bandwidth traditional interface retail leased lines compared to other EU incumbents. Only for short 2Mbit/s circuits does BT appear to offer a price in line with the EU average. There does not seem to be any obvious reason why BT

would face higher costs than other incumbents to supply these leased lines, that would justify BT's high price levels. BT's high prices for low bandwidth traditional interface retail leased lines therefore are consistent with the view that BT enjoys a degree of SMP in this market compared to other EU incumbents.

Comparison with non EU countries

B.85 For 64kbit/s traditional interface circuits, the charts indicate that only Japan's incumbent sets higher prices than BT for short circuits (roughly three times as much) whereas for long circuits all non-EU incumbents set higher prices (at least 45% more expensive).

B.86 For 2Mbit/s traditional interface circuits, Japan's incumbent sets much higher prices than BT for short circuits (almost eight times as much) and the US representative incumbent asks for slightly more (about €2,000 more). For long circuits all non-EU incumbents set higher prices (at least 40% more expensive) than BT.

B.87 In other words, BT always offers a better deal than the Japanese incumbent. North American incumbents seem to be significantly cheaper only for short 64kbit/s traditional interface circuits.

B.88 The Director is aware that the most recent international benchmarking exercise reveals, despite its methodological caveats, that BT was able to quote traditional interface retail prices frequently above the European average price. Looking forward, the Director anticipates that the introduction of remedies at the wholesale level will have a positive impact on the level of competition in the low bandwidth traditional interface retail leased line markets.

Responses to the previous consultation - retail low bandwidth traditional interface leased lines

B.89 Although not all respondents agreed on the precise bandwidth split, most communications providers agreed with the Director's conclusions that BT has SMP in the retail low bandwidth traditional interface leased lines market. Several respondents disagreed with the Director's conclusion that no remedy should be imposed on BT in the retail high and very high bandwidth traditional interface leased lines markets, on the grounds that BT leverages market dominance from retail low bandwidth traditional interface leased lines market to these markets through various discount schemes. The Director intends, as noted above, to consider separately any specific complaints of this nature.

B.90 In its response, BT disagreed with the Director's conclusions on forward-looking SMP for retail low bandwidth traditional interface leased lines. BT considers that the availability of PPCs will lead to a significant reduction in BT's share of the retail low bandwidth traditional interface leased lines market over the

next two years, to the extent that BT will no longer have SMP. BT mentions that 76,000 PPCs have been sold already and it expects that this number will increase significantly in the next 24 months.

B.91 The Director does not anticipate that BT's market position in the retail low bandwidth traditional interface leased lines market will change sufficiently in the next 2-3 years, and he remains of the view that BT will still have SMP on a forward-looking basis.

B.92 There are several reasons for this conclusion. First, barriers to switching (contractual terms and penalties, inertia, discount schemes, BT's brand, customer perception, etc) slow down the rate at which communications providers can win end users away from BT. These barriers are not affected by the implementation of a wholesale remedy.

B.93 Second, the economies of scale and of scope specific to retail activities are unlikely to be significantly reduced in the short term by the creation of a wholesale remedy.

B.94 Third, even though the number of circuits that migrated from traditional interface retail leased lines to PPCs may be large (about 43,000 as at August 2003 according to BT's latest figures) this migration has had only a small impact on BT's market share. In addition the number of new PPCs (as opposed to those migrated from existing private circuits) sold (about 17,000 according to BT's latest figures) can only be an upper bound indication of the decrease of BT's retail market share, because PPCs are used for other purposes besides traditional interface retail leased lines.

B.95 Finally, market conditions are such that telecommunications budgets both of end users and of communications providers are under pressure. This is unlikely to generate a situation in which communications providers' positions in the retail low bandwidth traditional interface leased lines market can improve rapidly and significantly, especially given BT's current very high market share. This is because a slow demand growth and tighter rules governing investments in network expansion are expected to make it harder to attract new customers as well as customers away from BT.

B.96 BT also draws the Director's attention to international comparisons which it believes are likely to be misleading. The Director agrees that such comparisons are made more difficult by the differing price and discount structures operating in different countries, but he considers that the overall picture given by these comparisons is consistent with the other clearer indications of SMP set out by the Director.

Conclusion on assessment of SMP in low bandwidth traditional interface retail leased lines

B.97 The assessment of the above criteria clearly indicates that BT currently possesses SMP in the retail market for low bandwidth traditional interface leased lines. Key factors, such as market share, barriers to switching, customers' inertia and the absence of wholesale remedies until recently, have made entry in the low bandwidth traditional interface retail leased lines market difficult and unattractive. As a result, competition has not been intensive and customers may not get good value for money. The recent international benchmarking figures, information from customers about BT's prices relative to competitors and BT's estimates of its profitability for low bandwidth digital leased lines are consistent with this view.

B.98 Wholesale remedies – the availability of PPCs – will promote competition and make entry easier, but the Director does not consider that BT's current strong market position will be undermined to the extent that its SMP will be removed within the next two years. The main reasons why the Director believes that BT will continue to able to behave to an appreciable extent independently of competitors and customers in the absence of retail regulation are:

- its current very high market share (73-78% by value, and even higher by volume); and
- the absence of a rapid declining trend in BT's market share.

B.99 The Director considers that, additionally, the factors outlined below are relevant:

- contractual, financial, and perceived barriers to switching;
- economies of scale and scope for retail activities;
- remaining scope for vertical leverage given the difference between marginal and average costs; and
- profitability and excessive pricing.

Likelihood of competition developing in the future

B.100 The Director has considered the potential impact of external factors on this market during the period covered by this review. The Director's view is that there are no developments that would generate sufficient competitive pressures within the next 2-3 years to alter the current finding of SMP. This is because the sources of SMP are high structural barriers to entry and because demand conditions and technological progress are unlikely to be able to reduce the strength of these entry barriers in the near future. However, the Director will keep market conditions under review.

Market for wholesale trunk segments in the UK

B.101 The Director's market assessment of the trunk segment market has been conducted assuming the presence of his proposed wholesale remedy in TISBO, but in the absence of his proposed remedies in the trunk segments and retail markets. The reasoning behind this approach is outlined in Chapter 3.

Wholesale trunk: summary of conclusions

B.102 The Director considers that BT has SMP in the market for trunk segments. He has reached this initial conclusion based on an analysis of:

- the ubiquity of BT's infrastructure and number of routes subject to little or no competition;
- barriers to entry;
- economies of scale;
- the relatively high percentage of terminating segments with which trunk segments were purchased from BT (especially given the charges set by BT); and
- BT's vertical integration; and
- Information supplied by BT suggesting that trunk segments are currently priced above cost.

B.103 The analysis outlined in the following subsections is conducted with a focus on the ability of communications providers to compete with BT in the provision of trunk segments defined as conveyance between the Tier 1 nodes of BT's SDH network. However, it is important to note, as outlined in Annex A, that, in the case of SDSL based services, the core portion of end-to-end circuits are conveyed across BT's ATM network. This issue is very unlikely to be of key importance in the context of the Director's SMP finding in the trunk market as a whole. SDSL is an emerging technology, currently restricted to a very small number of users, that is unlikely, due to this newness and other factors such as distance limitations, to displace a large proportion of the current volumes of SDH based leased lines products within the next 2-3 years.

B.104 In the context of trunk services offered over the ATM network, some aspects of the Director's SMP analysis, eg the data regarding the proportion of the current stock of PPCs that have been sold with a trunk segment, are not relevant and cannot be replicated specifically in the context of SDSL based services since SDSL based symmetric broadband origination has not yet been offered.

B.105 The number of SDSL based circuits that have been sold remains relatively small, meaning that it is difficult to make an SMP assessment based on evidence relating specifically to SDSL. However, the Director notes that many of the above factors are equally applicable to the assessment of the ability of communications providers to compete with BT in the conveyance of traffic across its ATM network, since:

- conveyance across the ATM network is subject to similar issues of barriers to entry in terms of replicating the ubiquity of BT's network (see the Director's review of the Wholesale Broadband Access Market, 16th December 2003, http://www.ofcom.org.uk/consultations/current/wabmr/wbamr.pdf for details) ;
- conveyance across the ATM network is also characterised by economies of scale (see the broadband market review for details); and
- similar issues with regard to capturing a share of conveyance across the ATM network are likely arise as a result of BT's vertical integration

B.106 The last point, ie the issue of vertical integration, is likely to be particularly important in the context of circuits provided over SDSL. SDSL based circuits will compete with circuits in the low bandwidth market. This means that, as discussed in the discussion of SMP for low bandwidth TISBO, BT's market share of the relevant market at the access level is likely to be persistently high (the Director notes that BT's current share of the low bandwidth access market is currently in excess of 80%). This share is likely to be considerably higher than it is in the broadband access market, in which, significantly, the cable operators have a significant market share. The Director's view is that it is unlikely that the cable networks will be able to economically provide symmetric services for the foreseeable future. This means that, in the case of SDSL based circuits, other communications providers are likely to be unable to compete for a significant proportion of trunk sales over the ATM network, since BT will self-provide the trunk elements of its retail leased lines.

B.107 In the light of these factors, the Director's view is that his trunk segments SMP assessment is largely applicable to the core component of end to end circuits that utilise SDSL based access segments.

Wholesale trunk: quantitative information criteria

Market shares

B.108 An important point to note concerning this, and all other wholesale markets, is that the Director's analysis has been informed by the use of market share estimates based on data provided to him regarding retail leased lines. Traditional interface retail leased lines are the most prominent of the services that may be offered using trunk and TISBO as inputs. However, as discussed in Chapter 2, the Director's wholesale market definitions and SMP assessments relate to the provision of these services for all end user applications. Comprehensive market share data on trunk segments is difficult to obtain, since trunk segments are used as an input into a range of retail services.

B.109 The quantitative information relating specifically to trunk segments that has been made available to the Director is set out below in the Director's discussion of the issues relating to BT's advantages that are derived from the ubiquity of its infrastructure.

B.110 Due to the number of end uses to which services in these markets are put to, it is difficult to directly measure BT's share of the total number of trunk segments in the UK. However, the following pieces of information are valuable indicators:

- BT's combined share of all traditional interface retail leased lines markets by revenue is in excess of 70% (as of the end of January 2003), as it has been for the past 5 years; and
- between January 2002 and July 2003, BT sold a number of PPCs to other operators. Information supplied to the Director by BT revealed that something in the region of 60% of these (see information on the "proportion of PPCs sold with trunk segments" below) were sold with an element of trunk segment.

B.111 The level and persistence of BT's share of the total trunk segments market is well above a level that the Director would associate with a presumption of dominance. The Director is not aware of any reason why the use of traditional interface retail leased lines data would provide a biased estimate of market shares in trunk segments.

Excess pricing and profitability

B.112 On page 110 of the 2002/03 CCA Financial Statements (http://www.btplc.com/Corporateinformation/Regulatory/Financialstatements/PDF2003/Finalstats2003g.pdf), BT has provided a comparison of the costs of regulated PPC services alongside the average priced charged over the same period. Based on this information it is noticeable that, for trunk segments, the

prices charged for all identified bandwidths is well above the standalone cost ceiling as determined by BT.

B.113 The table below is an extract from BT's 2002/03 financial statements.

Table B.4: BT's costs and charges for trunk segments (£ per km)

	LRIC "floor"	FAC	SAC "ceiling"	Average charge	Excess of charge over SAC
2 Mbps	4	4	10	21	110%
34 Mbps	29	33	67	115	72%
140/155 Mbps	61	71	162	244	51%

Source: BT

B.114 The Director is not familiar with the precise way in which the above figures were calculated by BT. At first sight though, the fact that BT is able to price trunk segments at a level that is a long way above the level of fully allocated cost, and also well above standalone cost, is consistent with BT enjoying SMP in this market. The Director also notes that at such prices BT has still sold trunk segments with about 60% of terminating segments (see Figures B.7 –B.9 below for details). This suggests that other communications providers are unable to quickly switch to the use of trunk segments that are either self-provided or supplied by another competing operator.

B.115 The above data may not provide conclusive evidence on its own without further investigation. Nevertheless it suggests to the Director that BT is able to price independently of its competitors, and as such is in a position of SMP.

International benchmarking

B.116 International benchmarking data on trunk segments is not available to the Director.

Wholesale trunk: firm-related criteria

Technological advantages or superiority

B.117 This criterion is of minimal relevance to trunk segments since:

- the technology of traditional interface leased lines is well established and known to all communications providers; and
- the incumbent is supplied with technological inputs by the same firms as other communications providers.

B.118 BT has additionally stated that it operates a relatively expensive PDH network and a modern SDH network, while its competitors only operate modern SDH-only networks. This could be viewed as indicating that BT is in some (limited) aspects of its technology at a disadvantage relative to other communications providers. The Director, however, considers that these factors are not significant enough to make this criterion an essential part of his market power assessment.

Control of infrastructure not easily duplicated

B.119 BT and other communications providers have supplied the Director with maps detailing the extent of the fibre optic networks built by the UK communications providers in the UK. These have not been replicated here, but are publicly available, notably on other communications providers' websites. Based on this information, it is clear that a number of such networks have now been built. In particular, many other communications providers have points of presence linking the UK's major cities, such as London, Leeds, and Birmingham. However, a number of other areas do not, based on the examination of these maps, appear to have been covered by the rollout of other communications providers' networks. The following sections describe evidence provided to the Director by BT concerning this issue.

Network reach information for BT and other communications providers

B.120 Other communications providers are usually reliant on BT for obtaining TISBO (see the assessment of SMP in TISBO below). Because of this, in order for another communications provider to be able to compete with BT in the trunk market, either through self-provision or supply to other communications providers, its network must be able to provide capacity between the locations of BT's Tier 1 nodes in the same manner as BT's own trunk network.

B.122 BT has supplied the Director with a series of maps detailing the location of BT's Tier 1 nodes relative to the PPC nodes of the other communications providers. These diagrams show that even the largest communications providers have not fully replicated the coverage of BT's trunk network, particularly outside the main metropolitan areas. These diagrams have not been reproduced in this document due to issues of confidentiality. Diagrammatic evidence of this sort is useful on an indicative basis, but has obvious limitations. The Director has therefore undertaken a more detailed analysis of the location of BT's network configuration and that of other communications providers. This analysis reveals that a number of other communications providers are in a position to provide trunk segments over a significant number of what the Director would expect to be the most important (in terms of capacity requirements and revenue potential) intra Tier 1 routes, notably between the UK's major urban areas. This suggests a significant degree of competition on these routes. Equally however, the ubiquity, ie very extensive geographic reach, of BT's network means that there are a

number of intra Tier 1 routes on which little or no competition seems currently to exist. In addition, given the costs of network extension the prospects for greater competition to develop on these routes in the foreseeable future appears to be weak. The relative importance of each trunk route in terms of the total market is difficult to quantify in the absence of very detailed volume information.

B.123 As of February 2003, BT had 65 Tier 1 nodes, meaning that there are over 2000 possible trunk routes between pairs of Tier 1 nodes (the number of possible routes calculated as $[65^2-65]\div 2$). On the assumption that presence at two Tier 1 nodes confers the ability to provide conveyance between them on a given trunk route, in order for a constraint to be provided on BT's ability to behave independently of competitors, at least one competing communications provider must have a point of presence sufficiently close to both the relevant Tier 1 nodes. The Director's analysis of the data provided by BT indicates that there are a large number of routes on which BT seems unlikely to be constrained. A summary of his analysis was provided in the previous consultation. Table B.5 in the previous consultation summarised the information provided by BT in a format along the lines of, "on X% of all trunk routes, there are no other communications providers with points of presence within Y km of both the relevant Tier 1 nodes".

Responses to previous consultation – network reach information

B.124 BT provided a number of comments on the Director's analysis as outlined in the previous consultation. The key points outlined by BT were that, in its view:

- effectively treating all Tier 1 nodes as being equal, ie not taking into account that some would be of minimal importance in the relevant markets, was likely to bias the Director's analysis towards underestimating the potential for competition in the market and that an alternative approach would provide a more accurate picture; and
- by only analysing those nodes with which communications providers already had hand-over points with BT (this was done because the Director has been obliged to rely on data supplied by BT rather than by all communications providers), the Director was underestimating the potential for competition; and
- the Director's focus on Tier 1 nodes underestimated the degree of competitiveness in the market since competing communications providers are also able to interconnect at lower tier, ie Tier 1.5/2/3 nodes;
- a proximity of 15km from a communications provider's point of presence to a BT Tier 1 node was, "clearly adequate to indicate that a competitor is able to compete on a route"

B.125 Other communications providers broadly agreed with the Director's chosen approach and his conclusions. It was suggested that even a proximity of 1km from a communications provider's point of presence to a BT Tier 1 node was insufficient, and that physical interconnection was required to provide a sufficient competitive constraint.

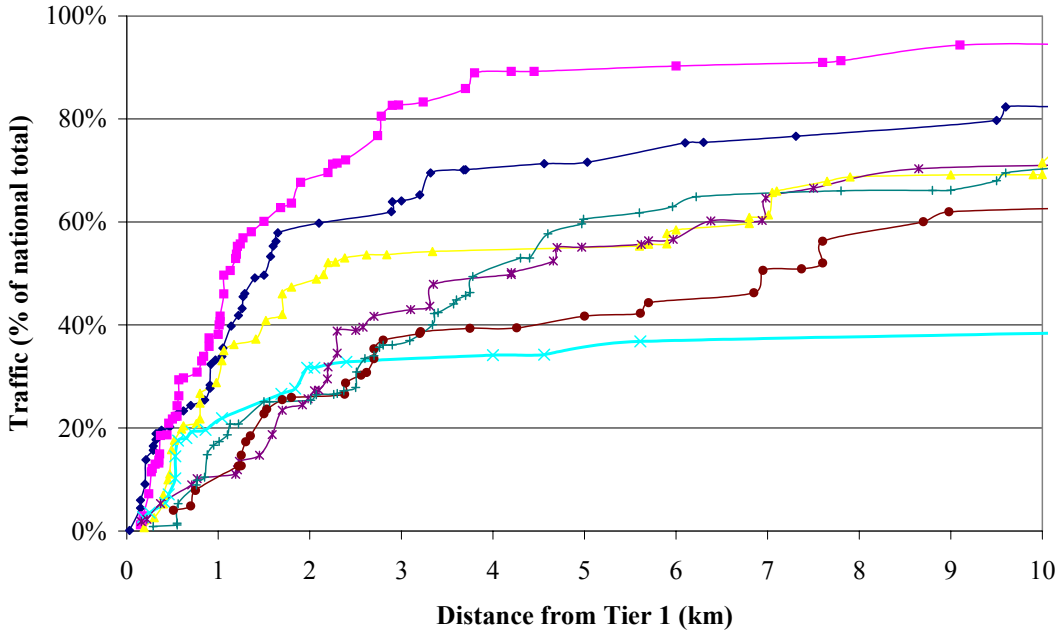
New analysis

B.126 In the light of the comments made by BT, the Director refined his analysis regarding the proximity of BT's Tier 1 nodes to other communications providers' points of presence. The results of this analysis are outlined in the chart in Figure B.6 below. The analysis was informed by two further data sources supplied to the Director following the publication of his first consultation. These related to:

- the volume of traffic passing through each of BT's Tier 1 nodes; and
- a comprehensive list of the network points of presence of the alternative communications providers

B.127 The chart in Figure B.6 is made up of seven curves, each representing the network coverage of seven of the biggest alternative network communications providers in the UK as of 2003. The curves represent the proximity of alternative networks to BT's Tier 1 nodes, where each BT node is weighted according to the proportion of % of total traffic passing through it. This traffic includes all traffic carried over the SDH network (including private circuits but also other services). Each curve can be interpreted as follows – it shows, for all the network points of presence of a given communications provider, the proportion, weighted by traffic, of BT's Tier 1 nodes that can be reached by a communications provider by digging various radial distances. The traffic weighting is intended to provide a proxy of the number of private circuits connected to each Tier 1 node, this being the best measure that was available to the Director, and not one that seems likely to bias his analysis significantly.

Figure B.6 - % of BT traffic at Tier 1 nodes potentially competed for by communications providers within a given radial distance



B.128 Figure B.6 shows, for example:

- the competing communications provider with the greatest level of network coverage (corresponding to the curve that is vertically the highest in the chart above) could potentially compete for almost 40% of the traffic at BT's Tier 1 nodes by digging 1km from its points of presence; and
- the same communications provider could potentially compete for almost 95% of the traffic at BT's Tier 1 nodes by digging 10km from its points of presence

B.129 BT's response to the previous consultation featured a similar analysis to the one outlined above. It divided the UK into 121 postcode areas and hence 7,260 "inter postcode area" routes. These routes were weighted according to the number of business sites in each and the areas in which BT had points of presence. BT stated that the results of this analysis showed that "BT's Tier 1 network can supply trunk links for a lower percentage of routes than any of three other communications providers, and significantly fewer than one of these".

B.130 The Director's view is that this type of analysis may be of some interest. However, he considers that his own analysis presents a better portrayal of the degree of competitiveness in the trunk market. This is because, significantly, BT's use of the "number of businesses per postcode area" is a considerably cruder measure of the relative importance of different trunk routes than the Director's own total traffic weighting. This is because using the total number of

businesses as a weighting measure does not take into account the size of different businesses in terms of their importance with regards to communications markets.

B.131 The Director agrees with the view expressed by network communications providers that communications providers need to be located at or very close to Tier 1 nodes in order to provide a constraint on BT. This is because of the significant time needed and cost that must be incurred in order for a competing communications provider to self supply such additional links, or to buy PPCs from BT. BT is obviously able to provide such links to itself very quickly and has clearly already built out to all of its own nodes. This view contradicts BT's assertion that a proximity of 15km from a communications provider's point of presence to a BT Tier 1 node was likely to be adequate to enable it to compete on a given route. The Director is therefore of the view, given the evidence and arguments outlined elsewhere in this section, that Figure B.6 shows that, while there is potential for competition on a number of trunk routes, that as yet such potential has significant limitations.

Information on PPC trunk segments sold to other communications providers by BT

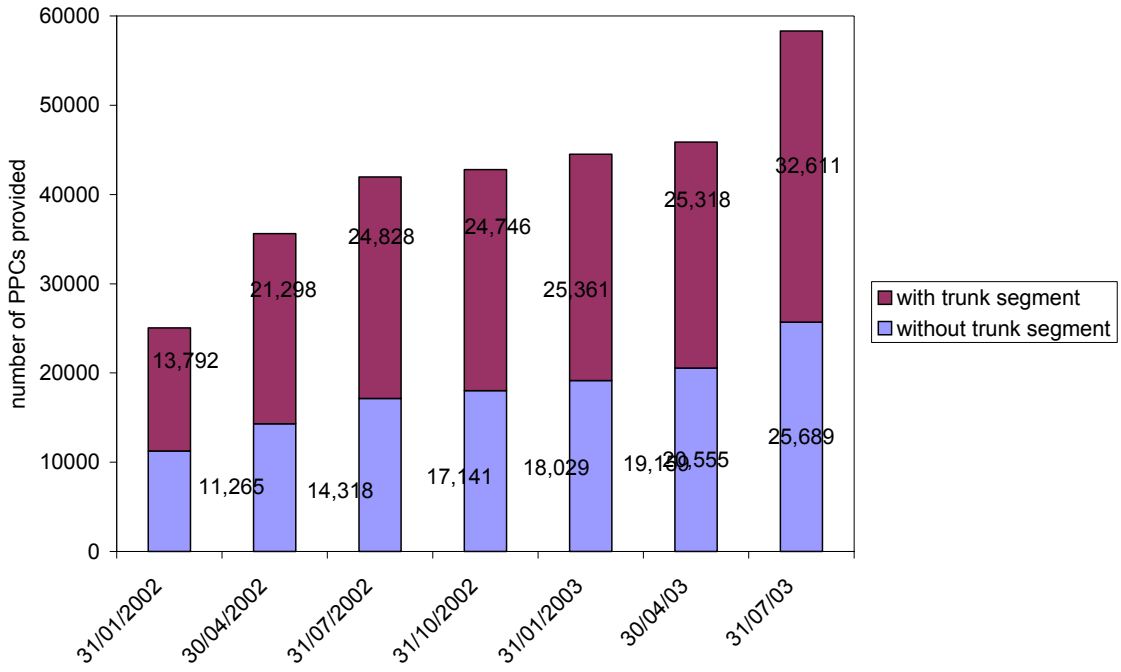
B.132 The previous section suggests that other communications providers may, in many cases, be forced to used BT as a source of trunk segments if they are to be able to provide traditional interface leased lines products to end customers. BT has additionally supplied the Director with information concerning the proportion of PPCs that it has sold (in the period up to the end of July 2003) that include a trunk segment. When purchasing a terminating segment from BT, other communications providers currently have the choice of also buying a trunk segment or self-providing (or buying from another communications provider if a price can be negotiated). The Director has set charges for BT's terminating segments (see his Phase II Direction), but the charges for trunk segments were set by BT, not the Director.

B.133 Communications providers have informed the Director that they generally prefer to self-provide trunk segments where they can. Given the above considerations, the Director's interpretation of such information is that, where a large proportion of PPCs are sold with trunk segments, this is likely to suggest that other communications providers are unable to either self provide trunk segments or source them from elsewhere (especially given the currently high trunk segment charges as outlined in paragraphs B.107-B.110).

B.134 The results of such an analysis should be interpreted with a degree of caution, since the PPCs are still a relatively recent introduction (they have been available since August 2001). A further relevant consideration is the extent to which any dependence on BT's trunk segments by other communications providers will persist. However, the Director believes that the results shown

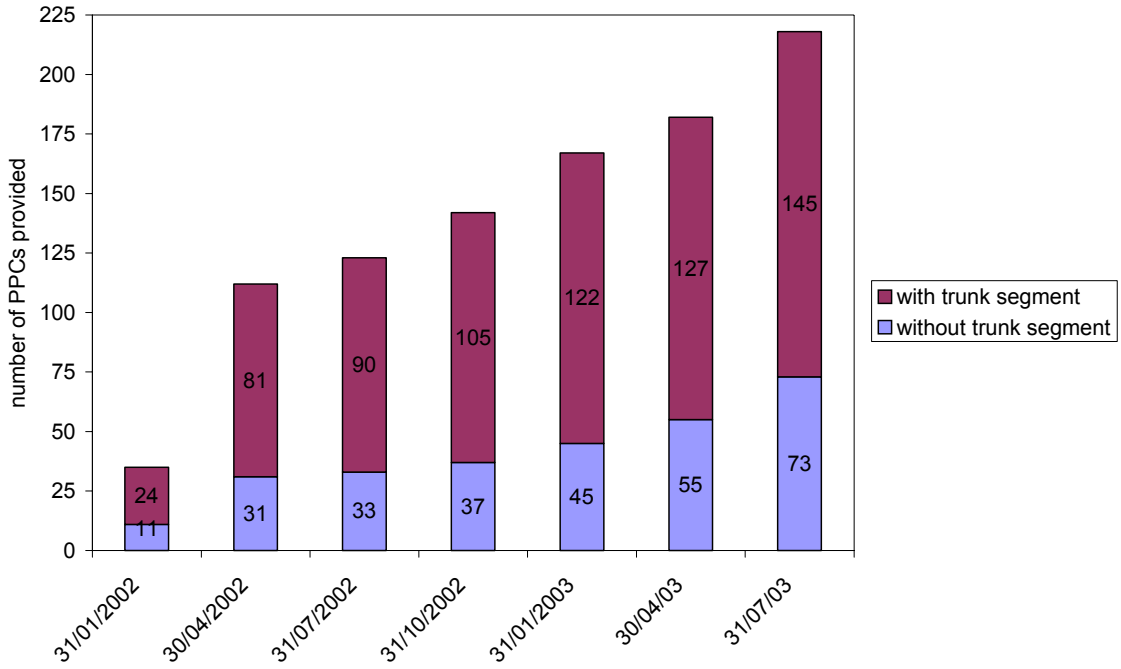
below are striking and as such strongly suggest that other communications providers are currently dependent on BT for the supply of trunk segments in most cases.

Figure B.7: Low bandwidth (<= 2Mbit/s) PPCs – numbers provided with and without trunk segments



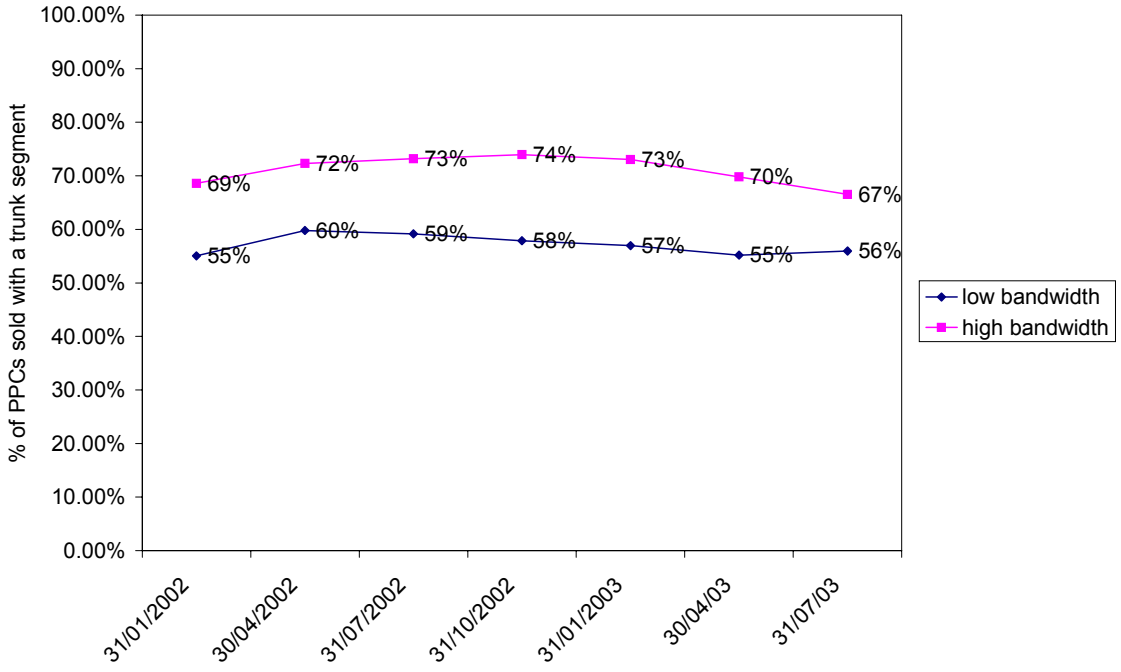
Source: BT data and Oftel analysis

Figure B.8: High bandwidth (>= 34Mbit/s) PPCs – numbers provided with and without trunk segments



Source: BT data and Oftel analysis

Figure B.9: PPCs – % provided with and without trunk segments



Source: BT data and Oftel analysis

B.135 In Figure B.9 above, the total (ie sum of low and high bandwidth) time series is indistinguishable from that for low bandwidth, since as indicated in the previous Figures, the number of low bandwidth PPCs sold far exceeds the number for high bandwidth PPCs. The figures above show that:

- the majority (55%-74%) of the PPCs that BT has sold include a trunk element;
- this proportion does not appear to be declining substantially; and
- the above is particularly marked in the case of high bandwidth PPCs.

B.136 The following should be noted when interpreting the above:

- the above charts do not provide information on the length of trunk segment involved in each PPC – in some cases, other communications providers' dependence on trunk segments may be restricted to short distances; and
- the definition of "trunk" used in the above data has not been fully agreed on by BT and Oftel, and as such may be subject to change.

B.137 The data presented in this section suggest that other communications providers are, to a significant extent, dependent on BT for the supply of trunk segments. In this review it is also relevant to take a forward-looking view and so the Director has considered the extent to which this dependence is likely to persist. Communications providers have been unable to provide the Director with estimates of the cost of trunk network expansion, due to the varied, bespoke nature of such projects. However, submissions received by the Director from other communications providers suggest that none of the Other communications providers intend to expand their trunk network coverage within the next year or so. It appears likely to the Director that such expansion would be too costly and time consuming for the prospect of it to provide a substantial constraint on BT's conduct. The Director therefore considers that, even on a forward-looking basis, BT's ubiquity puts it at a very significant advantage over other communications providers in the trunk segment market.

Responses to previous consultation – PPCs sold with trunk

B.138 In its response to the previous consultation, BT commented that it expected the proportion of PPCs sold with trunk segments to decline following the introduction of (following the Director's PPC direction) differential charging for private circuits at the intra Tier 1 level..

B.139 The Director does expect that the proportion of PPCs sold with trunk segments should be expected to decline over time as communications providers optimise their networks to reflect the Tier 1 pricing scheme referred to by BT. However, such network build out will take time, and, as demonstrated by Figures B.7 and B.8, competing communications providers are currently dependent on BT for the supply of trunk segments to a very significant extent, the proportion of PPCs sold with trunk segments having remained at a broadly constant level

between January 2002 and July 2003. Data of this sort will be considered when the Director next reviews leased lines markets.

B.140 BT also suggested that an analysis similar to the one outlined above (using older data) was potentially misleading since several of the PPCs covered by the chart above could be routed without a PPC trunk segment, ie had been supplied with “unnecessary trunk”. BT’s analysis suggested that the % of circuits supplied with “necessary” trunk might be in the region of 25% to 40% for high and low bandwidth PPCs respectively. The implication of BT’s analysis was that such “unnecessary trunk” was irrelevant for the purposes of the SMP assessment.

B.141 The Director considers that, given that BT’s trunk charges are currently above cost (see Table B.4 above for details), the high proportion of PPCs that are sold with an element of a trunk segment provides persuasive evidence of communications providers being dependent on BT for the provision of trunk segments. Asserting that many circuits are not “non-optimally routed” ignores the reality that it is not economic for communications providers with multiple network nodes to interconnect at all of BT’s Tier 1 nodes. Competing communications providers face a fixed per node cost of interconnection that in many cases may mean that it is only economic for the communications provider to interconnect to a subset of nodes that may, at a local level, result in some circuits being routed “non-optimally”.

Economies of scale

B.142 The Director’s opinion is that the trunk segments market is characterised by large economies of scale. The reason for this is that there exist large fixed costs, for example the costs of supplying duct and cables. Once these large up-front costs have been sunk, the cost to communications providers of supplying larger volumes of individual circuits (or higher bandwidths) is relatively small. This characterisation is supported by cost volume relationships (CVRs) previously estimated on behalf of the Director by Europe Economics as part of a study commissioned in 2000.

B.143 Europe Economics developed a ’bottom-up’, economic-engineering model of traditional interface leased line costs. Such models are typically very useful in informing the way in which costs vary with volume, because in their construction they focus on building up the costs by identifying the relevant cost drivers and the way in which costs arise. The CVR is the percentage increase in total cost arising from a small percentage increase in volume. A CVR equal to 1 would imply no economies of scale; a CVR of less than 1 indicates the presence of economies of scale, and the lower the figure, the greater their extent. The CVRs used below refer to the core element of the provision of end to end leased lines, and as such are useful as a proxy for the cost relationships inherent in the provision of intra Tier 1 transmission.

B.144 The CVRs estimated by Europe Economics imply the existence of substantial economies of scale in the provision of trunk segments. For example, its model calculated the following CVR slope coefficients (expressed in % terms) relating to core networks, where volume measures total capacity in terms of Mbit/s:

- duct – 0%;
- optical fibre – 11%;
- SDH equipment – 46%; and
- operating costs– 30%

B.145 Corresponding estimates calculated by BT were as follows:

- duct – 36%;
- optical fibre – 30%; and
- SDH equipment – 91%

B.146 These factors outlined above mean that the Director considers that the provision of trunk segments is characterised by significant economies of scale. In order to assess whether or not BT is able to exploit these economies of scale, it is necessary to compare the volumes of trunk segments provided by BT relative to other communications providers. Since BT's current share of the total trunk market is at least 70% (see discussion of quantitative data relating to trunk segments), it seems likely that BT is in a position to exploit these scale economies to a greater extent than its competitors. This might not be the case if other communications providers were to achieve higher utilisation levels than BT. The Director considers this to be unlikely on the majority of trunk routes, since BT's number of trunk circuits sold is so much greater (see the discussion of quantitative information above) than that of the other communications providers.

B.147 In summary, it seems likely that BT's position in the trunk segments market is substantially strengthened by its ability to exploit economies of scale.

Economies of scope

B.148 Economies of scope arise with the production of the trunk segments when some of the costs of supplying trunk segments can be shared with other products. The magnitude of economies of scope depends on two factors: the range of products and services with which some common costs are shared, and the volume of these various products and services.

B.149 Communications providers use their trunk networks to carry a range of products other than traditional interface leased lines. These include PSTN, ATM, and frame relay. The evidence made available to the Director regarding the utilisation of communications providers' trunk networks suggests that the

provision of leased lines accounts for a no greater proportion of the total trunk capacity of those other communications providers for which information is available than it does for BT. It therefore seems that, on the basis of the first factor influencing the magnitude of economies of scope, BT is not in a position to exploit these to any greater degree than other communications providers.

B.150 However, on the basis of the second factor influencing economies of scope, that is the actual volumes of the various products and services generating the economies of scope, BT appears to be in a better position to exploit these economies of scope than other communications providers. This is because BT has a larger customer basis for any of these products and services and serves a larger volume for each of them than any other communications provider.

B.151 The Director is therefore of the view that BT enjoys greater economies of scope in the trunk segment market than other communications providers and that, by enabling BT to obtain a cost advantage over its competitors, it is a source of market power for BT.

Product/services diversification

B.152 BT's dominant position in certain product markets (see, for examples, the Director's *Review of fixed narrowband retail markets* at www.oftel.gov.uk/publications/eu_directives/2003/eu_retail/index.htm) narrowband market reviews) could potentially be levered into other markets (including the trunk segments market) via the use of bundling. However, this type of conduct does not appear to impact on trunk segments, which BT has typically not offered as part of a bundle of goods.

Vertical integration

B.153 Vertical integration can be used to promote dominance. In the context of the trunk segment market, vertical integration refers to the integration between the upstream wholesale markets (both TISBO and trunk segments) and the downstream traditional interface retail leased line markets.

B.154 The 'multi-vendor circuit' argument provides a potential benefit to BT from being vertically integrated. This argument refers to the fact that some retail customers may avoid purchasing leased lines that are made up of elements coming from more than one communications provider's network. Given the ubiquitous nature of its network, BT is the communications provider that is in the best position to satisfy customers with uni-vendor preferences. BT is therefore the communications provider best positioned to supply the entire leased line on its own network.

B.155 Some evidence available to the Director suggests that some customers have uni-vendor preferences. But there is insufficient evidence available to the

Director to reach a firm conclusion on how widespread such preferences are, or the extent to which they will persist into the future. Therefore, while it is a potential source of advantage and market power for BT, the Director has not relied on it in reaching his conclusion.

Trunk segments and retail circuits

B.156 BT's market share in the combined traditional interface retail leased lines markets is very large, having been consistently in the region of 70% on a revenue basis (see the section on quantitative information relating to trunk segments). Wherever a BT retail circuit includes a trunk segment, the trunk segment is supplied via self provision. Since BT does not purchase trunk segments from other suppliers, other communications providers are unable to compete for such sales, and so this effectively forecloses a very significant proportion of the total trunk segment market to other communications providers.

B.157 This puts BT at a significant advantage over other providers of trunk segments, providing it with a predictable high volume of capacity. There is an interaction with economies of scale, discussed above. BT's high retail market shares and its self-provision of trunk segments enable it to exploit greater economies of scale than its competitors. This puts BT at a cost advantage for the remaining trunk segments (ie those not part of BT retail leased lines), for which BT and other communications providers potentially compete.

B.158 As discussed in his assessment of SMP in the market for retail low bandwidth traditional interface leased lines, the Director expects that BT's share of the traditional interface retail leased lines markets will decline over time, following the full impact of the introduction of cost oriented PPCs. The extent of BT's advantage from vertical integration may, therefore, be lower on a forward-looking basis. However, as discussed above, the Director does not consider that in the next two years increased competition in the retail low bandwidth traditional interface market will be sufficient to remove BT's SMP. Therefore, even on a forward-looking basis, the Director expects that vertical integration and its interaction with economies of scale will provide a source of market power for BT in the wholesale trunk segment market.

Distribution and sales network

B.159 Certain products rely on costly sales/distribution systems in order to reach customers. The ownership of such systems may confer an advantage on a firm vis-à-vis its competitors, including potential competitors. Such considerations do not apply to the trunk segments market, which is characterised by a relatively small number of buyers, ie other communications providers, who can easily maintain an awareness of the prices and functionality of the products offered by vendors, who are also few in number. The size of BT's sale and distribution network does not therefore strengthen its position in the trunk market.

Access to capital markets and financial resources

B.160 BT's larger overall size and relatively strong balance sheet may put it at an advantage when it comes to funding new network infrastructure. A number of other communications providers have recently faced financial pressures that may have constrained their willingness and ability to invest in new areas. For example, some communications providers may be reliant on securing orders at the retail level before investing in network infrastructure, and may face a higher cost of capital.

B.161 In addition, the Director considers that some end users may be inclined to avoid, where possible, using products that rely on network inputs from certain communications providers that have been facing financial difficulties. BT, on the other hand, is perceived as being relatively secure and financially stable at a time when financial markets are volatile and investors risk-averse. The Director's view is therefore that BT's superior access to capital markets and financial resources may put it an advantage in this market. He does not consider this to be a key factor in his SMP assessment however.

Wholesale trunk: customer-related criteria

Countervailing buying power

B.162 All the buyers of trunk segments from BT are communications providers. Because of this, they are relatively few in number (compared, for example, to certain retail markets). If these other communications providers are able to exercise a strong negotiating position, BT's ability to act independently of these customers will be undermined. However, the information available to the Director (eg on the proximity of OLO's network nodes to those of BT, see the Director's discussion of network reach information above) suggests that on many trunk segment routes BT's trunk segment customers are unlikely to have any significant buyer power, since they are unable to credibly threaten to leave BT and get supply from another communications provider for trunk segments. For other communications providers, the alternatives to buying trunk segments from BT are buying from another communications provider and self-provision.

Wholesale trunk: market related criteria

Ease of market entry

B.163 Evidence supplied to the Director by BT (such as the maps described in this Annex) shows that many inter-city routes have been already been built by a number of communications providers. It seems less likely that building out on the remaining routes will occur, since these are typically routes where traffic density is lower.

B.164 The Director's view is that the self-provision of trunk segments by other communications providers is unlikely to be viable in many cases due to the very significant capital expenditure required to dig duct and install fibre and equipment. Given the small retail market shares that many other communications providers currently have (see the quantitative information sections for traditional interface retail leased lines and high bandwidth TISBO), this may be uneconomic. BT's status as a former monopoly, and its large traffic volumes, mean that this rollout has been economic for BT.

B.165 The Director has been unable to obtain a usable estimate of the cost to other communications providers of extending trunk network capacity beyond current levels, due to the highly bespoke nature of such projects. However, it seems certain that the sunk cost required would often be very significant, as would the amount of time required to complete such a project. This suggests to the Director that the prospect of competition developing on less dense routes on a forward-looking basis is limited within the timeframe relevant to this review.

Absence of potential competition

B.166 It seems extremely unlikely that new companies will enter the market, or that existing players will choose to expand their trunk network capacities beyond the areas currently served. This is discussed in the section on barriers to entry above.

Barriers to switching

B.167 Self-provision is the main potential source of switching in the trunk market. As discussed above, this is typically not economic on the routes that have not already been built on by communications providers. This market is therefore characterised by barriers to switching, but the Director has primarily based his SMP assessment on other considerations.

Customers' ability to access and use information

B.168 This criterion is not relevant for the assessment of the trunk segments market, since the buyers of PPCs (including trunk segments) are few in number and well-informed.

Wholesale trunk: intensity of competition criteria

Barriers to expansion

B.169 The Director believes that the importance of barriers to entry in markets for trunk segments is such that it is not essential to consider further constraints provided by barriers to expansion. This is because competition in wholesale

markets appears unlikely to extend beyond the existing market players, for the reasons outlined in the discussion of barriers to entry. It may be that a loss of retail market share experienced by BT will enable an expansion of the *addressable* market, ie the part of wholesale markets not foreclosed by BT's dominance at the retail level. In the light of these factors it seems inappropriate to further consider barriers to expansion.

Active competition on non-price factors

B.170 Non-price competition refers to differentiation between products and between providers, for example in terms of quality, product diversity or reputation. Trunk segments are products that on average are not prone to differentiation and for which reputation does not play a major role. An exception might be the scope for product differentiation that is provided by offering different quality of service. This can, for example, affect the reliability of the services or the speed at which faults are dealt with. The Director is not aware that competition on non-price factors, or its absence, is a source of market power for BT in this market, and that this criterion is therefore unlikely to play a significant part in his SMP assessment.

Conclusion on assessment of market power in wholesale trunk segments

Summary

B.171 The Director is aware that the degree of competition on trunk segment routes appears to differ significantly: some are subject to little or no competition; on others there exists a significant number of competing communications providers. For the reasons set out in Annex A the Director has concluded that it is not practical to define separate markets by route and he has instead decided to define a national market. Having considered the evidence, The Director concludes that BT has SMP in the national market for trunk segments. The Director has reached this opinion in the light of the available information concerning, in particular:

- the ubiquity of BT's infrastructure and number of routes subject to little or no competition
- barriers to entry ;
- economies of scale;
- the relatively high percentage of terminating segments with which trunk segments were purchased from BT (especially given the charges set by BT); and
- BT's vertical integration.

Market power in wholesale trunk segments- application to trunk segments used to support SDSL based circuits

B.172 As outlined in Annex A, SDSL based circuits fall into the market for low bandwidth traditional interface symmetric broadband origination. Core conveyance relating to these services is carried across BT's ATM network, rather than its SDH network. Most of the Director's analysis has been conducted with specific reference to this network. However, the Director believes that the key aspects of his analysis are equally applicable to services conveyed across the ATM network, since such conveyance is likely to be characterised by:

- barriers to entry in terms of replicating the ubiquity of BT's network;
- economies of scale; and
- similar issues with regard to capturing a share of conveyance across the ATM network are likely arise as a result of BT's vertical integration

B.173 The Director therefore considers that his SMP finding is equally applicable to trunk segments conveyed across the ATM network, and that his analysis is not undermined by the fact that current sales are insufficient for the Director to have carried out a wide-ranging quantitative analysis. This is because SDSL is an emerging technology, currently restricted to a very small number of users, that is unlikely, due to this newness and other factors such as distance limitations, to displace a large proportion of the current volumes of SDH based leased lines products within the next 2-3 years

Likelihood of competition developing in the future

B.174 The Director has considered the potential impact of external factors on this market during the period covered by this review. The Director's view is that there are no developments that would generate sufficient competitive pressures within the next 2-3 years to alter the current finding of SMP. This is because the sources of SMP are high structural barriers to entry and because demand conditions and technological progress are unlikely to be able to reduce the strength of these entry barriers in the near future. However, the Director will keep market conditions under review.

Market for low bandwidth traditional interface symmetric broadband origination for the UK apart from Kingston upon Hull

B.175 As explained in Chapter 3, the market power assessment of the traditional interface symmetric broadband origination ("TISBO") markets will be carried out in the absence of any remedy at both the wholesale and the retail levels.

B.176 Symmetric broadband origination is capacity between customers' premises and Tier 1 nodes on BT's network (or the equivalent on other communications providers' networks). It therefore involves local infrastructure. Figure 2.1 in Chapter 2 shows the distinction between TISBO and other wholesale services.

B.177 Competition in the markets for TISBO involves buyers that are also suppliers. Other communications providers may buy TISBO in some locations (where they do not own network) while self-providing in other locations (where they have network presence). Competition is limited when other communications providers cannot supply or self-provide TISBO and must therefore buy from BT. No instances of other communications providers buying TISBO from communications providers other than BT has been reported to date, although that may be a future development.

Low bandwidth TISBO: summary of conclusions

B.178 The Director considers that in the absence of wholesale and retail regulation, BT has SMP in this market. He has reached this initial conclusion based on an analysis of, primarily (see the detailed assessment for the examination of other criteria):

- The ubiquity of BT's infrastructure and the fact that such infrastructure is not easily duplicated;
- BT's ability to exploit economies of scale and scope;
- The existence of significant barriers to entry including sunk costs; and
- Vertical integration

Low bandwidth TISBO: quantitative information criteria

Market share

B.179 Given the recent introduction of the two PPC Directions and the infancy of the low bandwidth TISBO market, it has been difficult to collect reliable market share data. Furthermore, market power is to be assessed in this market in the absence of regulation, so market shares in the absence of PPCs would be the more relevant statistics. The evidence collected by means of information requests is however helpful to get a first impression of the situation. BT self-provides all its low bandwidth TISBO services. Among other communications providers, the extent to which self-provision of low bandwidth TISBO services occurs varies significantly depending on the strategies and the size of the other communications providers. The percentages submitted spread between 65% and less than 1%.

B.180 In the absence of reliable data on the wholesale market, the Director has analysed retail market shares as an imperfect proxy for shares at the wholesale level. The reasoning behind this approach is as follows. If other communications providers self-supply all their TISBO and all the TISBO services are used for pure leased line purposes, then retail market shares should be equal to TISBO market shares. However it is known that other communications providers are in many cases dependent on BT for terminating segments. The Director asked communications providers to report the percentage of TISBO they buy from BT in

order to supply low and high bandwidth traditional interface leased lines. The percentages reported varied from 35% to more than 99%. Since BT always self-provides wholesale inputs for its own retail leased lines, BT's share of TISBO is therefore larger than its retail share.

B.181 But there is a second effect. Prior to the availability of PPCs, BT's retail market share included circuits provided to other communications providers to be used as a wholesale input. So the 'retail' statistics captured both the (wholesale) sale by BT to the other communications provider, and the other communications provider's retail sale. This would tend to mitigate the extent to which BT's retail market share might underestimate BT's TISBO market share.

B.182 The issues involved in using retail market shares as a proxy for wholesale market shares are illustrated in the hypothetical example below, in a market in which there are 100 retail leased lines, 75 of which are sold by BT, and 25 of which are sold by other communications providers. All 25 of the other communications providers' retail leased lines are sold using TISBO supplied by BT as 'retail circuits'. In this hypothetical example:

- BT's true share of TISBO would be (75+25)/(75+25) =100%;
- BT's true share of the retail market would be (75)/(75+25) = 75%, ie necessarily smaller than its true share of the TISBO market; and
- BT's measured share of the retail market would be (75+25)/(75+25+25) = 80%

B.183 Data described in the retail low bandwidth traditional interface leased line market power assessment can be summarised as follows:

Table B.5: BT's market shares by revenues:

	97 – 98	98 – 99	99 - 00	00 - 01	01 - 02	02 - 03
BT's share	75%	75%	73%	77%	77%	77%

Source: Oftel Market Information

Table B.6: BT's market shares by volumes

	97 - 98	98 – 99	99 - 00	00 - 01	01 - 02	02 - 03
BT's share	83%	76%	78%	87%	82%	82%

Source: Oftel Market Information

B.184 BT's retail market shares, in the light of previous comments, suggest that BT's market shares in the low bandwidth TISBO market are likely to be even higher. A very rough attempt at estimating how much higher this would be can be

carried out as described in the following paragraphs, where 2001/02 is used as an example.

B.185 The 2001/02 data is known to better reflect the actual number of leased lines sold by each communications provider, since it no longer includes a significant number of low bandwidth TISBO services that have been migrated to PPCs (about 34,000, based on data supplied by BT). In that year, BT sold about 202,000 low bandwidth traditional interface digital leased lines and other communications providers about 57,000. Since each leased line requires two TISBO services, the above figures mean that BT used about 404,000 TISBO services and that other communications providers used about 114,000. The total volume of TISBO services is therefore 518,000.

B.186 On the basis of information gathered during the market review, the Director can derive some estimate of BT's share of TISBO for that year. Assuming that all the migrated circuits are used to supply leased lines and that communications providers have migrated all the circuits used as a wholesale inputs, then it can be inferred that communications providers other than BT self-supplied 80,000 (ie 114,000 less 34,000 PPCs via migration) TISBO services. BT's market share therefore amounts to 84% (that is, 404,000 supplied to itself and 34,000 sold to other communications providers: a total of 518,000). The Director considers that his second assumption is conservative since he knows that more leased lines were migrated to PPCs in 2002/03 (about 50% more). This would suggest that BT's market share for low bandwidth TISBO in 2001/02 should be higher, at about 88% (the sum of 404,000 and 34,000 and 17,000 divided by 518,000)..

B.187 Drawing on the EC Guidelines (paragraph 75), the Director considers that his estimate of BT's market share supported by the evidence he received, ie well in excess of 50%, should be interpreted as evidence of the existence of a dominant position. In addition, the persistence of BT's retail market share at high levels is also to be interpreted as a sign of market strength in low bandwidth TISBO. This is because BT is known to self-provide all its TISBO services as well as a significant proportion of the TISBO services for many other communications providers' leased lines.

B.188 A caveat to the above analysis is that it focuses on TISBO as an input into low bandwidth *retail leased lines*, although, as discussed above, TISBO can be used as an input into a number of other retail services. The Director accepts that these market shares are not a perfect proxy, but is not aware of any reason why focusing on retail leased lines would bias BT's market share downwards. The data he has been able to gather from communications providers suggests that BT and other communications providers on average supply leased lines and other services in roughly equal proportions across their (core) networks, and hence that these figures should provide a reliable proxy.

Excess pricing and profitability

B.189 In the absence of regulation the Director considers that BT would set excessive prices for low bandwidth TISBO. The Director reaches this conclusion based on past experience. Before BT was required to provide PPCs, other communications providers had to buy low bandwidth TISBO from BT as part of retail leased lines at BT's retail prices. These were substantially above cost-based prices. The Director reaches this conclusion for two reasons. First, he notes that BT's ROCE on digital low bandwidth traditional interface retail leased lines is well in excess of its cost of capital of 13.5% (see Table B.3 above). Second, BT's retail prices are significantly higher than the cost-based charges that he set in the Phase II Direction for high bandwidth terminating segments. For example, the table below compares, for the rental of 2Mbit/s circuits, PPC service based charges with BT's retail charges as of December 2002 for a retail leased line.

Table B.7: Comparison of BT's retail and PPC charges (2Mbit/s circuits)

	PPCs service-based charges	Retail prices
Rental charge per local end per year	£658	£1,900
Rental charge per main link per year (fixed)	£1,356	£2,150
Rental charge per main link per year (per km)	£139/km	£310/km

Source: BT, PPCs Phase 2 draft Direction

B.190 Even after BT was required to make available PPCs, BT initially set charges for low bandwidth terminating segments that the Director had to revise downwards significantly in the Phase II PPC Direction. These reductions were needed in order for the charges to move further in line with costs.

B.191 The Director is of the view that BT's capacity to keep the charges well above the cost-oriented level in the absence of wholesale regulation, as well as in the presence of a wholesale regulation that does not set charges, is indicative of a certain degree of market power.

International benchmarking

Comparison with other EU countries

B.192 The European Commission's *Eighth Report on the Implementation of the Telecommunications Regulatory Package* (December 2002) does not include any comparison for wholesale leased lines.

B.193 The only indication of price differences for low bandwidth TISBO among EU countries can be found by comparing recent regulatory measures adopted by several EU telecom regulatory agencies. Indeed several of these measures direct the incumbent to supply TISBO at specified prices or according to very strict principles.

B.194 This evidence should, as mentioned above, be treated with caution in view of the problems with international comparisons arising from differences in circumstances between countries. This is why the Director has decided not to rely on the international benchmarking criterion in his assessment of BT's market power.

Low bandwidth TISBO: firm-related criteria

Technological advantages or superiority

B.195 The discussion of this criterion in the Director's analysis of SMP in the market for trunk segments is equally applicable to the markets for TISBO. It is repeated below.

B.196 This criterion is of minimal relevance since:

- the technology of leased lines is well established and known to all communications providers; and
- the incumbent is supplied with technological inputs by the same firms as other communications providers.

B.197 BT has additionally stated that it operates a relatively expensive PDH network and a modern SDH network, while its competitors only operate modern SDH-only networks. This could be viewed as indicating that BT is in some (limited) aspects of its technology at a disadvantage relative to other communications providers. The Director, however, considers that these factors are not significant enough to make this criterion an essential part of his market power assessment.

Control of infrastructure not easily duplicated

B.198 The network infrastructure required to provide TISBO is not easy to duplicate, in the sense that it takes time and money to build.

B.199 Network diagrams such as those described in the Director's discussion of trunk segments market power typically relate to core networks, and as such paint an incomplete picture of the relative abilities of communications providers to provide TISBO. However, they do in the main suggest that other communications providers have been unable to replicate the reach of BT's core network. The

economics of telecommunications networks are such that this effect is in most cases greatly magnified in the case of access networks.

B.200 As a former monopolist, BT's network is ubiquitous in its coverage. A corollary to this statement is that most of BT's network costs are sunk. This implies that BT has the infrastructure at its disposal to supply TISBO segments in most places in the country within a reasonable period and without incurring substantial costs. In other words, the ubiquity of BT's network makes the cost of marginal deployment of TISBO lower and makes it easier to reach many locations.

B.201 Most other communications providers are (recent) entrants and are still in the process of building their networks. This implies that other communications providers' local networks are not extensive and that they would need to incur sunk costs to extend local infrastructure. As outlined above, comments made by several leased line users indicate that BT is often the only traditional interface leased line supplier outside the main routes and the main cities, ie that other communications providers are unable to supply at competitive rates in these locations, implying that other communications providers are not in a position to profitably self-supply TISBO services outside these main routes and main cities.

B.202 Mobile communications providers, who use RBS backhaul circuits (one of the TISBO services), have confirmed that BT is their main supplier when they cannot self-supply by means of microwave radio links due to technical or cost reasons, because BT is almost always in a position to supply the required TISBO functionality faster and cheaper than the other communications providers. (The extent of self-provision of RBS backhaul circuits by mobile operators and its impact on market power assessment is further discussed under the 'countervailing buying power' criterion). As one large user told the Director, the ubiquity of BT's infrastructure means that BT has no competitors for the provision of traditional interface leased lines in a significant area of the UK. While other communications providers do in many cases have widespread access networks, cable communications providers are in general not able to provide symmetric services on an efficient basis, since their networks are designed for the transmission of asymmetric traffic flows.

B.203 The above considerations lead the Director to consider that difficulties in duplicating infrastructure is a relevant criterion for his TISBO market power assessment. Further he wishes to draw the attention to the fact that sunk costs are discussed further in the following section on ease of market entry, as is the extent to which the competition problems caused by ubiquity and barriers to entry differ by bandwidth.

Economies of scale

B.204 Symmetric broadband origination is characterised by significant economies of scale. The main economies of scale in supplying TISBO services derive from the existence of large fixed costs, namely the costs of building ducts and laying fibre or copper. Once the ducts are built and the copper or fibre laid, the cost of supplying additional TISBO is relatively small.

B.205 Other economies of scale arise at the local exchange (first network node) as well as the third party site, since the costs of equipment at the two sites do not increase significantly with capacity. The more leased line customers are served by the same local exchange or at the same third party site, the higher the capacity of the equipment that can be installed and the cheaper (per customer) it is to serve them.

B.206 In other words, the average cost of supplying TISBO services to a given location decreases with the number of TISBO services at that location. This means that the extent of economies of scale exploited for TISBO is likely to vary with geographical locations, ie with customer density.

B.207 Economies of scale for TISBO can be characterised by estimates of cost volume relationships (CVRs).

B.208 The Director has the following CVR estimates available to him for this purpose:

- an estimated CVR for end to end leased lines, provided by BT to the Director in 2002 based on its CCA financial statements for 2001/02. In these statements, the LRIC of 'inland private circuits' was £1,003m. The Fully Allocated Cost (FAC) for the same period was £1,295m, giving a ratio of 80%. This information can be interpreted as saying that, for each aggregate unit increase in private circuit volumes, the associated LRIC would increase by 80%; and
- CVR estimates for specific network components from the Europe Economics bottom up model described in the analysis of economies of scale in the market for trunk segments. For the access network, these include the following:
  - duct: 5%
  - copper: 35%
  - fibre: 22%
  - operating costs: 48%

B.209 The estimated CVRs above all suggest that the provision of TISBO is characterised by economies of scale. The precise extent of these economies of scale may be debatable however. In order to assess whether or not BT can exploit such scale economies, the Director needs to consider the extent to which BT enjoys larger economies of scale than other communications providers in any given area.

B.210 While BT and other communications providers both supply TISBO services in the same local areas, the Director's view is that BT enjoys larger economies of scale than other communications providers because it almost always carries more traffic in any given area. This is because BT 's customer base is larger than that of any other communications provider at the local access level for low bandwidth TISBO – see the market share figures included in the analysis of quantitative information.

B.211 This means that BT can serve more customers using the same equipment at local exchanges and at third party sites and so obtain better equipment utilisation, or use higher capacity equipment that is cheaper on a per customer basis. It also implies that BT can benefit from the existing ducts to a greater extent. As a result, the Director considers that BT is likely to enjoy larger economies of scale at the local access level than other communications providers.

B.212 In areas where other communications providers do not supply TISBO services, the Director considers that BT enjoys economies of scale and that other communications providers do not. This is because other communications providers must then buy TISBO services from BT, and because BT does not face any competitive pressure to pass on the economies of scale benefits to its buyers (in absence of any remedy). Since the number of areas in which BT is the only supplier of TISBO services is large, the Director is of the view that overall BT enjoys significantly greater economies of scale in the provision of TISBO services than other communications providers.

B.213 The Director believes that other communications providers are most likely to compete with BT in areas where the population density is high so that the level of capacity utilisation can be maximised. In these areas, BT and other communications providers benefit from the same flexibility to fill up their capacity in absence of any regulation.

B.214 The Director has reached the conclusions that there exist significant economies of scale in the low bandwidth TISBO market and that BT can benefit from them to a larger extent than other communications providers. As a result the Director considers that economies of scale are a source of cost advantage and market power for BT in the TISBO market.

Economies of scope

B.215 Economies of scope arise in the TISBO market if the costs incurred to supply TISBO services can be shared with various other products. The magnitude of the economies of scope is influenced by the range of products and services as well as by the volume of each of these various products and services over which the costs are shared.

B.216 Symmetric broadband origination can be used to carry products other than leased lines, though to a lesser extent than trunk segments. Communications providers have indicated that they use TISBO services to provide frame relay, ATM, IPVPN, Internet access, direct voice and wholesale leased lines.

B.217 The Director believes that BT enjoys larger economies of scope than other communications providers due to a combination of two factors. First, BT offers a wider range of products than most other communications providers and can therefore spread the cost of the TISBO common inputs over a larger array of products and services. Second, for most or all of these services and products BT carries larger volumes.

B.218 A key economy of scope for TISBO services is the possibility of using ducts to carry products and services other than TISBO. As the costs of digging and laying ducts are substantial and independent of the bandwidth, all communications providers try to take advantage of this and to maximise the number of products that can be supplied using the same ducts. However, only the owner of the ducts can take advantage of this economy of scope which means that BT, with the most ducts is likely to have a significant advantage compared to other communications providers.

B.219 The Director therefore considers that BT enjoys greater economies of scope than other communications providers and that this strengthens BT's market position in the TISBO market.

Low bandwidth TISBO services: marketing and strategies

Product/services diversification

B.220 In the absence of regulation it is likely that BT would not offer TISBO on its own. It would bundle it with trunk segments and another TISBO segment as part of an end-to-end traditional interface leased line sold at a retail price. Indeed this is what BT did before it was required by the Director to supply PPCs. However, the Director is not relying on this criterion for his market power assessment.

Vertical integration

B.221 BT supplies TISBO, trunk segments and retail leased lines. Where BT provides a retail leased line, it always self-provides TISBO at both ends. Therefore, BT's large market share (in excess of 80%, see Table B.6) in retail low bandwidth leased lines implies that a large volume of the market for TISBO is effectively unavailable for other communications providers to compete for.

B.222 In the absence of wholesale and retail regulation, it is not clear that BT's market share for retail traditional interface leased lines would decline in the next 2-3 years. Therefore, while BT's high market share in retail low bandwidth traditional interface leased lines persists, the corresponding wholesale market is foreclosed to a large degree. This has led the Director to conclude that vertical integration is a significant factor for his market power assessment as it is a source of market power for BT in the TISBO market.

Distribution and sales network

B.223 A well-developed distribution system for low bandwidth TISBO is not viewed as a potential indicator of market power, as the suppliers and buyers of low bandwidth TISBO are communications providers, and so relatively few in number and all know each other.

Access to capital markets and financial resources

B.224 BT's larger overall size and relatively strong balance sheet may put it at an advantage when it comes to funding new network infrastructure. A number of other communications providers have recently faced financial pressures that may have constrained their willingness and ability to invest in new areas. For example, some communications providers may be reliant on securing orders at the retail level before investing in network infrastructure, and may face a higher cost of capital.

B.225 In addition, the Director has received evidence suggesting that certain end users may be inclined to avoid, where possible, using products that rely on network inputs from certain communications providers that have been facing financial difficulties. BT, on the other hand, is perceived as being relatively secure and financially stable at a time when financial markets are volatile and investors risk-averse.

B.226 The Director however considers that the evidence described above is not sufficient to give much weight to this criterion in his market power assessment.

Low bandwidth TISBO services: conclusion on firm-related factors

B.227 In the low bandwidth TISBO market, considerations of firm-related factors provides evidence of BT's market power. In particular, BT's ubiquitous network, an infrastructure that cannot easily duplicated, seems key to BT's market power in this market. Other important factors are BT's advantage over other communications providers from exploiting economies of scale and scope and taking advantage of vertical integration.

Low bandwidth TISBO services: customer-related criteria

Countervailing buying power

B.228 In the market for low bandwidth TISBO, there is very little countervailing power available in the form of self-provision by other communications providers. Indeed other communications providers mostly do not self-provide for low bandwidth because of the costs of doing so relative to expected revenues, given that a significant part of the costs is fixed with respect to bandwidth.

B.229 Even in the case of RBS backhaul circuits, which some mobile communications providers self-supply in significant numbers, the Director has concluded that this self-provision does not impose adequate pressure on BT to justify a recognition of countervailing buying power. The Director has considered whether mobile operators would opt to self provide if BT raised the price of RBS backhaul circuits above the competitive level.

B.230 If the mobile operators were entirely reliant on purchasing RBS backhaul circuits, self-provision through fixed technology such as fibre or copper would require significant investment to be made. These cost structures would be quite similar to that of an entrant in the TISBO market. Self-provision through microwave radio would not be suitable for these operators. This is because many of their sites would not necessarily have line of sight that could enable microwave radio technology to be used. Hence these operators would find many of their sites unsuitable for self-provision through radio. They would need to incur significant investment costs in acquiring new sites to provision RBS backhaul circuits through microwave radio. Hence the threat of self-provision by these operators will only become effective if the costs of self-provision are below the costs of buying from BT.

B.231 The Director has also considered if mobile operators already using a mix of self-provision and RBS backhaul circuits purchase would switch to more self-provision if BT increased its RBS backhaul circuits price. The evidence provided to him shows those operators who have built a significant proportion of their network themselves choose to purchase backhaul circuits in sites where it has not been practical to self-provide by means of microwave radio. There are various circumstances in which self-provision is not a technically practical or economically effective option – for example, self-provision through microwave radio cannot take place where line of sight is unavailable, or in urban sites (below roof level). In these circumstances mobile operators cannot exert countervailing buying power since self-provision would then require significant investment to be made to lay down copper or fibre.

B.232 The data gathered by the Director on self-provision by mobile operators shows that it ranges from 0% to about 60%. The same data also allows the Director to calculate that BT supplies at least 30% of RBS backhaul circuits needed by each mobile operator. Since the above considerations reveal that mobile operators cannot easily start self-supplying the RBS backhaul circuits

supplied by BT, it can be deduced that they do not benefit from significant countervailing power vis-à-vis BT.

B.233 The lack of countervailing buyer power in the absence of regulation is indicated by the experience before the Director required BT to make available PPCs and set cost oriented charges and to supply RBS backhaul circuits at cost oriented prices. The Director is of the view that this criterion is not an essential part of his assessment of BT's market power, although it contributes to it.

Low bandwidth TISBO services: market related criteria

Ease of market entry

B.234 As a national incumbent, BT has sunk a significant share of the network costs associated with the provision of leased lines, such as digging and laying ducts, which are very expensive components of the access network.

B.235 This gives BT a very substantial strategic advantage over would-be competitors in the provision of TISBO. In contrast to BT, entrants generally need to sink costs in order to compete at the wholesale level. Communications providers have provided the Director with estimates of the levels of these costs, which he is unable to reproduce fully here due to confidentiality issues.

B.236 Estimates of the cost of fibre (per fibre per km) supplied to the Director by other communications providers have been in excess of £10 per metre, and estimates of the cost of digging duct on a per metre basis have been in excess of £50 per metre, a figure which can easily be doubled in urban areas. Very substantial costs such as these (eg £50,000 per kilometre for digging duct in rural areas) are clearly likely to pose a barrier to entry.

B.237 The size of barriers to entry may be reduced to the extent that other communications providers can achieve a lower cost network through investment in superior technology or innovation. However, it appears to the Director that the barrier provided by the high sunk costs of duct and fibre is likely to persist for the foreseeable future, and is likely to outweigh any such factors.

B.238 This is illustrated by the case of RBS backhaul circuits. The mobile communications providers that were allowed to self-provide their network from the start opted to do so to a large extent by means of microwave radio technology, which was cheaper than TISBO purchased (at retail prices, at that time) from BT. But whenever microwave radio links were not practical, mobile communications providers faced too high entry barriers (digging and ducting) to start self-supplying further. The mobile communications providers have indicated that this is unlikely to change in the next 2 to 3 years.

B.239 The significance of this barrier is at its greatest in the low bandwidth traditional interface market because:

- certain elements of the cost of the infrastructure required to provide TISBO services are independent of capacity and hence have to be recovered even for low bandwidth TISBO services. An obvious example is the cost of duct, which may account for a significant proportion of the cost of longer circuits; and
- infrastructure costs as a proportion of expected (retail) revenues is relatively high for low bandwidth products.

B.240 Additionally, the existence of economies of scale and scope makes it harder for entrants to compete on an equal basis with BT. For example, an entrant into TISBO is likely to operate at a smaller scale than BT, sell a narrower range of products and unable to engage in as much infrastructure sharing. This problem is compounded by the fact that smaller communications providers may not enjoy access to capital markets on the same terms as BT.

B.241 In summary, the Director believes that the low bandwidth TISBO market is characterised by very high barriers to entry, due to the existence of sunk costs that are in many cases high relative to expected revenues. These substantial barriers to entry are an important source of market power for BT. This is why the Director views the ease of market entry criterion as essential for his market power assessment.

Absence of potential competition

B.242 Potential competition refers to the prospect of new competitors entering the market within the timeframe considered for the market review. In the context of low bandwidth TISBO, this primarily refers to the prospect of self provision by other communications providers.

B.243 The prospect of widespread entry by new firms appears to the Director to be limited. This is due to:

- entry barriers;
- the current financial situation affecting many other communications providers; and
- the fact that the Director is not aware of any widespread entry by new players having occurred over the past two years or so.

B.244 The Director is aware that since the first consultation, BT has introduced an alternative technology to supply low bandwidth TISBO, namely contended SDSL. In absence of wholesale regulation, the only SDSL-based constraint on BT's market position is from the Local Loop Unbundling Operators (LLUOs). (Note that the absence of wholesale regulation implies that LLU backhaul links

are not available from BT.) Hence only the SDSL-upgraded unbundled loops to which LLUOs can add their own LLU backhaul links can constitute a source of potential competition for TISBO. Evidence collected as part of the market review exercise suggests that this is unlikely to form a material competitive pressure on BT. Indeed the volume of unbundled loops (in the thousands) is relatively small compared to the low-bandwidth TISBO volume (close to half a million) and the number of LLU backhaul links self-supplied by LLUOs are very limited (in the tens).

B.245 The Director, therefore, considers that there is little potential competition to low bandwidth TISBO services. However he is minded not to give much weight to this criterion in his market power assessment.

Barriers to switching

B.246 Certain factors make it difficult for other communications providers to switch from BT to self-provision for low bandwidth TISBO. Communications providers have stated to the Director that they are unlikely to switch to self-provision for low bandwidth traditional interface leased lines, first because of the high costs of entry relative to expected (retail) revenues, and second because of the costs associated with switching that would make the whole operation unattractive.

B.247 There are additional types of barriers to switching for RBS backhaul. For example, switching to self-provision through microwave radio would not be suitable for communications providers whose networks are based on the purchase of RBS backhaul circuits on fibre or copper, because many of their sites would not necessarily have line of sight that could enable microwave radio technology to be used. Hence these communications providers would find many of their sites unsuitable for self-provision through radio. They would need to incur significant investment costs in acquiring new sites to provision RBS backhaul circuits before they could switch.

B.248 In order to switch to self-provision, another communications provider would need to operate its own TISBO and a BT-provided PPC or leased line simultaneously until switchover, in order minimise interruption. There might also be contractual barriers to switching relating to early termination of contracts with BT.

B.249 These considerations suggest that there are barriers to switching from BT's supply of low bandwidth TISBO to self-provision.

Customers' ability to access and use information

B.250 PPC buyers consist of relatively few, well-informed communications providers and self-provision is the main source of competition. This criterion is not therefore relevant.

Low bandwidth TISBO services: intensity of competition criteria

Barriers to expansion

B.251 The Director believes that the importance of barriers to entry in markets for TISBO (which varies according to bandwidth, as discussed in the text on barriers to entry) is such that it is not essential to consider further constraints provided by barriers to expansion. Where the existing market players have already sunk costs and have local infrastructure in place, they may be able to expand their market share. But the scope for this appears to be limited, and most expansion would require the building of material new network and the sinking of costs.

Active competition on non price factors

B.252 Non-price competition refers to differentiation between products and between providers. Product differentiation may be in terms of quality or in terms of diversity. Provider differentiation can be captured through reputation. Low bandwidth TISBO are products that on average are not prone to differentiation and for which reputation does not play a role. The lack of active competition on non-price factors criterion is not therefore relevant for the market power assessment analysis.

Conclusion on assessment of market power in low bandwidth TISBO

B.253 The investigation of the above market power criteria for the low bandwidth TISBO market indicates that BT has SMP. The main reasons why the Director has reached this conclusion are that BT controls an ubiquitous infrastructure that is difficult to duplicate, that it can exploit more effectively economies of scale and scope, that it benefits from vertical integration and that there exist significant barriers to entry including sunk costs. All these factors make entry in the low bandwidth TISBO market difficult and unattractive. This conclusion is supported by BT's very large market share in low bandwidth TISBO, which is likely to be significantly larger than its retail market share and in excess of 80%.

B.254 The assessment of SMP in this market is to be carried out in the absence of wholesale remedies. This is because the purpose of this analysis is to assist in the assessment of whether and what remedies are appropriate in the market for low bandwidth TISBO. The Director considers that his conclusion that BT has SMP is also supported by the experience in the UK, namely that in the absence of regulation BT did not supply TISBO (other than as part of retail leased lines at

retail prices) and that such supply was at charges well in excess of cost-based prices.

Likelihood of competition developing in the future

B.255 The Director has considered the potential impact of external factors on this market during the period covered by this review. The Director's view is that there are no developments that would generate sufficient competitive pressures within the next 2-3 years to alter the current finding of SMP. This is because the sources of SMP are high structural barriers to entry and because demand conditions and technological progress are unlikely to be able to reduce the strength of these entry barriers in the near future. However, the Director will keep market conditions under review.

Market for high bandwidth traditional interface symmetric broadband origination

B.256 The assessment of market power in the high bandwidth traditional interface symmetric broadband origination ("TISBO") market is carried out in the absence of any remedy at both the wholesale and the retail level for reasons described in Chapter 3.

High bandwidth TISBO: summary of conclusions

B.257 The Director considers that BT has SMP in this market. He has reached this initial conclusion based on an analysis of, primarily (see the detailed assessment for the examination of other criteria):

- the ubiquity of BT's infrastructure;
- economies of scale and scope;
- barriers to entry including sunk costs; and
- BT's ability to set excessive charges well above cost-based prices.

B.258 Many aspects of the Director's assessment in this market are similar to those in the market for low bandwidth TISBO. However, as is outlined below, the high bandwidth market is characterised by somewhat lower barriers to entry, and hence less severe competition problems, as shown by the fact that BT's share of this market is not as high as in the case of the corresponding low bandwidth market. However, as is outlined below, BT retains a significant advantage over other communications providers in this market, and retains a persistently high share of the market.

High bandwidth TISBO services: quantitative information criteria

Market shares

B.259 Market share data on high bandwidth TISBO is not yet available to the Director. However, he has conducted an analysis of market shares at the retail level. Retail market shares are clearly an imperfect proxy for shares at the wholesale level in this context. The discussion of market shares in the market for low bandwidth TISBO above discusses the extent to which retail market shares underestimate BT's wholesale market share. This effect arises since BT provides the wholesale inputs for all of its own retail circuits, and provides wholesale inputs for some of the circuits sold by other communications providers.

B.260 The tables below show the market share of BT (by volume and by revenue) in the UK apart from Kingston upon Hull in the high bandwidth traditional interface retail leased lines market.

Table B.8: BT's market share in the high bandwidth traditional interface retail leased line market by revenue

	2000/2001	2001/2002
BT's share	46%	47%

Source: Oftel Market Information

Table B.9: BT's market share in the high bandwidth traditional interface retail leased line market by volume

	2000/2001	2001/2002
BT's share	35%	42%

Source: Oftel Market Information

B.261 The Director notes that:

- There may be some issues of consistency of the data between years, which make it difficult to infer a reliable trend from the tables above. However, based on the available data, BT's market share does not appear to be declining, regardless of whether it is measured by volume or by revenue – indeed, it appears if anything to be increasing; and
- BT's market share by revenue appears to be in excess of its market share by volume. This may be explained by some or all of the following:
  - BT has a greater share in 140Mbit/s and 155Mbit/s circuits than in 34Mbit/s and 45Mbit/s circuits. This is possible but would appear to contradict the widely held belief that the extent to which BT's market share is eroded by entry is positively correlated with bandwidth – indeed, the opposite seems to be more plausible;
  - BT sells circuits of a greater length than do other communications providers. The Director has no evidence regarding this; or

- BT on average charges higher prices than other communications providers for circuits of an equal specification.

B.262 The Director has also attempted to calculate an approximate figure for BT's share of the market for high bandwidth TISBO, using the same methodology as that used in his analysis of the low bandwidth market. As per the low bandwidth market, these were calculated using data on the number of PPCs sold in the 2001/02 financial year, and are shown in the table below.

Table B.10: Estimated BT market shares in 2001/02 – high bandwidth traditional interface retail leased lines and high bandwidth TISBO

	HBW Retail leased lines	HBW TISBO
Revenue market share	47%	49%
Volume market share	42%	44%

Source: Oftel/BT

B.263 The Director has also examined more recent (mid 2003) data relating to the provision of 155Mbit/s SDH based circuits only (sold by all communications providers to all customers). This data suggests that BT's market share by volume remains at least as high as those shown in Table B.10 above.

B.264 The Director has been unable to obtain reliable market share information relating to the 2002/03 financial year on the entire high bandwidth traditional interface market. However, he has been able to obtain market shares relating to 144Mbit/s and 155Mbit/s retail private circuits only, ie not 34Mbit/s or 45Mbit/s circuits. The Oftel Market Information data relating to high bandwidth traditional interface circuits collected by the Director since 2000/01 has consistently shown that BT's volume share of 144/155Mbit/s traditional interface circuits has been lower than its share of 34/45Mbit/s circuits. By the end of 2002/03, BT's share of all 140/155Mbit/s retail traditional interface circuits was slightly higher than the aggregate high bandwidth figure shown in table B.10.. This information suggests that BT's share of the high bandwidth market is no longer decreasing, and in fact may be increasing. This is consistent with the Director's finding of SMP in this market.

Excess pricing and profitability

B.265 In the absence of regulation the Director considers that BT would set excessive prices for high bandwidth TISBO. The Director reaches this conclusion

based on the past experience. Before BT was required to provide PPCs, other communications providers had to buy high bandwidth TISBO from BT as part of retail leased lines at BT's retail prices. These were substantially above the cost-based prices. The Director reaches this conclusion for two reasons. Firstly, he notes that BT's ROCE on high bandwidth traditional interface retail leased lines is well in excess of its cost of capital of 13.5% - see the table below. Second, BT's retail prices are significantly higher than the cost-based charges that he set in the Phase II Direction for high bandwidth terminating segments. This is outlined in the table below, in which the rental charges for 34Mbit/s circuits are compared, using PPC service based charges, and BT's retail charges as of December 2002.

Table B.11: Comparison of BT's retail and PPC charges (34Mbit/s circuits)

	PPCs service-based charges	Retail prices
Rental charge per local end per year	£8,521	£18,998
Rental charge per main link per year (fixed)	£12,058	£26,884
Rental charge per main link per year (per km)	£323/km	£720/km

Source: Oftel/BT

B.266 Even after BT was required to make PPCs available, BT initially set charges for high bandwidth terminating segments that the Director had to revise downwards significantly in the Phase II PPC Direction. These reductions were needed in order for the charges to become properly based on costs. See the Director's Phase II Direction for details of these reductions.

B.267 The only profitability data available relating to BT's profitability in the provision of TISBO is at the retail level. Such data does not fully reflect the impact that existing regulation on the supply of TISBO might have on profitability, or indeed of the relationship between retail costs and revenues. The table below shows BT's estimates of its Return On Capital Employed (ROCE) for high bandwidth retail leases lines. It should be noted that these figures include data relating to BT's (small number of) very high bandwidth circuits.

Table B.12: BT's ROCE for high bandwidth retail leased lines

	2000/2001	2001/2002
BT's share	27%	32%

Source: BT

International benchmarking

B.268 Benchmarking data on TISBO is not available to the Director. However, he has been able to benchmark the deal received by UK consumers at the retail level against that received by consumers in similar economies. Such evidence is not critical in assessing whether there is dominance in the wholesale market, but is nonetheless useful as an additional source of information.

B.269 The European Commission's *Eighth Report on the Implementation of the Telecommunications Regulatory Package* (December 2002) contains data on the prices charged for high bandwidth retail leased lines by incumbent communications providers in a sample of countries. Comparisons contrast the prices charged for 34Mbit/s and 140/155Mbit/s circuits for 2001 and 2002 for circuit lengths of 2km and 100km.

B.270 At bandwidths of 34Mbit/s, the report indicates that, in 2001 and 2002, BT charged, for 2km circuits, a higher price than any other EU country, and also more than in the USA and Japan. BT's average price of €53,464 per year in 2002 was 68% higher than the EU11 average of €31,765 per year. For 200km circuits, BT was more expensive than any of the sample countries except Ireland in 2002, and was the third most expensive in 2001. Its average price of €335,778 per year in 2002 was 48% higher than the EU11 average of €226,440 per year.

B.271 At bandwidths of 140/155Mbit/s, the report indicates that, in 2001 and 2002, BT charged, for 2km circuits, a higher price than any other EU country, and also more than in the USA and Japan. BT's average price of €159,817 per year in 2002 was 170% higher than the EU11 average of €59,210 per year. For 200km circuits, BT was more expensive than any of the sample countries except for the US in 2002 and 2001. Its average price of €959,064 per year in 2002 was 125% higher than the EU11 average of €425,516 per year.

B.272 Notwithstanding the usual caveats of such a comparison exercise (ie incumbents price their circuits differently and rarely offer identical products), it is clear that BT's charges for single high bandwidth leased lines in the comparison are far higher than those charged by other European incumbents. It appears to the Director that there is no reason why BT should face higher costs than other incumbents to justify these discrepancies. BT's prices for high bandwidth retail leased lines are therefore consistent with a degree of market power in wholesale markets.

B.273 This evidence should, as mentioned above, be treated with caution in view of the problems with international comparisons ie incumbents price their circuits differently with varying often unpublished discount structures; they rarely offer identical products; and they may have different approaches to cost recovery.

High bandwidth TISBO services: firm-related criteria

Technological advantages or superiority

B.274 The discussion of this criterion in the Director's analysis of SMP in the market for trunk segments and low bandwidth TISBO is equally applicable to the markets for high bandwidth TISBO. It is repeated below.

B.275 This criterion is of minimal relevance since:

- the technology of leased lines is well established and known to all communications providers; and
- the incumbent is supplied with technological inputs by the same firms as other communications providers.

B.276 BT has additionally stated that it operates a relatively expensive PDH network and a modern SDH network, while its competitors only operate modern SDH-only networks. This could be viewed as indicating that BT is in some (limited) aspects of its technology at a disadvantage relative to other communications providers. The Director, however, considers that these factors are significant enough to make this criterion an essential part of his market power assessment.

Control of infrastructure not easily duplicated

B.277 The discussion of this criterion in the Director's analysis of SMP in the market for low bandwidth TISBO is, to some extent, equally applicable to the market for high bandwidth TISBO. The extent to which BT's ubiquity is an issue in the high bandwidth market (as opposed to the other markets for TISBO) is discussed in the section on ease of market entry below.

B.278 The text used in the Director's analysis of the market for low bandwidth TISBO is repeated below.

B.279 The network infrastructure required to provide TISBO is not easy to duplicate, in the sense that it takes time and money to build.

B.280 As a former monopolist, BT's network is ubiquitous in its coverage. A corollary to this statement is that most of BT's network costs are sunk. This implies that BT has the infrastructure at its disposal to supply TISBO services in most places in the country within a reasonable period and without incurring substantial costs. In other words, the ubiquity of BT's network makes the cost of marginal deployment of TISBO services lower and makes it easier to reach many locations.

B.281 Most other communications providers are (recent) entrants and are still in the process of building their networks. This implies that other communications providers' networks are not extensive and that their costs are not yet sunk. As

outlined above, comments made by several leased line users indicate that BT is often the only leased line supplier outside the main routes and the main cities, ie that other communications providers are unable to supply at competitive rates in these locations, implying that other communications providers are not in a position to profitably self-supply TISBO services outside these main routes and main cities.

B.282 Evidence regarding the extent of BT's ubiquity at the TISBO level relative to that of other communications providers is difficult to provide, particularly in terms of comparing the access networks of different communications providers.

B.283 Network diagrams showing the network rollout of other communications providers relative to BT, such as those discussed in the section on trunk segments market power relates to core networks, and as such paints an incomplete picture of the relative abilities of communications providers to provide end to end leased lines. However, they do tend to demonstrate that even the largest communications providers have been unable to replicate the reach of BT's network. The economics of telecommunications networks are such that this effect is in most cases greatly magnified in the case of access networks.
A key feature of the network roll-out described above is that most of BT's network costs are sunk. This implies that BT has the infrastructure at its disposal to supply leased lines in most places in the country within a reasonable period and without incurring substantial costs. In other words, the ubiquity of BT's network makes the cost of marginal deployment of TISBO services lower and makes it easier to reach many locations.

B.284 Most other communications providers are relatively recent entrants, and as such are, in certain cases, to some extent still in the process of building certain aspects of their networks. This implies that other communications providers' networks are not extensive and that their costs are not yet sunk. Comments made by several leased line users that BT is often the only leased line supplier outside the main routes and the main cities, indicate that other communications providers are unable to supply at competitive rates in these locations, which implies that other communications providers are not in a position to self-supply TISBO services in profitable conditions outside these main routes and main cities.

B.285 LLU communications providers have indicated in a similar manner that they do not consider that there are alternative communications providers besides BT that are in a position to supply LLU backhaul, because LLU backhaul stretches between a BT MDF site and an LLU communications provider's POC and it is unlikely that another communications provider would be present at both points obviating the need for substantial digging and ducting.

B.286 Sunk costs are discussed further in the following section on ease of market entry, as is the extent to which the competition problems caused by ubiquity and barriers to entry differ by bandwidth.

B.287 As discussed above, the barriers to entry in the TISBO market (circumvented by BT by virtue of the ubiquity of its network) are particularly relevant to the provision of low bandwidth TISBO, since the revenues that are set against high costs of entry are lower. However, the representations made to the Director suggest that the ubiquity of BT's network also provides it with a very significant advantage in the high bandwidth market. The text dealing with barriers to entry (see below) provides a further discussion of this issue.

Economies of scale

B.288 The discussion of this criterion in the Director's analysis of SMP in the market for low bandwidth TISBO is, in the Director's opinion equally applicable to the market for high bandwidth TISBO. The text used in the Director's analysis of the market for low bandwidth TISBO is repeated below.

B.289 Symmetric broadband origination is characterised by significant economies of scale. The main economies of scale in supplying TISBO services derive from the existence of large fixed costs, namely the costs of building ducts and laying fibre or copper. Once the ducts are built and the copper or fibre laid, the cost of supplying additional TISBO is relatively small.

B.290 Other economies of scale arise at the local exchange (first network node) as well as the third party site, since the costs of equipment at the two sites do not increase significantly with capacity. The more leased line customers are served by the same local exchange or at the same third party site, the higher the capacity of the equipment that can be installed and the cheaper (per customer) it is to serve them.

B.291 In other words, the average cost of supplying TISBO services to a given location decreases with the number of TISBO services at that location. This means that the extent of economies of scale exploited for TISBO is likely to vary with geographical locations, ie with customer density.

B.292 Economies of scale for TISBO can be characterised by estimates of cost volume relationships (CVRs).

B.293 The Director has the following CVR estimates available to him for this purpose:

- an estimated CVR for end to end leased lines, provided by BT to the Director in 2002 based on its CCA financial statements for 2001/02. In these statements, the LRIC of 'inland private circuits' was £1,003m. The FAC for the

same period was £1,295m, giving a ratio of 80%. This information can be interpreted as saying that, for each aggregate unit increase in private circuit volumes, the associated LRIC would increase by 80%; and

- CVR estimates for specific network components from the Europe Economics bottom up model described in the analysis of economies of scale in the market for trunk segments. For the access network, these include the following:
  - duct: 5%
  - copper: 35%
  - fibre: 22%
  - operating costs: 48%.

B.294 The estimated CVRs above all suggest that the provision of TISBO is characterised by economies of scale. The extent of these economies of scale may be debatable however. In order to assess whether or not BT can exploit such scale economies, the Director needs to consider the extent to which BT enjoys larger economies of scale than that of other communications providers in any given area.

B.295 While BT and other communications providers both supply TISBO services in the same local areas, the Director's view is that BT enjoys larger economies of scale than other communications providers because it almost always carries more traffic in any given area. This is because BT 's customer base is larger than that of any other communications provider at the local access level for bandwidth TISBO – see the market share figures included in the analysis of quantitative information.

B.296 This means that BT can serve more customers using the same equipment at local exchanges and at third party sites and so obtain better equipment utilisation, or use higher capacity equipment that is cheaper on a per customer basis. It also implies that BT can benefit from the existing ducts to a greater extent. As a result, the Director considers that BT is likely to enjoy larger economies of scale at the local access level than other communications providers.

B.297 In areas where other communications providers do not supply TISBO services, the Director considers that BT enjoys economies of scale and that other communications providers do not. This is because other communications providers must then buy TISBO services from BT, and because BT does not face any competitive pressure to pass on the economies of scale benefits to its buyers (in absence of any remedy). Since the number of areas in which BT is the only supplier of TISBO services is large, the Director is of the view that overall BT enjoys significantly greater economies of scale in the provision of TISBO services than other communications providers.

B.298 The Director believes that other communications providers are most likely to compete with BT in areas where the population density is high so that the level of capacity utilisation can be maximised. In these areas, BT and other communications providers benefit from the same flexibility to fill up their capacity in absence of any regulation.

B.299 The Director has reached the conclusions that there exist significant economies of scale in the high bandwidth TISBO market and that BT can benefit from them to a larger extent than other communications providers. As a result the Director considers that economies of scale are a source of cost advantage and market power for BT in the TISBO market.

Economies of scope

B.300 The discussion of this criterion in the Director's analysis of SMP in the market for low bandwidth TISBO is, in the Director's opinion equally applicable to the market for high bandwidth TISBO.

B.301 Economies of scope arise in the TISBO market if the costs incurred to supply TISBO services can be shared with various other products. The magnitude of the economies of scope is influenced by the range of products and services as well as by the volume of each of these various products and services over which the costs are shared.

B.302 Symmetric broadband origination can be used to carry products other than leased lines, though to a lesser extent than trunk segments. Communications providers have indicated that they use TISBO services to provide frame relay, ATM, IPVPN, Internet access, direct voice and wholesale leased lines.

B.303 BT is thought to enjoy larger economies of scope than other communications providers for two reasons. First BT offers a wider range of products than most other communications providers and can therefore spread the cost of the common inputs for TISBO over a larger array of products and services. Second for each/most of these services and products BT carries larger volumes.

B.304 A key economy of scope for TISBO is the possibility of using ducts to carry products and services other than TISBO services . As the costs of digging and laying ducts are substantial and independent of the bandwidth, all communications providers try to take advantage of this and to maximise the number of products that can be supplied using the same ducts. However, only the owner of the ducts can take advantage of this economy of scope which means that BT, with the most ducts is likely to have a significant advantage compared to other communications providers.

B.305 The Director therefore considers that BT enjoys greater economies of scope than other communications providers and that this strengthens BT's market position in the market for high bandwidth TISBO.

High bandwidth TISBO services: marketing and strategies

Product/services diversification

B.306 The discussion of this criterion in the Director's analysis of SMP in the market for low bandwidth TISBO is, in the Director's opinion equally applicable to the market for high bandwidth TISBO.

B.307 The text used in the Director's analysis of the market for low bandwidth TISBO is repeated below.

B.308 In the absence of regulation it is likely that BT would not offer TISBO on its own. It would bundle it with trunk segments and another TISBO segment as part of an end-to-end leased line sold at a retail price. This is what BT did before it was required by the Director to supply PPCs.

Vertical integration

B.309 The discussion of this criterion in the Director's analysis of SMP in the market for low bandwidth TISBO is, to some extent, applicable to the market for high bandwidth TISBO.

B.310 Tables B.8 and B.9 describe how BT's market share in high bandwidth retail leased lines has evolved over time. BT supplies TISBO, trunk segments and traditional interface retail leased lines. Where BT provides a retail leased line, it always self-provides TISBO at both ends. Therefore, BT's substantial market share in retail high bandwidth leased lines of about 40% implies that a significant volume of the market for TISBO is effectively unavailable for other communications providers to compete for.

B.311 Bearing in mind the relative magnitudes of the market shares in question, this effect is more pronounced in the case of the markets for trunk segments and low bandwidth TISBO.

Distribution and sales network

B.312 The discussion of this criterion in the Director's analysis of SMP in the market for low bandwidth TISBO is, in the Director's opinion. Equally applicable to the market for high bandwidth TISBO.

B.313 The text used in the Director's analysis of the market for low bandwidth TISBO is repeated below.

B.314 A well developed distribution system for high bandwidth TISBO is not viewed as a potential indicator of market power, as the suppliers and buyers of high bandwidth TISBO are communications providers, and so relatively few in number and all know each other.

Access to capital markets and financial resources

B.315 BT's larger overall size and relatively strong balance sheet may put it at an advantage when it comes to funding new network infrastructure. A number of other communications providers have recently faced financial pressures that may have constrained their willingness and ability to invest in new areas. For example, some communications providers may be reliant on securing orders at the retail level before investing in network infrastructure, and may face a higher cost of capital.

B.316 In addition, the Director has received evidence suggesting that certain end users may be inclined to avoid, where possible, using products that rely on network inputs from certain communications providers that have been facing financial difficulties. BT, on the other hand, is perceived as being relatively secure and financially stable at a time when financial markets are volatile and investors risk-averse.

High bandwidth TISBO services: customer-related criteria

Countervailing buying power

B.317 The discussion of this criterion in the Director's analysis of SMP in the market for low bandwidth TISBO is, in the Director's opinion applicable to the market for high bandwidth TISBO, albeit to a smaller extent, given the greater opportunities for economic self provision.

B.318 In the markets for TISBO, there is some countervailing power available in the form of self-provision by other communications providers. Other communications providers self-provide some high bandwidth traditional interface circuits, but in many circumstances the barriers to self provision are considerable, because of the costs of doing so relative to expected revenues, given that a significant part of the costs are fixed with respect to bandwidth. Evidence submitted by LLU communications providers suggests that even though there is self-supply of LLU backhaul by some LLU communications providers, this is not significant compared to the supply by BT. The lack of countervailing buyer power in the absence of regulation is indicated by the experience before the Director required BT to make available PPCs and set cost oriented charges.

High bandwidth TISBO services: market entry related criteria

Ease of market entry

B.319 The discussion of this criterion in the Director's analysis of SMP in the market for low bandwidth TISBO is also applicable to the market for high bandwidth TISBO.

B.320 As a national incumbent, BT has sunk a significant share of the network costs associated with the provision of leased lines, such as digging and laying ducts, which are very expensive components of the access network. This gives BT a very substantial strategic advantage over would-be competitors in the provision of TISBO. In contrast to BT, entrants generally need to sink costs in order to compete at the wholesale level. Communications providers have provided the Director with estimates of the levels of these costs, which he is unable to reproduce fully here due to confidentiality issues.

B.321 Estimates of the cost of fibre (per fibre per km) provided to the Director by other communications providers have been in excess of £10 per metre, and estimates of the cost of digging duct on a per metre basis have been in excess of £50 per metre, a figure which can easily be doubled in urban areas. Very substantial costs such as these (eg £50,000 per kilometre for digging duct in rural areas) are clearly likely to pose a barrier to entry.

B.322 The size of barriers to entry may be reduced to the extent that other communications providers can achieve a lower cost network through investment in superior technology or innovation. However, it appears to the Director that the barrier provided by the high sunk costs of duct and fibre is likely to persist for the foreseeable future, and is likely to outweigh any such factors.

B.323 The significance of this barrier is not uniform between all markets for TISBO. In particular, its importance is at its greatest in the low bandwidth, and at its lowest in the very high bandwidth market. This is the case because:

- certain elements of the cost of the infrastructure required to provide TISBO services are independent of capacity, obvious examples being the cost of duct, which may account for a significant proportion of the cost of longer circuits; and
- infrastructure costs as a proportion of expected (retail) revenues decrease with increasing bandwidth.

B.324 Additionally, the existence of economies of scale and scope makes it harder for entrants to compete on an equal basis with BT. For example, an entrant into TISBO is likely to operate at a smaller scale than BT, sell a narrower range of products and unable to engage in as much infrastructure sharing.

B.325 This problem is compounded by the fact that smaller communications providers may not enjoy access to capital markets on the same terms as BT.

B.326 The higher degree of entry in this market by other communications providers (see the Director's analysis of quantitative information) suggests that the market for high bandwidth TISBO is characterised by lower barriers to entry than the market for low bandwidth TISBO. This reflects higher expected (retail) revenues in the high bandwidth market.

B.327 In summary, the Director believes that the market for high bandwidth TISBO is characterised by relatively high barriers to entry (although not as high as in the market for low bandwidth TISBO). This is due to the existence of high sunk costs that are in many cases, particularly for longer circuits, not mitigated by the higher expected revenues that can be earned at the retail level.

Absence of potential competition

B.328 The discussion of this criterion in the Director's analysis of SMP in the market for low bandwidth TISBO is, in the Director's opinion, equally applicable to the market for high bandwidth TISBO.

B.329 'Potential competition' refers to the prospect of new competitors entering the market within the timeframe considered for the market review. In the context of high bandwidth TISBO, this primarily refers to the prospect of self provision by other communications providers.

B.330 The prospect of widespread entry by new firms appears to the Director to be limited. This is due to:

- entry barriers;
- the current financial situation affecting many other communications providers; and
- the fact that the Director is not aware of any widespread entry by new players having occurred over the past two years or so.

Barriers to switching

B.331 Certain factors make it difficult for other communications providers to switch from BT to self-provision for high bandwidth TISBO. In order to switch to self-provision, another communications provider would need to operate its own TISBO and a BT-provided PPC or leased line simultaneously until switchover, in order minimise interruption. There might also be contractual barriers to switching relating to early termination of contracts with BT.

B.332 These considerations suggest that there are barriers to switching from BT's supply of high bandwidth TISBO to self-provision. He would not expect them

to be as high as in the market for low bandwidth TISBO, however, due to the higher expected (retail) revenues available in the high bandwidth market.

B.333 The Director notes that barriers to switching are less substantial than for low bandwidth TISBO, due to the extra expected revenue potential provided by high bandwidth TISBO.

Customers' ability to access and use information

B.334 As outlined under low bandwidth symmetric information, PPC buyers consist of relatively few, well-informed communications providers and self-provision is the main source of competition. This criterion is not therefore relevant.

High bandwidth TISBO services: intensity of competition criteria

Barriers to expansion

B.335 The discussion of this criterion in the Director's analysis of SMP in the market for low bandwidth TISBO is, in the Director's opinion equally applicable to the market for high bandwidth TISBO.

B.336 The text used in the Director's analysis of the market for low bandwidth TISBO is repeated below.

B.337 The Director believes that the importance of barriers to entry in markets for TISBO (which varies according to bandwidth, as discussed in the text on barriers to entry) is such that it is not essential to consider further constraints provided by barriers to expansion. Where the existing market players have already sunk costs and have local infrastructure in place, they may be able to expand their market share. But the scope for this appears to be limited, and most expansion would require the building of material new network and the sinking of costs.

Active competition on non-price factors

B.338 The discussion of this criterion in the Director's analysis of SMP in the market for low bandwidth TISBO is, in the Director's opinion equally applicable to the market for high bandwidth TISBO.

B.339 The text used in the Director's analysis of the market for low bandwidth TISBO is repeated below.

B.340 Non-price competition refers to differentiation between products and between providers. Product differentiation may be in terms of quality or in terms of diversity. Provider differentiation can be captured through reputation. High

bandwidth TISBO are products that, in general, are not prone to differentiation and for which reputation does not play a role (although, as discussed above, the Director notes that certain other communications providers currently facing financial difficulties may be at a disadvantage relative to BT due to issues of reputation).

B.341 In summary, the Director believes that a lack of active competition on non-price factors criterion is not a major source of market power for BT.

Responses to previous consultation – SMP in high bandwidth TISBO

B.342 BT states that the market share figures provided by the Director are inconsistent with those in the PPC Phase I Direction, and in particular that it considers the quoted high bandwidth market shares to be above its true market share. BT suggests that there is 'double counting' in view of the majority of its high bandwidth sales being to communications providers rather than retail customers. BT also considers that its advantages derived from economies of scale are less for high bandwidth services than for low bandwidth services, because of its smaller customer base.

B.343 The Directors view is that his market shares are accurate. The "double counting" issue is not relevant to the use of retail market shares to proxy wholesale market shares. In fact the use of the market information on retail shares is likely to *underestimate* BT's share of sales to other communications providers since no other providers sell circuits to BT. See paragraphs B.179 to B.181 for a more detailed discussion of this point. The Director agrees that there would be a risk of a "double counting" issue if this data were to be used to inform SMP at the retail level. However, he has not done this.

B.344 Energis suggests that retail leased line market shares are not an appropriate proxy for wholesale TISBO market shares at higher bandwidths, since there are a number of other retail services which rely upon these wholesale services. It suggests that BT has greater shares of these other retail markets, and that its share of the wholesale market is accordingly greater.

B.345 The Director is not persuaded by this argument. Information supplied to him by all operators suggest that each carries a roughly equal proportion of each type of retail service over their (core) networks. The Director's view is therefore that retail market shares are likely to be a good proxy for shares at the wholesale level.

B.346 Energis also points out that if SHDS and DWDM services are included in TISBO, BT's share of the market at higher bandwidths will be greater.

B.347 As outlined in Annex A, the Director's view is that SHDS and WDM based services are both in economic markets that are distinct from the markets for SDH based services.

Conclusion on assessment of SMP in high bandwidth TISBO

B.348 The Director concludes that BT has SMP in high bandwidth TISBO. The Director has reached this opinion in the light of information submitted to him concerning, principally:

- the ubiquity of BT's infrastructure;
- economies of scale and scope;
- barriers to entry including sunk costs;
- BT's ability to set excessive charges well above cost-based prices; and
- BT's high market share.

Likelihood of competition developing in the future

B.349 The Director has considered the potential impact of external factors on this market during the period covered by this review. The Director's view is that there are no developments that would generate sufficient competitive pressures within the next 2-3 years to alter the current finding of SMP. However, the Director will keep market conditions under review.

Market for very high bandwidth traditional interface symmetric broadband origination in the UK apart from Hull

B.350 As described above, the Director's decision to identify a separate market for traditional interface symmetric broadband origination ("TISBO") at and above 622Mbit/s was informed by demand-side substitution possibilities and the SSNIP test in the light of the availability of new evidence regarding proxies for competitive prices (based on cost oriented wholesale prices). The purpose of market definition is to assist in the assessment of market power. The Director notes that competitive conditions appear to be significantly different at very high bandwidths. The evidence made available to the Director suggests that entry by communications providers has been substantially easier in the case of circuits at 622Mbit/s and above. This is reflected in the market power analysis outlined below.

B.351 The market for very high bandwidth TISBO is currently relatively small, both in terms of revenue and volumes (recent estimates suggest the market is one third of the size of the high bandwidth market in revenue terms, and approximately one tenth of its size in terms of number of circuits). The Director's market information stated that the total market totalled in the region of 200 (retail) circuits at the end of 2001/02. BT's share of this market was small, in the region of 10% or less. These two statistics mean, at first glance, that the market

appears to differ substantially from the other leased lines markets that the Director has analysed.

Very high bandwidth TISBO: summary of conclusions

B.352 The Director considers that this market is effectively competitive. This is based on the fact that BT's ubiquity and the presence of barriers to entry appear not to lead to competition problems in this market. This is supported by BT's market share, which, as discussed below, is in the region of 10% or less.

Very high bandwidth TISBO services- Quantitative information criteria

B.353 Due in part to the newness of this market, a limited degree of quantitative information is available to the Director that specifically relates to the very high bandwidth TISBO market. BT has supplied the Director with no profitability data at the retail or wholesale level, and the strongly bespoke nature of BT's pricing (and that of other communications providers) makes it difficult to analyse the current levels of, or trends in, prices at either the wholesale or retail level.

B.354 The retail market share data available to the Director may be less reliable than that available at other bandwidths, due partly to the newness of these services. However, the data available to the Director suggests that, when measured by either volume or revenue, BT's market share is not at a level that is consistent with it possessing single firm dominance in this market.

B.355 Since very high bandwidth TISBO circuits are a relatively new product, the Director does not have reliable data going back a number of years. The data that has been made available to him is shown in the tables below.

Table B.13: BT's market shares by revenue in very high bandwidth traditional interface retail leased lines

	2000/01	2001/02
BT's share	7%	7%

Table B.14: BT's market shares by volume in very high bandwidth traditional interface retail leased lines

	2000/01	2001/02
BT's share	8%	6%

B.356 In the case of very high bandwidth circuits, retail market shares are a good proxy for wholesale market shares, since the Director understands that BT's sales of very high bandwidth circuits do not include any significant number of sales to other communications providers.

B.357 The above market shares are at a level that suggests that BT does not enjoy market power in this market.

Very high bandwidth TISBO services: firm-related criteria

Technological advantages or superiority

B.358 Since entrants appear to have been able to capture high market shares, and the incumbent is supplied with technological inputs by the same firms as other communications providers, he considers that this criterion is of limited relevance in the market for very high bandwidth TISBO.

Control of infrastructure not easily duplicated

B.359 As the Director has outlined in his analysis of the other leased lines markets above, as a former monopolist, BT's network is ubiquitous in its coverage. A corollary to this statement is that most of BT's network costs are sunk. This implies that BT has the infrastructure at its disposal to supply TISBO in most places in the country within a reasonable period and without incurring substantial costs. In other words, the ubiquity of BT's network makes the cost of marginal deployment of TISBO lower and makes it easier to reach many locations.

B.360 The revenues that can be earned from very high bandwidth circuits are substantially higher than those for lower bandwidth circuits (as described earlier in this section, the very high bandwidth market is one third of the size of the high bandwidth market in revenue terms but only one tenth of the size in volume terms). The extent to which this, and other factors, may mean that the infrastructure required to offer very high bandwidth TISBO is described in the text on ease of market entry below.

Economies of scale

B.361 Some of the discussion of this criterion in the Director's analysis of SMP in the market for low bandwidth TISBO is, in the Director's opinion equally applicable to the market for very high bandwidth TISBO.

B.362 Symmetric broadband origination is characterised by significant economies of scale. The main economies of scale in supplying TISBO services derive from the existence of large fixed costs, namely the costs of building ducts and laying fibre or copper. Once the ducts are built and the copper or fibre laid, the cost of supplying additional TISBO is relatively small.

B.363 Other economies of scale arise at the local exchange (first network node) as well as the third party site, since the costs of equipment at the two sites do not increase significantly with capacity. The more leased line customers are served

by the same local exchange or at the same third party site, the higher the capacity of the equipment that can be installed and the cheaper (per customer) it is to serve them.

B.364 In other words, the average cost of supplying TISBO services to a given location decreases with the number of TISBO services at that location. This means that the extent of economies of scale exploited for TISBO is likely to vary with geographical locations, ie with customer density.

B.365 Economies of scale for TISBO can be characterised by estimates of cost volume relationships (CVRs).

B.366 The Director has the following CVR estimates available to him for this purpose:

- an estimated CVR for end to end leased lines, provided by BT to the Director in 2002 based on its CCA financial statements for 2001/02. In these statements, the LRIC of 'inland private circuits' was £1,003m. The FAC for the same period was £1,295m, giving a ratio of 80%. This information can be interpreted as saying that, for each aggregate unit increase in private circuit volumes, the associated LRIC would increase by 80%; and
- CVR estimates for specific network components from the Europe Economics bottom up model described in the analysis of economies of scale in the market for trunk segments. For the access network, these include the following:
  - duct: 5%
  - copper: 35%
  - fibre: 22%
  - operating costs: 48%

B.367 The estimated CVRs above all suggest that the provision of TISBO is characterised by economies of scale. The extent of these economies of scale may be debatable however. In order to assess whether or not BT can exploit such scale economies, the Director needs to consider the extent to which BT enjoys larger economies of scale than that of other communications providers in any given area.

B.368 While BT and other communications providers both supply TISBO services in the same local areas, the Director's view is that BT enjoys larger economies of scale than other communications providers because it almost always carries more traffic in any given area. This is because BT 's customer base is larger than that of any other communications provider at the local access level for TISBO – see the market share figures included in the analysis of quantitative information. In the context of the very high bandwidth market, it is important to note that this size of customer base relates to TISBO at all bandwidths, due to the potential for equipment and infrastructure sharing.

B.369 This means that BT can serve more customers using the same equipment at local exchanges and at third party sites and so obtain better equipment utilisation, or use higher capacity equipment that is cheaper on a per customer basis. It also implies that BT can benefit from the existing ducts to a greater extent. As a result, the Director considers that BT is likely to enjoy larger economies of scale at the local access level than other communications providers.

B.370 In areas where other communications providers do not supply TISBO services, the Director considers that BT enjoys economies of scale and that other communications providers do not. This is because other communications providers must then buy TISBO services from BT, and because BT does not face any competitive pressure to pass on the economies of scale benefits to its buyers (in absence of any remedy). Since the number of areas in which BT is the only supplier of TISBO services is large, the Director is of the view that overall BT enjoys significantly greater economies of scale in the provision of TISBO services than other communications providers.

B.371 The Director believes that other communications providers are most likely to compete with BT in areas where the population density is high so that the level of capacity utilisation can be maximised. In these areas, BT and other communications providers benefit from the same flexibility to fill up their capacity in absence of any regulation.

B.372 The Director has reached the conclusion that there exist significant economies of scale in the very high bandwidth TISBO market and that BT can benefit from them to a larger extent than other communications providers. As a result the Director considers that economies of scale are a source of cost advantage and market power for BT in the TISBO market. However, the Director believes that cost advantages derived from this are, on their own, unlikely to be a source of SMP.

Economies of scope

B.373 Some of the discussion of this criterion in the Director's analysis of SMP in the market for high bandwidth TISBO is, in the Director's opinion equally applicable to the market for very high bandwidth TISBO.

B.374 Economies of scope arise in the TISBO market if the costs incurred to supply TISBO services can be shared with various other products. The magnitude of the economies of scope is influenced by the range of products and services as well as by the volume of each of these various products and services over which the costs are shared.

B.375 Symmetric broadband origination can be used to carry products other than leased lines, though to a lesser extent than trunk segments. Communications providers have indicated that they use TISBO services to provide frame relay, ATM, IPVPN, Internet access, direct voice and wholesale leased lines.

B.376 BT is thought to enjoy larger economies of scope than other communications providers for two reasons. First BT offers a wider range of products than most other communications providers and can therefore spread the cost of the common inputs for TISBO over a larger array of products and services. Second for each/most of these services and products BT carries larger volumes.

B.377 A key economy of scope for TISBO is the possibility of using ducts to carry products and services other than TISBO services. As the costs of digging and laying ducts are substantial and independent of the bandwidth, all communications providers try to take advantage of this and to maximise the number of products that can be supplied using the same ducts. However, only the owner of the ducts can take advantage of this economy of scope which means that BT, with the most ducts is likely to have a significant advantage compared to other communications providers.

B.378 The Director therefore considers that BT enjoys greater economies of scope than other communications providers and that this strengthens BT's market position in the market for very high bandwidth TISBO.

Very high bandwidth TISBO services: marketing and strategies

Product/services diversification

B.379 As in the Director's discussion of the other TISBO markets, the Director does not consider that this criterion is likely to be of enough significance to form a key part of his analysis. The text included above on the high bandwidth market is therefore equally applicable.

Vertical integration

B.380 The Director considers that this criterion is likely to be of limited relevance to this market, since BT's share in the corresponding retail market is low (see the assessment of quantitative information criteria).

Distribution and sales network

B.381 The discussion of this criterion in the Director's analysis of SMP in the market for low (and high) bandwidth TISBO is, in the Director's opinion equally applicable to the market for very high bandwidth TISBO.

B.382 The text used in the Director's analysis of the market for low bandwidth TISBO is repeated below.

B.383 A well-developed distribution system for very high bandwidth TISBO is not viewed as a potential indicator of market power, as the suppliers and buyers of very high bandwidth TISBO are communications providers, and so relatively few in number and all know each other.

Access to capital markets and financial resources

B.384 BT's larger overall size and relatively strong balance sheet may put it at an advantage when it comes to funding new network infrastructure. A number of other communications providers have recently faced financial pressures that may have constrained their willingness and ability to invest in new areas. For example, some communications providers may be reliant on securing orders at the retail level before investing in network infrastructure, and may face a higher cost of capital.

B.385 In addition, the Director has received evidence suggesting that certain end users may be inclined to avoid, where possible, using products that rely on network inputs from certain communications providers that have been facing financial difficulties. BT, on the other hand, is perceived as being relatively secure and financially stable at a time when financial markets are volatile and investors risk-averse.

Very high bandwidth TISBO services: customer-related criteria

Countervailing buyer power

B.386 Given the opportunities that exist for self-provision in this market, it is possible that significant countervailing buyer power exists. This is because buyers of very high bandwidth TISBO can in most cases negotiate with BT and credibly threaten to use an alternative supplier. This is unlikely to be the case in the low bandwidth and high bandwidth markets due to BT's very significant cost advantages.

Very high bandwidth TISBO services: market related criteria

Ease of market entry

B.387 As described in the Director's text on barriers to entry in the markets for low and high bandwidth TISBO, markets for TISBO are characterised by large sunk costs. However, the significant entry made by other communications providers relative to BT (see the Director's market share estimates) suggests that sunk costs are, at the market's current stage of development, not excessively

high in relation to the expected retail revenues that can be earned from retail products offered over very high bandwidth circuits. An additional factor is that other communications providers' submissions to the Director suggest that no or an extremely limited number of very high bandwidth PPCs have been sold by BT, suggesting that other communications providers are engaging in a significant degree of self provision.

B.388 It may be that the very high bandwidth circuits that have been sold so far are all in metropolitan areas, meaning that circuits are relatively short and sunk costs are relatively low. In such a scenario, if very high bandwidth circuits were to become, due to increasing capacity requirements, less of a niche application, then other communications providers might not be in as strong a position to compete with BT in the provision of longer circuits. However, the Director does not have clear evidence to support this view, and as such he does not consider that issues of BT's ubiquity and the importance of sunk costs currently prevent other communications providers from competing in the market for very high bandwidth TISBO. This represents a significant distinction between very high bandwidth TISBO and the lower bandwidth markets, and has a significant impact on the Director's analysis.

Absence of potential competition

B.389 'Potential competition' refers to the prospect of new competitors entering the market within the timeframe considered for the market review. In the context of very high bandwidth TISBO, this primarily refers to the prospect of self-provision by other communications providers.

B.390 Given that the extent of entry in this market has hitherto been high, the Director has no reason to believe that this market is characterised by an absence of potential competition.

Barriers to switching

B.391 The Director does not consider that barriers to switching are currently the cause of significant problems in the very high bandwidth TISBO market. His reasoning behind this is similar to that outlined above under the 'barriers to entry' heading. Additionally, the information made available to the Director suggests that BT's current market share is relatively low, and that the issue of switching to self provision is therefore less relevant.

Customers' ability to access and use information

B.392 As outlined under low bandwidth symmetric information, PPC buyers consist of relatively few, well-informed communications providers and self-provision is the main source of competition. This criterion is therefore unlikely to be relevant.

Very high bandwidth TISBO services: intensity of competition criteria

Barriers to expansion

B.393 The Director believes that these are not a relevant criteria in his analysis of this market. Relative to other leased lines markets, very high bandwidth TISBO is characterised by relatively few barriers to entry, and is a new market that the Director would expect to expand at a quicker rate.

Active competition on non-price factors

B.394 The discussion of this criterion in the Director's analysis of SMP in the markets for low (and high) bandwidth TISBO is, in the Director's opinion equally applicable to the market for very high bandwidth TISBO.

B.395 The text used in the Director's analysis of the market for low bandwidth TISBO is repeated below.

B.396 Non-price competition refers to differentiation between products and between providers. Product differentiation may be in terms of quality or in terms of diversity. Provider differentiation can be captured through reputation. Very high bandwidth TISBO are products that, in general, are not prone to differentiation and for which reputation does not play a role (although, as discussed above, the Director notes that certain other communications providers currently facing financial difficulties may be at a disadvantage relative to BT due to issues of reputation).

B.397 In summary, the Director believes that a lack of active competition on non-price factors criterion is not a major source of market power for BT.

Responses to previous consultation – SMP in very high bandwidth TISBO

B.398 Communications providers suggest that there is SMP in very high bandwidth TISBO, for a number of reasons.

B.399 Firstly, they state that market share data is too sparse. The Director has information on retail market shares for two years, which shows a consistent picture of low shares for BT. The Director considers that it would not be appropriate to ignore this evidence.

B.400 Secondly, communications providers suggest that as wholesale circuits are used for many purposes including core/ access network construction and retail data and Ethernet services, leased line market shares are not a reliable proxy. The Director accepts that these market shares are not a perfect proxy, but is not aware of any reason why focusing on retail leased lines would bias BT's

market share downwards. The data he has been able to gather from communications providers suggests that BT and other communications providers on average supply leased lines and other services in roughly equal proportions across their (core) networks, and hence that these figures should provide a reliable proxy. The Director has defined Ethernet based services as falling within a distinct economic market, and he considers the level of competition in this market in the section on AISBO below.

B.401 Thirdly, communications providers suggest that LLU backhaul circuits will significantly increase the number of very high bandwidth lines over the next two years. The Director considers that in view of the current very small number of unbundled local loops, there would have to be a very large increase in their numbers in order to affect market shares to a degree that would alter the Director's analysis and conclusions.

B.402 Fourth, communications providers point out that the Director ruled in the LLU backhaul Direction that it (and LES/SHDS) was not competitive.

B.403 Fifth, communications providers state that they do not just target high population densities; they target sectors of the market. However, as large businesses tend to be found in areas of high population density, this amounts to much the same effect.

B.404 Sixth, communications providers state that high barriers to entry outweigh expected revenues. Communications providers often purchase LES circuits from BT rather than PPCs, at very high bandwidths. Dig costs are comparatively high. Time delays from dig mean competition is easy only if self provided access has already been carried out. The section on SMP in the AISBO market discusses issues relating to the LES market.

B.405 Seventh, communications providers state that expected revenues will reduce as lines become cheaper. The Director notes in relation to this point that falling prices may be an indicator of increased competition in the market.

B.406 Eighth, communications providers state that there are barriers to retail switching – volume discounts, long term contracts, penalty clauses, costs and time delays of installation by communications providers. The Director concedes that this may be true, but considers it an insufficient basis for a finding of SMP. BT currently sells only a handful of very high bandwidth TISBO circuits to other communications providers.

B.407 Finally, communications providers cite economies of scale and access to capital. The Director's discussion of economies of scale is included from paragraph B.361. The Director has not relied heavily on access to capital in his assessment of SMP. This criterion is unlikely to be key in the very high bandwidth TISBO market since the required investment is of a bespoke nature.

The Director has not been presented with any evidence for the purpose of this or any of his other market reviews as to the role of BT's greater access to capital in dominance findings.

Conclusion on assessment of SMP in very high bandwidth TISBO

B.408 The Director concludes that BT does not have SMP in very high bandwidth TISBO. The Director has reached this opinion in the light of information submitted to him concerning, chiefly, the extent to which market entry by other communications providers has been possible and BT's low market share. Other considerations, namely the unequal access to capital markets enjoyed by BT and other communications providers, and the presence of economies of scale and scope, might be interpreted as evidence in favour of suggesting that BT enjoys an advantage, but the Director considers that the evidence against BT having SMP is sufficient to outweigh such considerations.

B.409 It is possible that, as the market for very high bandwidth circuits expands beyond its current levels (and outside the limited geographical areas in which it currently exists), the high sunk costs for communications providers to self supply may begin to pose a barrier to the entry of other communications providers. Such factors will be considered when the Director next reviews the leased lines markets, However, the Director's view is that, in the period relevant to this review, the available evidence does not support a finding of SMP.

Market for Alternative Interface Symmetric Broadband Origination in the UK apart from Hull

B.410 The assessment of market power in the Alternative Interface Symmetric Broadband Origination ("AISBO") market is carried out in the absence of any remedy at both the wholesale and the retail level, for the reasons described in Chapter 3.

AISBO: summary of conclusions

B.411 The Director considers that BT has SMP in this market. He has reached this initial conclusion based on an analysis of, primarily (see the detailed assessment for the examination of other criteria):

- BT's very high market share;
- the advantages enjoyed by BT due to the ubiquity of its infrastructure and the existence of barriers to entry, notably those provided by sunk costs;
- the greater economies of scale and scope enjoyed by BT; and
- the advantages BT enjoys as a result of its vertical integration.

Quantitative information criteria

B.412 This explanatory statement and notification present the Director's first detailed analysis of the information he has gathered regarding the alternative interface (predominantly LES) based retail market and the wholesale AISBO market. Because of this, the analysis below does not make use of any time series data on, for example, market shares. The Director's view is that this is unlikely to represent a significant gap in the available information given the very high level of BT's market share and the likelihood of similar shares having existed in previous years.

Market shares

B.413 The Director has not collected data relating specifically to the AISBO (as opposed to retail LES circuits) market. However, he sees no reason why retail data would not be a good proxy for wholesale market shares in this context. In terms of the section of the wholesale market that is used to supply retail LES circuits, retail market data will tend to underestimate BT's share of the wholesale market, since BT currently supplies other operators with wholesale inputs (on "retail" terms) whereas the reverse is not true.

B.414 The market share data gathered by the Director suggests that, in the market for retail LES circuits (across all bandwidths and based on all technologies including over direct fibre and over WDM), BT's market share is above 80% by volume. A very high market share such as this, if persistent would be consistent with a presumption of dominance on BT's part. It seems very likely that these market shares have been, and will continue to be for the next few years, at a high level, since the long contracts in this market preclude the type of market share volatility that might hint at an inability to set prices. A finding of SMP is supported by the arguments regarding barriers to entry and the advantages conferred by BT's ubiquity that are outlined below.

Excess pricing and profitability

B.415 Reliable data on BT's profitability in the provision of AISBO circuits is not available to the Director.

International benchmarking

B.416 International benchmarking data relating to AISBO circuits is not currently available to the Director.

Firm-related criteria

Technological advantages or superiority

B.417 This criterion is unlikely to be of key importance to the AISBO market since the use of LES is relatively well established (other than the use of emerging

technologies such as WDM, which currently accounts for a relatively small number of circuits), such services having been offered for over five years, and the relevant technology is therefore well known to all communications providers. Additionally, the incumbent is supplied with technological inputs (eg lengths of fibre, routers, and so on) by the same firms as other communications providers.

Control of infrastructure not easily duplicated

B.418 AISBO circuits are not easily duplicable in the sense that significant amounts of time and money are required in order to roll them out.

B.419 As the former monopoly, BT has developed and now enjoys a ubiquitous network, having undertaken the sunk investment to provide it with duct and fibre access to a far greater number of customer premises than other communications providers. This implies that BT has the essential building blocks ready at its disposal to supply AISBO at most locations within the UK within a reasonable time period, and without incurring very substantial costs. In other words, the ubiquity of BT's network makes its cost of marginal deployment of AISBO circuits lower and makes it easier for BT to cover many locations.

B.420 Most communications providers requiring services in this market are recent entrants relative to BT, and are still in the process of building out their level of network coverage. This implies that competing networks are not extensive and that their costs are not yet sunk. This means that communications providers other than BT are not likely to be in a position to self-supply AISBO outside areas in which they currently have established points of presence.

B.421 The expected revenues from the provision of retail AISBO are low relative to the expected revenues from retail high and very high bandwidth TISBO. Duct and fibre costs, which, unlike equipment costs, are not incurred on an equal basis by BT and other communications providers (BT's advantage being very significant due to the ubiquity of its network), form a relatively large proportion of the total costs that must be incurred to provide LES circuits directly over fibre. This means that the barriers to entry in the AISBO market are at a level comparable with the low bandwidth TISBO market, even though LES circuits are sold at high and very high bandwidths. This is shown by price comparisons supplied to the Director by communications providers including BT. For example, BT's data suggested that, over a distance of 17km, the connection and rental charges of a 155Mbit/s PPC circuit were around twice the level of a 100Mbit/s LES circuit.

Economies of scale

B.422 Economies of scale achievable in the provision of AISBO are likely to be similar to those inherent in the provision of TISBO.

B.423 The main economies of scale in supplying AISBO derive from the existence of large fixed costs, namely the costs of building ducts and laying fibre. Once duct has been built and fibre laid, the cost of supplying additional AISBO circuits using these ducts and fibre is relatively small. In other words, the average cost of supplying AISBO to a given location decreases with the number of AISBO circuits serving that location. This means that scale economies relating to AISBO are likely to vary with geographical locations (ie with density of customers).

Economies of scope

B.424 Economies of scope arise in the AISBO market if the costs incurred in supplying AISBO can be shared with various other products. BT's economies of scope are likely to be greater than those of other communications providers. This is because BT offers a relatively large number of products and can therefore spread the costs of the AISBO common inputs over a larger array of products and services.

B.425 One key example of economies of scope in the case of AISBO derives from the possibility of using duct to carry a range of products and services rather than just AISBO. Since the costs incurred by suppliers of AISBO for digging and laying duct are substantial, all communications providers try to take advantage of this and to maximise the number of products that can be supplied by means of the same duct. In assessing the importance of this potential scope economy for communications providers, it must be kept in mind that only the owner of the duct can take advantage of it. This means that with respect to the economies of scope derived from duct usage, BT is likely to have a significant advantage compared with its competitors.

Concerning marketing and strategies

Product/services diversification

B.426 This criterion is not of great relevance to the assessment of market power in the AISBO market. The Director is not aware of BT having tended to bundle other products together with AISBO, and considers that BT has SMP in AISBO regardless of BT's pricing in relation to other products and markets.

Vertical integration

B.427 In the context of the AISBO market, vertical integration could refer to either:

- integration between the upstream AISBO market and the downstream retail LES circuits market; or
- integration between the AISBO market and markets for other inputs that are further upstream, such as WDM.

B.428 The first of these considerations is likely to increase the strength of BT's position in the market for AISBO since its very high retail market share (see above) means that the majority of the AISBO market is foreclosed to other communications providers. This factor, together with the potential for economies of scale, puts BT at a significant advantage *vis-à-vis* its competitors.

B.429 The Director's view is that the second of the above considerations is currently unlikely to be a major source of competitive advantage to BT in the supply of AISBO. See paragraphs 2.176 to 2.185 above for further details.

Distribution and sales network

B.430 This criterion is unlikely to be an issue in the case of AISBO. The buyers (and suppliers) of AISBO are few in number, and are all relatively well known. BT's distribution and sales network is therefore unlikely to confer any significant advantage on it in this market.

Access to capital markets and financial resources

B.431 BT's larger overall size and relatively strong balance sheet may put it at an advantage when it comes to funding new network infrastructure. A number of other providers have recently faced financial pressures that may have constrained their willingness and ability to invest in new areas. For example, some communications providers may be reliant on securing orders at the retail level before investing in network infrastructure, and may face a higher cost of capital.

Customer-related criteria

Countervailing buying power

B.432 In the AISBO market, communications providers are, in some cases, able to use self-provision as an alternative to being supplied by BT. However, in general the Director is not aware of BT's competitors possessing any significant degree of countervailing buyer power. This is because none of the buyers of AISBO accounts for a large proportion of the BT's total output, not least because of BT's very high market share at the retail level.

Market entry related criteria

Ease of market entry

B.433 Barriers to entry are a strong feature of the AISBO market. As discussed above, substantial sunk costs are incurred by communications providers attempting to roll out duct and fibre to extend their networks to customer

premises. While these sunk costs are lower if a communications provider is already supplying circuits at a certain premises, it appears to the Director that in many cases these sunk costs represent a substantial barrier to entry in the AISBO market.

B.434 Alternative communications providers have supplied the Director with confidential cost data comparing, on a per km basis, dig costs with the prices of BT's retail LES circuits. These figures show that, by self-supplying SBO, communications providers are unlikely to be able to compete with BT's retail charges for LES circuits in many instances. For example, estimates supplied to the Director by communications providers concerning the feasibility of competing with BT suggest that the capital expenditure required to compete with BT's retail LES products can be higher than 10 years' worth of BT's revenues. This may be ameliorated to the extent that such dig costs could be spread over a variety of services. But, as discussed above, BT is likely to have a significant advantage over other communications providers in terms of economies of scope.

Absence of potential competition

B.435 "Potential competition" refers to the prospect of new competitors entering the market within the timeframe considered for the market review. In the context of AISBO, this refers to the prospect of self-provision by communications providers other than BT. The prospect of widespread entry by new firms appears to the Director to be limited. This is due to:

- entry barriers;
- the current financial situation affecting many other communications providers; and
- the fact that the Director is not aware of any widespread entry by new players having occurred over the past two years or so.

Barriers to switching

B.436 This refers to the possible difficulties communications providers would face in switching from buying AISBO from BT to self-provision. In the Director's view, this market is characterised by barriers to switching. These include various costs associated with switching, including those of simultaneously running a BT AISBO circuit together with a self-provided one. Contract length, and penalties for early termination, may also be barriers to switching.

Customers' ability to access and use information

B.437 This criterion is not relevant for the assessment of market power in AISBO. This is because the buyers of AISBO are very few in number, being a group of well-informed communications providers. Self-provision is the main source of competition.

Intensity of competition criteria

Barriers to expansion

B.438 The Director is not aware of substantial barriers to expansion in the AISBO market that exist in addition to the barriers to entry and switching discussed above.

Active competition on non-price factors

B.439 Non-price competition refers to differentiation between products and between providers. Product differentiation may be in terms of quality or in terms of diversity. Provider differentiation can be captured through reputation. Products such as AISBO are in general characterised by widespread product differentiation. This criterion is therefore of minimal relevance to the SMP assessment for AISBO.

Conclusion on assessment of market power in AISBO

B.440 the Director concludes that BT has significant market power in the market for AISBO. The Director has reached this view based on an analysis of, primarily:

- BT's very high market share;
- the advantages enjoyed by BT due to the ubiquity of its infrastructure and the existence of barriers to entry, notably those provided by sunk costs;
- the greater economies of scale and scope enjoyed by BT; and
- the advantages BT enjoys as a result of its vertical integration.

Likelihood of competition developing in the future

B.441 The Director has considered the potential impact of external factors on this market during the period covered by this review. The Director's view is that there are no developments that would generate sufficient competitive pressures within the next 2-3 years to alter the current finding of SMP. This is because the sources of SMP are high structural barriers to entry and because demand conditions and technological progress are unlikely to be able to reduce the strength of these entry barriers in the near future. However, the Director will keep market conditions under review.

Responses to previous consultation – UK ex Hull, all retail and wholesale markets

B.442 BT suggests that (in relation to other markets within the scope of this review) even if it does have better access to capital markets, this does not necessarily give it more market power than its competitors. It adds that financial

restructuring by some communications providers may enable them to compete far more effectively in future.

B.443 BT also notes that the Director has not analysed any retail markets other than retail leased lines, or demonstrated that SMP in wholesale TISBO and wholesale trunk segments restricts or distorts competition in those other downstream markets.

B.444 The Director does not consider that BT's access to capital markets is in isolation a definitive source of market power – rather, it is just one of the considerations to bear in mind. However, he wants to draw attention to the advantage enjoyed by BT as a result of its position as incumbent, to access capital markets and to attract customers worried by the financial difficulties faced by some communications providers and the implications these can have for the continuity of services. The Director considers that although the restructuring of some communications providers may improve their competitive ability, this is unlikely to impact significantly on BT's market power in the next 2-3 years given its current strong position.

B.445 The Director is restricting his investigation of the retail markets in the Leased Line Market Review to those proposed by the EU Recommendation. The lack of competition in these retail markets has prompted the Director to propose remedies at the wholesale level, where the main problem appears to lie. This is also in line with the EU Recommendation, which proposes wholesale terminating segments of leased lines to be considered for ex ante regulation. The Director has already explained why he considers it appropriate to adopt a slightly broader market at the wholesale level. First he wants to ensure that the remedies do not discriminate among technologies used to provide leased lines at the retail level. Second he wishes to include all other wholesale services (that is, services sold to communications providers) that are technologically equivalent or that pragmatism suggests should be placed in the same market. Whether or not the competition in other retail markets using these symmetric broadband origination services is distorted is not a necessary pre-condition for a finding of SMP and the application of proportionate remedies.

Kingston upon Hull

Low bandwidth traditional interface retail leased lines in the Hull area

B.446 As explained in the Director's description of the order of his market analysis in Chapter 3, the SMP assessment of the low bandwidth traditional interface retail leased line market shall be carried out in the presence of the proposed remedy at the wholesale level but in absence of any remedy at the retail level.

Low bandwidth traditional interface retail leased lines in the Hull area: quantitative information criteria

Market shares

B.447 The Director has not been supplied with sufficiently detailed information from every communications provider in order for him to be able to determine the market shares of players in leased lines markets in Kingston upon Hull with complete certainty.

B.448 The only network based competition in leased lines in the Kingston area is provided by other communications providers via means such as radio links to provide direct connectivity with customer sites within the Kingston upon Hull area.

B.449 Estimates provided by Kingston suggest that its market share in the low bandwidth traditional interface retail market is in the region of 83%, or 76% when adjusted to exclude sales to other communications providers (which are currently made on the same terms as sales to end users). Persistent market shares of this size are consistent with a presumption of dominance. While specific market share figures are not available for earlier years, the Director considers it likely that Kingston's share has been similarly high for a number of years since he is not aware of any competing providers having recently left the market.

Excess pricing and profitability

Pricing

B.450 In the absence of reliable cost data against which to compare prices, it is difficult to assess the relationship between Kingston's prices for products in this market and their underlying cost. Additionally, benchmarking Kingston's prices against those of other communications providers (in either the UK or overseas) is a difficult exercise. This is because, perhaps because the Hull geographic area is relatively small, Kingston's circuits are not charged on a distance related (eg per km) basis. Other operators generally charge on a distance related basis. The Director has therefore not relied on an analysis of Kingston's prices in his analysis.

Profitability

B.451 Kingston has not supplied the Director with reliable estimates of its profitability rates for traditional interface retail leased line products. Estimates provided to the Director included a ROCE estimate in excess of 90%. In the absence of more reliable figures, the Director has based his quantitative

assessment on other criteria, ie Kingston' market share, but has included the 90% figure since this is Kingston's own estimate.

Low bandwidth traditional interface retail leased lines in the Hull area: firm related criteria

Technological advantages or superiority

B.452 The Director does not believe this criterion to be relevant, because the technology used to supply leased lines is mature (communications providers and customers have commented that leased lines are a "commodity product"), and because suppliers to the incumbent can also supply to any other communications providers. Additionally, it seems implausible that Kingston would have advantages over potential entrants based on technological superiority, given its relatively small R&D capability.

Control of infrastructure not easily duplicated

B.453 The market for low bandwidth traditional interface retail leased lines in the Hull area is small in the context of the UK as a whole (Kingston estimates that the total market numbers approximately 1,500 lines) and Kingston's current share of the retail market is very high. The Director believes that the barriers to entry outlined in the Director's assessment of SMP in the markets for TISBO (see below) are likely to continue to cause problems in the retail market in the absence of any retail regulation. The reasons for this are outlined in the Director's discussion of barriers to entry at the retail level (see below).

Economies of scale

B.454 The Director does not consider that Kingston' position in the market for retail traditional interface leased lines is significantly strengthened by the presence of economies of scale. This is because, while the Director believes that provision of leased lines is in general characterised by the potential for economies of scale, it is unlikely that reproducing such economies of scale would be prohibitively difficult for other communications providers, given the relatively small size of the Hull area.

Economies of scope

B.455 The Director has identified that, in this market, Kingston enjoys greater economies of scope than other communications providers at the wholesale level. The proposed remedy at the wholesale level is expected to reduce the magnitude of the economies of scope advantage that Kingston enjoys. This is because the remedy requires the supply of TISBO upon request, without undue discrimination, and on a cost oriented basis. Cost oriented charges should reflect

part of the cost saving enjoyed by Kingston as a result of economies of scope. And this will be passed on to the buyers.

B.456 The Director, however, believes that there exist economies of scope typical of the retail level, such as marketing. Because of its historical market position as an incumbent in the area, Kingston has a larger customer base than any other communications provider. This enables it to enjoy greater retail economies of scope than its competitors. As a result, the Director believes that Kingston's retail market position is strengthened by these economies of scope, even though this strengthening effect is less than at the wholesale level.

Product/services diversification

B.457 This criterion does not seem to be significant for the assessment of SMP in the retail low bandwidth traditional interface leased lines market, as the Director is not aware that Kingston generally bundles other products with its retail leased lines offering.

Vertical integration

B.458 Kingston's vertical integration may generate efficiency relative to a chain of non-integrated firms, as it enables various transaction costs to be avoided.

B.459 However a side effect of Kingston' vertical integration is that it is relatively difficult for other communications providers to enter the market for traditional interface retail leased lines due to Kingston's dominance of the wholesale market providing it with the potential to leverage market power into downstream markets.

B.460 The Director has proposed regulation to deal with discriminatory behaviour that Kingston might undertake in order to favour its retail business. However, whilst wholesale remedies may reduce the scope for vertical leveraging, they do not remove it entirely. For example, cost oriented charges for TISBO would be based on a measure of average costs, but marginal costs are lower. Kingston's ability to engage in margin squeezes to strengthen its retail low bandwidth traditional interface leased line business would not be removed.

Distribution and sales network

B.461 A well-developed distribution system and sales network is costly, sometimes even impossible, to reproduce and as such may represent an advantage over other competitors.

B.462 The Director does not consider that this factor is likely to be of great relevance to his SMP assessment in the market for low bandwidth traditional interface retail leased lines in the Hull area, given that the relevant customers are all relatively well informed business users.

Access to capital markets and financial resources

B.463 Kingston's size means it does not derive any benefits relative to potential entrants from its status as an incumbent communications provider within markets in the Hull area.

Low bandwidth traditional interface retail leased lines in the Hull area: customer related criteria

Countervailing buying power

B.464 The Director does not believe that this factor is likely to be of major relevance in the market for low bandwidth retail leased lines in the Hull area since he is not aware of any single customer accounting for a sufficiently large proportion of the relevant market.

Low bandwidth retail leased lines in the Hull area: market related criteria

Ease of market entry

B.465 In the light of the Director's proposed order of market analysis, this discussion of the retail market will focus on those barriers to entry that apply in the presence of his proposed wholesale market regulation.

B.466 The Director's discussion of the markets for TISBO describes the existence of network-related barriers to entry. His intention is that his proposed wholesale remedies will largely mitigate the effects that these barriers might have at the retail level. However, the nature of the market in Kingston upon Hull is such that it is not certain that their impact will fully flow through to retail markets in the immediate future. In particular, inertia caused by Kingston's history as the main supplier of telecommunications services in the area, together with the small size of the market may act as a barrier to entry. This is because, even after the availability of cost oriented PPCs, retail competitors will need to incur certain fixed network and marketing costs that may not be economic given the size of the market.

Absence of potential competition

B.467 In the light of the limited size of the market for traditional interface retail leased lines in the Hull area, and the barriers to entry identified above, the Director does not believe that the potential for increased competition is particularly great.

Barriers to switching

B.468 Responses to the questions regarding leased lines in Oftel's survey *Business use of fixed telecom services and Internet in the Hull Area* (March 2003) reveals that nine out of ten leased line end users have never used another supplier. Five reasons for not switching leased line supplier are mentioned: perceptions of current supplier as cheapest (mentioned by a quarter), not aware of alternatives (a quarter), inertia (nearly 1 in 5), general satisfaction with current supplier (1 in 10), too busy (1 in 20) or tied into contract (1 in 20). Only one of these reasons, namely tied into contract, can be considered as a clear barrier to switching (although, under some circumstances, customer inertia could also make entry and expansion by competitors more difficult).

B.469 The same survey reveals that 30 per cent of leased line end users cannot switch because of the absence of alternative suppliers in the area where they are located.

B.470 On the basis of this information the Director is of the view that barriers to switching may be a source of SMP in the Hull area. However, in line with his analysis of the corresponding product markets in the UK excluding Hull, his view is that other considerations are likely to provide stronger evidence of SMP.

Customers' ability to use and access information

B.471 The survey evidence available to the Director (see above) suggests that traditional interface retail leased lines customers in the Hull area are satisfied with the standard of information available to them.

B.472 The Oftel Business survey (2003) that reports on fixed telecom services and Internet in the Hull area finds that 25% of the leased line end users are not aware of existing alternatives. It is, however, not known whether or not these end users are located in areas where alternative suppliers are available.

Low bandwidth retail leased lines in the Hull area: intensity of competition criteria

Barriers to expansion

B.473 The Director's market share information suggests that growth in the size of the market for low bandwidth retail leased lines (between Q1 2001/02 and Q2 2002/03 the total number of lines fell by 8%) has been minimal in recent years. The Director anticipates that this situation, combined with barriers to entry (see above), would, absent regulation in the retail market, contribute towards Kingston Communication's ability to behave independently of competitors and consumers in this market, by making entry less attractive.

Active competition on non-price factors

B.474 The Director is of the view that the degree of competition on non-price factors in this market is at a low level, due to the very low sales volumes of alternative communications providers, and additionally in the light of his belief that leased lines products are generally not prone to significant product differentiation. The lack of active competition on the non-price factors criterion is not therefore relevant for the market power assessment analysis.

International benchmarking

B.475 The Director's analysis of markets in the Hull area has not relied on international benchmarking analysis, since Kingston is, relative to other incumbent communications providers, a relatively small communications provider, and operates in a relatively small geographic area. This makes price comparisons even more difficult than usual. As noted in the discussion of quantitative factors above, Kingston's charges are at approximately the same level as those of BT, which, as outlined in the Director's analysis of the UK market, are higher than those of most incumbent communications providers.

Likelihood of competition developing in the future

B.476 The Director has considered the potential impact of external factors on this market during the period covered by this review. The Director's view is that there are no developments that would generate sufficient competitive pressures within the next 2-3 years to alter the current finding of SMP. There are at least two reasons for this view. First, Kingston's market share is very high in the Hull area (83% including sales to other communications providers). Second the small size of, and the slow growth in, the Hull area make it unattractive for other communications providers to start supplying traditional interface retail leased lines. However, the Director will keep market conditions under review.

Conclusion on assessment of SMP in low bandwidth traditional interface retail leased lines in the Hull area

B.477 The investigation of the above market power criteria for the low bandwidth traditional interface retail leased lines indicates that, on a forward-looking basis, Kingston Communications is likely to continue to enjoy SMP even in the presence of the Director's proposed remedies at the wholesale level.

B.478 The Director anticipates that it might take more than two years before the impact of these remedies is significant enough to remove the significant market power status of Kingston, in the light of its current very high market share and the current absence of a request from competing operators for a wholesale (TISBO) product in the Hull area. The relatively small size of the market in Kingston upon Hull, and its low growth rate, are such that the Director considers that the

likelihood of widespread entry is low. The Director considers that the economies of scope available to Kingston are likely to provide it with a material cost advantage over its current and potential competitors. Additionally, any cost based wholesale inputs provided by Kingston will be priced at a level more akin to average cost (LRIC) than marginal cost. Scope for vertical leveraging by Kingston from wholesale to retail level will persist to a degree.

B.479 The main reasons why the Director believes that Kingston would continue to able to behave to appreciable extent independently of competitors and customers in the absence of retail regulation are:

- it controls a network infrastructure that it is not economic for competitors to duplicate, due to:
  - small market size and slow growth
  - the presence of barriers to entry (sunk costs);
- economies of scope; and
- it is vertically integrated.

B.480 All these factors make entry in the low bandwidth traditional interface retail leased lines market difficult and unattractive. As a result, the competition is not intensive.

B.481 The factors set out above explain Kingston's high market share in the market for low bandwidth TISBO, which, based on estimates provided by Kingston Communications itself, is approximately 75% by volume.

Market for trunk segments

B.482 As described in the market definition, there is no separate market for trunk segments in the Hull area, since the market is UK-wide (see the Director's analysis of the market for trunk segments in the UK).

Market for low bandwidth traditional interface symmetric broadband origination in the Kingston upon Hull area

B.483 The assessment of market power in the low bandwidth traditional interface symmetric broadband origination ("TISBO") market has been made in the absence of any remedy at both the wholesale and the retail level for reasons described in the Director's description of the order of his market analysis in Chapter 3.

Market for low bandwidth TISBO in the Hull area: quantitative information criteria

Market shares

B.484 Kingston sells its leased lines products at 'retail' prices, even when the sales are to other telecommunications providers. Kingston has provided the Director with raw data that has enabled him to calculate an estimate of Kingston's market share at the low bandwidth 'wholesale' level, ie low bandwidth TISBO. The most relevant figure is its share of total market sales, including sales to its downstream arm (which sells at the retail level to end users) and to other communications providers.

B.485 Kingston's own estimate of its share of this market is 83% by volume (including sales to other operators). Whilst specific market share figures are not available for earlier years, the Director considers it likely that Kingston's share has been similarly high for a number of years. This market share information is consistent with a presumption of dominance.

Excess pricing and profitability

B.486 In the absence of wholesale regulation, Kingston does not offer TISBO on its own and instead other communications providers have to buy traditional interface retail leased lines at retail prices. As outlined in the discussion of Kingston's SMP at the retail level, the Director has carried out his assessment of SMP without reference to an analysis of Kingston's prices.

Market for low bandwidth TISBO in the Hull area: firm related criteria

Technological advantages or superiority

B.487 The Director does not believe this criterion to be relevant, because the technology used to supply leased lines is mature (communications providers and customers comment that leased lines are a "commodity product"), and because suppliers to the incumbent can also supply to any other communications providers. Additionally, it seems implausible that Kingston would have advantages over potential entrants based on technological superiority, given its relatively small R&D capability.

Control of infrastructure not easily duplicated

B.488 Kingston is alone in having substantial network coverage in the Hull area. This is analogous to the position of BT in the wider UK market. The extent to which it is profitable for other communications providers to enter wholesale markets in the Kingston upon Hull area is considered in the Director's discussion of barriers to entry below.

Economies of scale

B.489 Kingston is not in a position to exploit economies of scale in markets for TISBO. This is because, while the Director believes that provision of leased lines is in general characterised by the potential for economies of scale, it is unlikely that reproducing such economies of scale would be prohibitively difficult for other communications providers.

Economies of scope

B.490 Kingston may be in a position to exploit economies of scope in markets for TISBO in the Hull area. There are two reasons for this. First, it is the only communications provider to offer a broad range of services on a widespread basis in this area. Second for each service provided, Kingston has the largest number of customers due to its historical incumbent position.

B.491 This is why the Director is of the view that Kingston Communications enjoys greater economies of scope than any other communications provider in this area and that this strengthens Kingston's market position in the low bandwidth TISBO market.

Product/services diversification

B.492 In the absence of wholesale regulation, Kingston does not offer TISBO on its own and instead other communications providers have to buy traditional interface retail leased lines at retail prices.

Vertical integration

B.493 In a manner analogous to that described in the Director's discussion of markets for TISBO in the UK excluding Kingston upon Hull, Kingston is able to foreclose a significant proportion of the wholesale markets in the Hull area because of its high market share at the retail level. This means that a large part of the wholesale market is not available to competitors.

Distribution and sales network

B.494 A well-developed distribution system for low bandwidth TISBO is not viewed as a potential indicator of market power, as the suppliers and buyers of low bandwidth TISBO are few in number and all know each other.

Access to capital markets and financial resources

B.495 Kingston Communication's size means it does not derive any benefits relative to potential entrants from its status as an incumbent communications provider within markets in the Hull area.

Market for low bandwidth TISBO in the Hull area: customer-related criteria

Countervailing buying power

B.496 The Director does not believe that any purchaser of TISBO is in a position to counter Kingston's very strong position in the relevant markets, given its very high market share.

Market for low bandwidth TISBO in the Hull area: market related criteria

Ease of market entry

B.497 The market for low bandwidth terminating segments in the Hull area is characterised by substantial barriers to entry.

B.498 Any potential entrant needs to undertake substantial sunk investment in order to offer TISBO services in competition with Kingston. The quantification provided in the Director's discussion of corresponding markets in the rest of the UK is equally applicable to the Hull area.

B.499 Given that no other communications provider owns significant network infrastructure in the Hull area, and that the expected revenues from entry into the market are low relative to the costs of entry, the Director considers that these factors are likely to pose a very substantial barrier to entry.

Absence of potential competition

B.500 Potential competition refers to the prospect of new competitors entering the market within the timeframe considered for the market review.

B.501 In the light of the barriers to entry identified above and the relative size of the relevant markets, the Director believes that the scope for potential competition in markets for TISBO is limited.

Barriers to switching

B.502 The Director is not aware of any specific widespread competition problems caused by barriers to switching that are of comparable significance to those caused by Kingston being the only network communications provider in the Hull area.

Customers' ability to use and access information

B.503 The Director believes that buyers of TISBO in the Hull area are likely to be in a good position to use and access relevant information, since the players involved are a small number of relatively well informed communications providers.

Market for low bandwidth TISBO in the Hull area: intensity of competition criteria

Barriers to expansion

B.504 It is difficult to assess the extent of barriers to expansion in a small area such as Kingston upon Hull. The Director has therefore based his SMP assessment on other factors.

Active competition on non-price factors

B.505 The Director is not aware of any competition on non-price factors that takes place in the Hull area.

International benchmarking

B.506 The Director's analysis of markets in the Hull area has not relied on international benchmarking analysis, since Kingston is, relative to other incumbent communications providers, a relatively small communications provider, and operates in a relatively small geographic area.

Likelihood of competition developing in the future

B.507 The Director has considered the potential impact of external factors on this market during the period covered by this review. The Director's view is that there are no developments that would generate sufficient competitive pressures within the next 2-3 years to alter the current finding of SMP. This is mainly because of the existence of substantial barriers to entry. As an incumbent, Kingston has sunk the costs of network deployment, and entrants will not be in a position to effectively compete at the wholesale level until they have sunk these costs. Another reason, also deriving from the legacy position of Kingston, is the greater economies of scope enjoyed by Kingston compared to those of any entrant. However, the Director will keep market conditions under review.

Conclusion on assessment of market power in the market for low bandwidth TISBO in the Kingston upon Hull area

B.508 The Director concludes that Kingston has SMP in the market for low bandwidth TISBO in the Hull area.

B.509 In the absence of wholesale regulation, the Director believes that Kingston would be able to behave to appreciable extent independently of competitors, retail communications providers, and, ultimately, customers.

B.510 This is due to its legacy position as the incumbent communications provider in the Hull area and high barriers to entry. Together these factors mean that Kingston controls an infrastructure that it would not be economic for competitors to duplicate. High barriers to entry arise from the large and sunk costs of building new network relative to the expected revenue, and from Kingston's ability to exploit greater economies of scope.

B.511 This factor explains Kingston's market share in the market for low bandwidth TISBO, which Kingston itself estimates to be in the region of 83% by volume (this figure relates to the sale of low bandwidth traditional interface retail leased lines including sales to other operators).

Market for high bandwidth traditional interface symmetric broadband origination in the Hull area

B.512 The assessment of market power in the high bandwidth traditional interface symmetric broadband origination ("TISBO") market has been made in the absence of any remedy at both the wholesale and the retail level for reasons described in the Director's description of the order of his market analysis in Chapter 3.

B.513 The overall size of the relevant market is small: data supplied by Kingston suggests that there are only nine high bandwidth circuits in the Hull area.

Market shares

B.514 Kingston sells its leased lines products at 'retail' prices, even when the sales are to other telecommunications providers. Kingston has provided the Director with raw data that has enabled him to calculate an estimate of Kingston's market share at the high bandwidth 'wholesale' level, ie high bandwidth TISBO. The most relevant figure is its share of total market sales, including sales to its downstream arm (which sells at the retail level to end users) and to other communications providers.

B.515 Kingston's own estimate of its share of this market is 65% by volume. Whilst specific market share figures are not available for earlier years, the

Director considers it likely that Kingston's share has been similarly high for a number of years, meaning that the above share is consistent with a presumption of dominance.

Excess pricing and profitability

B.516 In the absence of wholesale regulation, Kingston does not offer TISBO on its own and instead other communications providers have to buy traditional interface retail leased lines at retail prices. As outlined in the discussion of Kingston's SMP at the retail level, the Director has carried out his assessment of SMP without reference to an analysis of Kingston's prices.

Market for high bandwidth TISBO in the Hull area: firm related criteria

Technological advantages or superiority

B.517 The Director does not believe this criterion to be relevant, because the technology used to supply leased lines is mature (communications providers and customers comment that leased lines are a "commodity product"), and because suppliers to the incumbent can also supply to any other communications providers. Additionally, it seems implausible that Kingston would have advantages over potential entrants based on technological superiority, given its relatively small R&D capability.

Control of infrastructure not easily duplicated

B.518 Kingston is alone in having substantial network coverage in the Hull area. This is analogous to the position of BT in the wider UK market. The extent to which it is profitable for other communications providers to enter wholesale markets in the Hull area is considered in the Director's discussion of barriers to entry below.

Economies of scale

B.519 Kingston is not in a position to exploit economies of scale in markets for TISBO. This is because, while the Director believes that provision of leased lines is in general characterised by the potential for economies of scale, it is unlikely that reproducing such economies of scale would be prohibitively difficult for other communications providers.

Economies of scope

B.520 Kingston may be in a position to exploit economies of scope in markets for TISBO in the Hull area. This is so because it is the only communications provider to offer a broad range of services on a widespread basis in this area and

because it has, per service, the largest number of customers due to its historical incumbent position.

B.521 This is why the Director is of the view that Kingston enjoys greater economies of scope than any other communications provider in this area and that this strengthens Kingston's market position in the high bandwidth TISBO market.

Product/services diversification

B.522 In the absence of wholesale regulation, Kingston does not offer TISBO on its own and instead other communications providers have to buy traditional interface retail leased lines at retail prices.

Vertical integration

B.523 In a manner analogous to that described in the Director's discussion of markets for TISBO in the UK excluding Kingston upon Hull, Kingston is able to foreclose a significant proportion of the wholesale markets in the Hull area because of its high market share at the retail level. This means that a large part of the wholesale market is not available to competitors.

Distribution and sales network

B.524 A well-developed distribution system for high bandwidth TISBO is not viewed as a potential indicator of market power, as the suppliers and buyers of low bandwidth TISBO are few in number and all know each other.

Access to capital markets and financial resources

B.525 Kingston's size means it does not derive any benefits relative to potential entrants from its status as an incumbent communications provider within markets in the Hull area.

Market for high bandwidth TISBO in the Hull area: customer-related criteria

Countervailing buying power

B.526 The Director does not believe that any purchaser of TISBO is in a position to counter Kingston's very strong position in the relevant markets, given its very high market share.

Market for high bandwidth TISBO in the Hull area: market related criteria

Ease of market entry

B.527 The market for high bandwidth terminating segments in the Hull area is characterised by significant barriers to entry.

B.528 Any potential entrant needs to undertake substantial sunk investment in order to offer TISBO services in competition with Kingston. The quantification provided in the Director's discussion of corresponding markets in the rest of the UK is equally applicable to the Hull area.

B.529 Given that no other communications provider owns significant network infrastructure in the Hull area, and that the expected revenues from entry into the market are relatively low, the Director considers that these factors are likely to pose a very substantial barrier to entry in the absence of wholesale regulation.

B.530 The Director considers that sunk costs create significant problems in the market for high bandwidth TISBO. The barriers to entry are not as high as for the low bandwidth market, because the expected revenue from high bandwidth circuits is larger (and many of the costs are independent of bandwidth). However, the Director considers that the sunk costs are still relatively high and so the barriers to entry are still significant. One further reason why entry may be unattractive is due to the very small size of the high bandwidth market, which, as of 27 May 2002, amounted to only nine circuits.

Absence of potential competition

B.531 Potential competition refers to the prospect of new competitors entering the market within the timeframe considered for the market review.

B.532 In the light of the barriers to entry identified above and the relative size of the relevant markets, the Director believes that the scope for potential competition in markets for TISBO is limited.

Barriers to switching

B.533 The Director is not aware of any specific widespread competition problems caused by barriers to switching that are of comparable significance to those caused by Kingston being the only network communications provider in the Hull area.

Customers' ability to use and access information

B.534 The Director believes that buyers of TISBO in the Hull area are likely to be in a good position to use and access relevant information, since the players

involved are a small number of relatively well informed communications providers.

Market for high bandwidth TISBO in the Hull area: intensity of competition criteria

Barriers to expansion

B.535 It is difficult to assess the extent of barriers to expansion in a small area such as Kingston upon Hull. The Director has therefore based his SMP assessment on other factors.

Active competition on non-price factors

B.536 The Director is not aware of any competition on non-price factors that takes place in the Hull area.

International benchmarking

B.537 The Director's analysis of markets in the Hull area has not relied on international benchmarking analysis, since Kingston is, relative to other incumbent communications providers, a relatively small communications provider, and operates in a relatively small geographic area.

Likelihood of competition developing in the future

B.538 The Director has considered the potential impact of external factors on this market during the period covered by this review. The Director's view is that there are no developments that would generate sufficient competitive pressures within the next 2-3 years to alter the current finding of SMP. However, the Director will keep market conditions under review.

Conclusion on assessment of market power in the market for high bandwidth TISBO in the Hull area

B.539 The Director concludes that Kingston has SMP in the market for high bandwidth TISBO in the Hull area.

B.540 In the absence of wholesale regulation, the Director believes that Kingston would be able to behave to appreciable extent independently of competitors, retail communications providers, and, ultimately, customers.

B.541 This is due to its legacy position as the incumbent communications provider in the Hull area, which means that it controls an infrastructure that it would not be economic for competitors to duplicate due to the presence of barriers to entry. The small size of the high bandwidth TISBO market is such that

these barriers are likely to prove difficult for any would-be entrant to overcome (despite the higher revenues that can be earned on high bandwidth leased lines services compared to low bandwidth services).

B.542 These factors explain Kingston's market share in the market for high bandwidth TISBO, which Kingston itself estimates to be in the region of 65% by volume.

Market for very high bandwidth traditional interface symmetric broadband origination in the Hull area

B.543 Responses to the data requests made by the Director to communications providers (including Kingston) during the course of this review suggest that there are currently no very high bandwidth traditional interface retail or wholesale leased lines products sold in the Hull area. Therefore, whilst the market for very high bandwidth traditional interface symmetric broadband origination is a potential future market, it does not currently exist in the Hull area. Given this consideration, the Director considers it premature to conduct an SMP assessment in this market.

Market for alternative interface symmetric broadband origination in the Hull area

B.544 The assessment of market power in the alternative interface symmetric broadband origination ("AISBO") market has been made in the absence of any remedy at both the wholesale and the retail level for the reasons described in the Director's description of the order of his market analysis in Chapter 3.

B.545 The overall size of the relevant market is small: data supplied by Kingston and other communications providers suggests that there are only something in the region of 30 AISBO circuits in the Hull area. Kingston supplies all of these circuits.

Market shares

B.546 As stated above, the information received by the Director suggests that no other communications provider supplies AISBO circuits in the Kingston upon Hull area.

B.547 Whilst specific market share figures are not available for earlier years, the Director considers it likely that Kingston has been the only supplier of alternative interface based services since they were introduced, a position which is consistent with a presumption of dominance.

Excess pricing and profitability

B.548 The Director has not relied on this criterion to inform his SMP assessment in this market, since he has not conducted an investigation into whether either BT or Kingston's retail prices for LES circuits are likely to be cost orientated, and hence an analysis of Kingston's pricing is unlikely to provide any meaningful insights into the extent of Kingston's degree of market power.

Market for AISBO in the Hull area: firm related criteria

Technological advantages or superiority

B.549 The Director does not believe this criterion to be relevant, because the technology used to supply LES circuits is relatively mature, and because suppliers to the incumbent can also supply to any other communications providers. Additionally, it seems implausible that Kingston would have advantages over potential entrants based on technological superiority, given its relatively small R&D capability.

Control of infrastructure not easily duplicated

B.550 Kingston is alone in having a substantial network coverage in the Hull area. This is analogous to the position of BT in the wider UK market. The extent to which it is profitable for other communications providers to enter wholesale markets in the Hull area is considered in the Director's discussion of barriers to entry below.

Economies of scale

B.551 Kingston is unlikely to be in a position to exploit economies of scale in the market for AISBO. This is because, while the Director believes that provision of leased line products is in general characterised by the potential for economies of scale, it is unlikely that reproducing such economies of scale would be prohibitively difficult for other communications providers.

Economies of scope

B.552 Kingston may be in a position to exploit economies of scope in markets for AISBO in the Hull area. This is the case because it is the only communications provider to offer a broad range of services on a widespread basis in this area and because it has, per service, the largest number of customers due to its historical incumbent position. The Director is therefore of the view that Kingston is likely to enjoy greater economies of scope than any other communications provider in this area, and that this strengthens Kingston's market position in the AISBO market.

Product/services diversification

B.553 In the absence of wholesale regulation, Kingston does not offer AISBO, ie the wholesale product, on its own and instead other communications providers have to buy retail leased lines at retail prices.

Vertical integration

B.554 In a manner analogous to that described in the Director's discussion of markets for TISBO in the UK excluding Kingston upon Hull, Kingston is likely to be able to foreclose a significant proportion of the AISBO in the Hull area because of its high market share at the retail level. This means that a large part of the wholesale market is not available to competitors.

Distribution and sales network

B.555 A well-developed distribution system for AISBO is not viewed as a potential indicator of market power, as the suppliers and buyers of AISBO in the Kingston upon Hull area are few in number and all know each other.

Access to capital markets and financial resources

B.556 Kingston's size means it does not derive any benefits relative to potential entrants from its status as an incumbent communications provider within markets in the Hull area.

Market for AISBO in the Hull area: customer-related criteria

Countervailing buying power

B.557 The Director does not believe that any purchaser of AISBO is in a position to counter Kingston's very strong position in the relevant markets, given that no other suppliers offer the product.

Market for AISBO in the Hull area: market related criteria

Ease of market entry

B.558 The market for AISBO in the Hull area is characterised by significant barriers to entry.

B.559 Any potential entrant needs to undertake substantial sunk investment in order to offer AISBO in competition with Kingston. The quantification provided in the Director's discussion of corresponding markets in the rest of the UK is equally applicable to the Hull area.

B.560 Given that no other communications provider owns significant network infrastructure in the Hull area, and that the expected revenues from entry into the market are relatively low, the Director considers that these factors are likely to pose a very substantial barrier to entry in the absence of wholesale regulation.

B.561 The Director considers that sunk costs create significant problems in the market for AISBO. The barriers to entry are likely to be of comparable significance to those in the *low bandwidth* TISBO market, because the expected revenue from retail LES circuits is relatively low. As outlined in the discussion of the AISBO market in the UK, the cost structure of AISBO is such that Kingston's ownership of significant lengths of ducting and fibre in the Kingston upon Hull area will provide it with a very significant advantage over potential entrants. This problem is compounded by the fact that entry is likely to be relatively unattractive due to the small size of the AISBO market in the Kingston upon Hull area, which, as of mid 2002 amounted to approximately 30 circuits.

Absence of potential competition

B.562 Potential competition refers to the prospect of new competitors entering the market within the timeframe considered for the market review. In the light of the barriers to entry identified above and the relative size of the relevant markets, the Director believes that the scope for potential competition in this market is limited.

Barriers to switching

B.563 The Director is not aware of any specific widespread competition problems caused by barriers to switching in this market that are of comparable significance to those caused by Kingston being the only network communications provider in the Hull area.

Customers' ability to use and access information

B.564 The Director believes that buyers of AISBO in the Hull area are likely to be in a good position to use and access relevant information, since the players involved are a small number of relatively well informed communications providers.

Market for AISBO in the Hull area: intensity of competition criteria

Barriers to expansion

B.565 It is difficult to assess the extent of barriers to expansion in a small area such as Kingston upon Hull. The Director has therefore based his SMP assessment on other factors.

Active competition on non-price factors

B.566 The Director is not aware of any competition on non-price factors that takes place in the Hull area.

International benchmarking

B.567 The Director's analysis of markets in the Hull area has not relied on international benchmarking analysis, since Kingston is, relative to other incumbent communications providers, a relatively small communications provider, and operates in a relatively small geographic area.

Likelihood of competition developing in the future

B.568 The Director has considered the potential impact of external factors on this market during the period covered by this review. The Director's view is that there are no developments that would generate sufficient competitive pressures within the next 2-3 years to alter the current finding of SMP. However, the Director will keep market conditions under review.

Conclusion on assessment of market power in the market for AISBO in the Hull area

B.569 The Director concludes that Kingston has SMP in the market for AISBO in the Hull area.

B.570 In the absence of wholesale regulation, the Director believes that Kingston would be able to behave to an appreciable extent independently of competitors, retail communications providers, and, ultimately, customers.

B.571 This is due to its legacy position as the incumbent communications provider in the Hull area, which means that it controls an infrastructure that it would not be economic for competitors to duplicate due to the presence of barriers to entry. The small size of the AISBO market in Kingston upon Hull is such that these barriers are likely to prove insurmountable for any would-be entrant (despite the higher revenues that can be earned on high bandwidth leased lines services compared to low bandwidth services).

B.572 These factors explain Kingston's very high market share in the AISBO market – there are currently no other suppliers of products in this market.

Responses to previous consultation – SMP in Hull markets (all wholesale markets)

B.573 Kingston questions the Director's use of its "informal" market share estimates, stating that these are an inappropriate basis for an SMP designation,

and that it is disappointed that the Director "has failed to undertake a complete and comprehensive market analysis". Kingston further states that SMP in low bandwidth TISBO in Hull is "debatable". At high bandwidths, it makes a case for no SMP based on the relatively small size of the Hull area, Kingston's economies of scale and scope being smaller than BT's, and it having less privileged access to capital than BT.

B.574 The Director disagrees with Kingston. It cannot be inferred from paragraph B.370 of the first consultation document that the Director has not undertaken a sufficiently comprehensive analysis. The Director stated that communications providers' responses to questions on the Hull area were insufficient for him to determine *market shares* with complete certainty. Notwithstanding this, they did provide sufficient support for the Director's findings of SMP based on factors other than market shares – and these findings are clearly supported by Kingston's own estimates of market share, estimates which it must be assumed are a minimum and that are well above the level at which SMP can be assumed to be present.

B.575 Indeed, Kingston admits later in its response that providing market data is acceptable, it does possess "some degree of market power" in the Hull area, and that the Director's analysis "rightly identifies that Kingston probably has a relatively strong market position". The Director is not, however, as Kingston states, concluding that such a position is the *result* of anti-competitive behaviour. It could, of course, lead to anti-competitive behaviour, and this is why it is necessary for the Director to impose a proportionate level of ex ante regulation for the Hull area.

B.576 In a contestable market potential entrants face no barriers to entry. Competition takes the form of the threat of entry from potential entrants. This is sufficient to restrain the pricing behaviour of the incumbent and ensure the removal of supernormal profits. It is worth emphasising that the tests for a market to be contestable are extremely tough. In particular there must be no sunk costs at all. This clearly is not true for wholesale services in the Hull area, where Kingston is able to behave, to an appreciable extent, independently of competitors and customers. This is possible because Kingston controls an infrastructure that is not easy for potential competitors to duplicate, it is able to exploit economies of scope more effectively than other communications providers and there are significant barriers to entry, including substantial sunk costs.

B.577 Although in absolute terms the scale of investment required to enter Hull markets may be relatively small, since the network build costs faced by potential entrants are comparatively small, nevertheless the size of the potential market is also relatively small. Similarly, while Kingston is smaller than BT, the Hull market is also smaller than the rest of the UK, so that its ability to exert market power is unlikely to be significantly affected by this factor.

Annex C

Cost benefit analysis for PPC price control

Introduction

C.1 This annex aims to inform a clearer understanding of the potential costs and benefits of imposing a price control on PPC terminating segments. A careful investigation of the possibility of reaching meaningful quantification of costs and benefits for the 2003 set of market reviews has been carried out at a more global level. The conclusion of this investigation is that quantification efforts should focus on the impact of price reductions. There are two sets of reasons behind this conclusion. First, the short timeframe of the market reviews and resource constraints make it unrealistic to quantify more than a few elements. Second, several cost and benefit elements are by nature difficult to estimate in a robust manner as they cover dynamic aspects. This is why quantification in the leased line market review concentrates on the welfare gains generated by price reductions.

C.2 However, it is also important to recognise the other benefits and costs. Therefore, the Director has also undertaken a qualitative analysis of the other relevant elements that are more difficult to estimate.

C.3 This annex sets out the general approach, methodology, and conclusions of the quantitative analysis, including appropriate sensitivity analysis. It also sets out a qualitative analysis of the other cost and benefit elements that have not been quantified. The approach taken in the following sections draws from CBA work carried out in connection with previous Oftel reviews of leased lines, for example *National Leased Lines: Effective competition review and policy options*, August 2000.

Quantified cost benefit analysis

Introduction

C.4 This section explains the additional costs benefit analysis work that has been carried out by the Director to quantify the impacts of regulating the leased lines markets, where such impacts have been identified as quantifiable. Four different analyses have been undertaken. These are:

- No obligation to supply versus obligation to supply for 8Mbit/s and below (low bandwidth);
- No obligation to supply versus obligation to supply for over 8Mbit/s (high bandwidth);
- Obligation to supply versus Oftel price control for 8Mbit/s and below; and

- Obligation to supply versus Oftel price control for over 8Mbit/s.

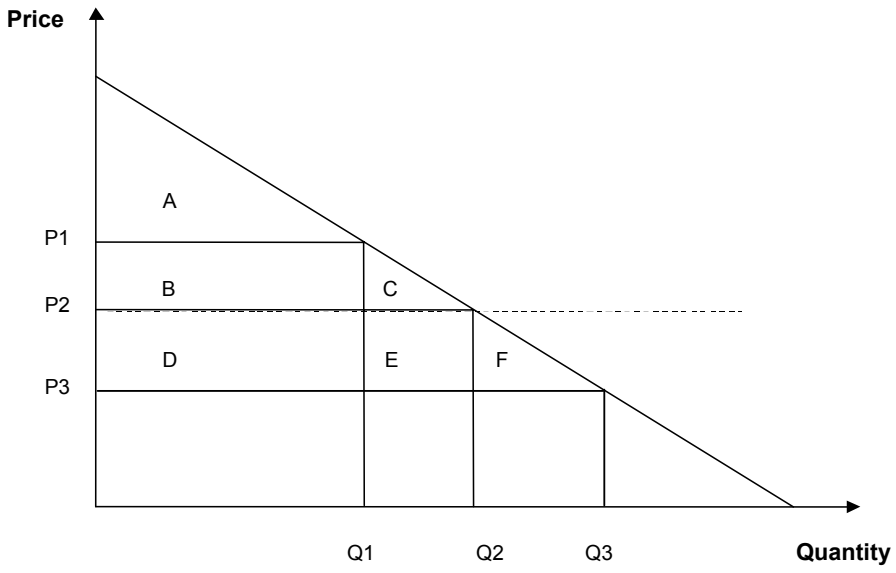
C.5 The first pair of comparisons compares traditional interface leased line retail prices prior to the introduction of PPCs in August 2001 to the retail prices of traditional interface leased lines after the introduction of PPCs. The second pair compares the retail prices of traditional interface leased lines after the introduction of PPCs with the forecast retail prices of traditional interface leased lines after the implementation of the interim price control proposals.

C.6 The analysis uses data from Q4 2000/01 for the initial retail prices and Q2 2002/03 for retail prices after the introduction of the obligation to supply. The post price control prices are calculated by reference to the Phase II Direction charges. The analysis also allows the modelling of a number of sensitivities.

PPC CBA overview

C.7 The benefits that are going to be quantified in this annex are those that accrue because of the reduction in the retail price of traditional interface digital leased lines (see chapters 5 and 6). This price reduction is due to regulation in the wholesale markets: an obligation on BT to supply PPCs at the wholesale level and an interim price control on BT's provision of PPC terminating segments. There are two types of effect, welfare gains and transfer of producer surplus to consumers. These are represented in figure C.1.

Figure C.1: Welfare gain diagram



Where:

P1 = the price that BT charges when it has no obligation to supply a wholesale product, i.e. the retail price;
P2 = the price that BT charges when it has an obligation to supply a wholesale product;
P3 = the average cost and the price that BT charges when it has an obligation to charge a cost oriented wholesale product under the conditions of Oftel's price control;
Q1 = the quantity that corresponds to price P1;
Q2 = the quantity that corresponds to price P2; and
Q3 = the quantity that corresponds to price P3.

A = the original consumer surplus;
B+D = the original producer surplus;
C+E+F = the original dead-weight loss;
A+B+C = the consumer surplus at price P2 and quantity Q2;
D+E = the producer surplus at price P2 and quantity Q2;
F = the dead-weight loss at price P2 and quantity Q2;
A+B+C+D+E+F = the consumer surplus at price P3 and quantity Q3;
C+E = the welfare gain from moving from P1Q1 to P2Q2;
F = the welfare gain from moving from P2Q2 to P3Q3; and
C+E+F = the welfare gain from moving from P1Q1 to P3Q3.

C.8 The price when BT has an obligation to supply a wholesale product (P2) is the retail price of traditional interface leased lines after BT negotiated wholesale prices with other communications providers following the Director's March 2001 PPC Direction. This Direction required that BT negotiate terms and conditions for the provision of PPCs, within the framework laid down by the Interconnection Directive (ICD). The ICD required that the negotiated terms and conditions be cost oriented.

C.9 To simplify the analysis, the Director has assumed that the price P3 is equal to cost and that there are no scale economies. This means that P3 is assumed to be equal to marginal cost. This simplifying assumption will tend to underestimate the magnitude of the benefits. However, the calculations should continue to give an accurate indication of the effects of the regulations being imposed.

C.10 The cost benefit analysis assumes that when BT has an obligation to supply a wholesale product the price of retail traditional interface leased lines falls from P1 to P2 with consumption increasing from Q1 to Q2. This transfers area B of the original producer surplus to consumers, creates area C as new consumer surplus and creates area E as new producer surplus. The welfare gain is C+E. This welfare gain is a true benefit, rather than a transfer, representing the benefit from moving from inefficient pricing at P1 to more efficient pricing at P2.

C.11 The price reduction from P2 to P3 represents the change in retail price from the obligation to supply a wholesale PPC product to the retail price after the

implementation of the interim price control proposals. This transfers areas D and E of the producer surplus to the consumer. The welfare gain, in the form of new consumer surplus, of this price reduction is area F. Again this welfare gain is a true benefit, rather than a transfer and represents the benefit from moving from inefficient pricing at P2 to efficient pricing at P3.

C.12 In summary, the shift from P1 to P3 transfers the producer surplus B+D to the consumer and creates a welfare gain of C+E+F.

No obligation to supply vs obligation to supply

C.13 To calculate the monetary benefits, the Director originally proposed to use data on the number of and corresponding revenues for the retail traditional interface leased lines BT provided in Q4 2000/01 and in Q2 2002/03, split by 8Mbit/s and below and over 8Mbit/s. Using this data, the Director intended to calculate total capacity in Mbit/s in each market and the average unit price by dividing the revenues in each category by the corresponding capacity figures. However, BT has only been able to provide robust data for the high bandwidth (over 8 Mbit/s) market. Therefore, the Director has had to assume that price reduction in the low bandwidth (8Mbit/s and below) traditional interface market is of the same magnitude as shown by the data for the high bandwidth traditional interface market. The data is shown in tables C.1 and C.2.

Table C.1: Retail traditional interface leased line provision and revenues Q4 2000/01[1]

	Capacity (Mbit/s)	Revenues (£m)	Unit price (£/Mbit/s)
<=8Mbit/s	211086	438	2075
>8Mbit/s	173738	39	227

1. Numbers may not sum due to rounding

Table C.2: Retail traditional interface leased line provision and revenues Q2 2001/02[1]

	Capacity (Mbit/s)	Revenues (£m)	Unit price (£/Mbit/s)
<=8Mbit/s	Unavailable	unavailable	1756[2]
>8Mbit/s	250196	48	192

1. Numbers may not sum due to rounding
2. Unit price calculated by reducing Q4 2000/01 unit price by 15%.

C.14 The retail price of leased lines reduced by around 15% in the high bandwidth traditional interface market.

C.15 The Director recognises that assuming similar proportionate price reductions in both markets from an obligation to supply may produce inaccurate results from the analysis. However, because of the data limitations, this is the best way in which the benefits can be calculated. The sensitivity analysis below

calculates the benefits assuming smaller price reductions from the obligation to supply. This sensitivity analysis shows that the benefits of the obligation remain significant.

C.16 If BT had no obligation to supply wholesale TISBO products it would sell leased lines to wholesale customers at the retail price, P1 in figure C.1. This is in fact what BT was doing before August 2001, when it was obliged to introduce a wholesale PPC product. With an obligation to supply, BT has to sell TISBO at a wholesale price selected by BT. This creates a new retail price P2 in figure C.1. P1 and P2 correspond to the unit costs in tables C.1 and C.2 respectively.

C.17 In order to quantify the benefits of requiring BT to offer TISBO, it is necessary for the Director to make a number of simplifying assumptions. In addition to the evidence indicating a price reduction of around 15%, the main assumptions are:

- the price elasticity of demand;
- the form of the demand function; and
- the discount rate.

C.18 In the August 2000 document, the Director's central assumption for the elasticity of demand was –0.5. In response to the consultation document, BT said that the elasticity assumption was purely speculative. However, BT did not at that time suggest or provide evidence for an alternative value for the elasticity. The Director has again assumed –0.5 as the central assumption for the elasticity of demand. In addition, the Director has carried out sensitivity analysis of this assumption. Some of the results of this sensitivity analysis are set out below. These results show that the benefits remain significant even if more pessimistic assumptions about the elasticity of demand are made.

C.19 The Director has used a varying elasticity demand function to calculate the welfare gains. This demand function is denoted by the following formula:

$q = ae^{-bp}$

Where: a = constant term
b = a positive constant

Point elasticity is given by = $-bp$

Consumer surplus is given by: q/b

C.20 Adopting this demand function in combination with the elasticity assumption allows the calculation of the welfare gains.

C.21 The appropriate discount rate to use to calculate the net present value of the benefits over time is the government discount rate. The government has recently reassessed the level of its discount rate. The government considers its discount rate to be 3.5% in real terms (Source: *Green Book, Appraisal and Evaluation in Central Government: Treasury Guidance*, HM Treasury, January 2003). The Director has adopted this as the appropriate discount rate.

C.22 The central assumptions are summarised in table C.3.

Table C.3: The Director's central assumptions

	Central assumption
Retail price reduction from obligation to supply	15%
Price elasticity of demand at starting price	-0.5
Form of demand function	$q = ae^{-bp}$
Discount rate	3.5%

C.23 From these assumptions, the Director has been able to calculate how much demand changes because of the reduction of the retail price, the corresponding welfare gain and the value of the transfer of producer surplus to consumers.

C.24 Table C.4 sets out a summary of the analysis. The figures show discounted totals over a 10 year period.

Table C.4: Benefits over 10 years from imposing an obligation to supply (£m)

	Consumer benefit	**Welfare gain**
<=8Mbit/s retail vs wholesale	561	113
>8Mbit/s retail vs wholesale	51	10

Obligation to supply versus terminating segments price control

C.25 Following negotiations pursuant to a Direction in March 2001, BT provided a wholesale PPC product. The March 2001 Direction required that BT provide wholesale PPCs to the other communications providers on terms and conditions to be negotiated between BT and the communications providers within the framework laid down in the Interconnection Directive. The charges for PPCs were required to be cost oriented. However, after the completion of the negotiations and the introduction of a wholesale PPC product in August 2001, several of the communications providers requested that the Director resolve disputes between themselves and BT. The conclusion of this process was the December 2002 Phase II Direction.

C.26 BT's regulatory obligation to supply, following the March 2001 PPC Direction, although requiring the provision of PPCs on cost oriented terms, did not result in cost oriented prices. In addition, an obligation to supply does not create incentives for BT to increase its efficiency over time. Ordinarily, competitive markets create incentives to keep prices cost oriented and to increase efficiency. However, where competition is not possible, price controls can be imposed to mimic the effect of the competitive market and introduce incentives to keep prices in line with costs and increase efficiency in the provision of a product or service.

C.27 As explained in Chapter 6, the Director intends to implement interim price control arrangements, effective from 1 March 2004. The Director will replace these interim arrangements with longer-term proposals after he has undertaken a full analysis of BT's costs of providing PPCs. The Director expects this to come into effect during the latter half of 2004, although the details on the timing will be a matter for Ofcom. The consultation on the longer-term proposals will include a cost benefit analysis of those proposals.

C.28 Set out below is the Director's analysis of the costs and benefits of the interim price control proposals. In order to calculate the benefits from the interim price control assumptions in addition to the assumptions made above have to be made. These include:

- the cost path of PPCs;
- the effect of Oftel's PPC Phase II Direction on the retail price of leased lines;
- the value of X imposed by the interim price control; and
- the proportion of retail costs that are composed of the price controlled product.

C.29 Because of the various number of ways in which a PPC can be constructed it is necessary to make simplifying assumptions to carry out the analysis. The first simplifying assumption relates to the change in the costs over time of providing PPCs. The analysis of the benefits of the interim price control assumes that costs remain constant over the period in which the benefits are calculated. However, the Director expects that the costs of PPC provision will fall over time. This is due to economies of scale, falling equipment charges and through increased efficiency. A failure to correct for this cost reduction will allow welfare losses to grow. By assuming costs remain constant over time, the calculations set out below will tend to underestimate the benefits from the price regulation of PPCs. When Ofcom consults on proposals for a longer-term price control this will include a cost benefit analysis of those proposals. That analysis will take account of the expected economies of scale and increased efficiency.

C.30 Another simplifying assumption relates to the effect of the Phase II Direction on the price of leased lines. To ensure consistency with the conclusions

of the market analysis, the Director has used the same assumptions about the costs of providing PPCs used in the market analysis to calculate the price of leased lines after the Phase II Direction to calculate the benefits of an interim price control.

C.31 To calculate the retail price of leased lines after the Phase II Direction, the Director has calculated the difference between the implied cost of providing a leased line (using BT's wholesale charges), including a margin to recover the cost of capital, against the corresponding price of a leased line as set out in BT's carrier price list. This gives a difference of around 35% in both of the relevant markets. Using these figures and assuming that the Phase II Direction will have the effect of reducing the price of retail leased lines to cost through effective regulation and increased levels of competition in the retail market, the Director then estimates revised retail leased line prices.

C.32 To calculate the benefits of the interim price control against the leased line retail price when there is an obligation to supply requires a further adjustment. This adjustment is to account for the reduction in the retail price of leased lines after the costs of terminating segments is reduced through the implementation of the interim price control.

C.33 The value of X in the interim price control is the amount by which BT will have to decrease the price of the items on its PPC carrier price list from 1 March 2004. As explained in Chapter 6, the Director has proposed to set the annualised value of X equal to the value of X for the interconnect specific basket in the network charge control ie 7%. This corresponds to a value of X of 12.7% for the implementation date of 1 March 2004.

C.34 In the instance of retail leased lines, the product being price controlled is limited to the terminating segments of the wholesale PPC. Therefore the Director needs to estimate the proportion of the retail leased line that is composed of the cost of terminating segments. This can then be used to inform how much the Director can expect the price of retail leased lines to decrease because of a reduction in the price of terminating segments. The Director's central assumption is that 44% of leased line retail prices are composed of the costs of PPC terminating segments. This central assumption is informed by calculating the proportion of operating and capital costs from private circuits relating to connection circuit provision and local ends as reported in BT's financial statements for 2002/03.

C.35 A summary of the Director's central assumptions is set out in table C.5.

Table C.5: The Director's central assumptions

	Central assumption
Retail price reduction from Phase II	35%

Direction	
Price elasticity of demand at starting price	-0.5
Form of demand function	$q = ae^{-bp}$
Discount rate	3.5%
Value of X	7%
Proportion of retail costs that are terminating segments	44%

C.36 From these assumptions the Director can work out the change in demand due to the reduction in the price of terminating segments. The discounted benefits of the price control are calculated over a period of ten years. Table C.6 sets out a summary of the conclusions of the analysis.

Table C.6: Benefits over 10 years from imposing price control on PPC terminating segments (£m)

	Consumer benefit	Welfare gain
<=8Mbit/s wholesale vs price control	1,231	121
>8Mbit/s wholesale vs price control	148	15

C.37 Figures in tables C.4 and C.6 can be aggregated to illustrate the benefits of imposing an obligation to supply and a terminating segments price control on the two markets. This is shown in table C.7.

Table C.7: Summary of benefits by market (£m) [1]

	Consumer benefit	Welfare gain
8Mbit/s and below	1,792	235
Above 8Mbit/s	199	25

1. Numbers may not sum due to rounding.

Conclusions of quantitative analysis

C.38 The analysis presented in tables C.4, C.6 and C.7 shows that there are significant welfare gains to be made from imposing an obligation to supply TISBO and a price control on PPC terminating segments in both of the markets. In addition to these welfare gains, the analysis also shows that there are even greater transfer benefits to be realised from transferring the profits from high, inefficient prices from producers to consumers.

Sensitivity analysis

C.39 As explained above, to calculate the benefits of introducing an obligation to supply and a price cap on terminating segments requires the Director to make a number of assumptions. It is also necessary for the Director to make inferences

from data associated with PPCs. As PPCs are a relatively new product, the Director cannot be confident that the results of his analysis are as robust as they could have been if they were the result of analysing data associated with more established products which had available more robust and better understood data.

C.40 In order to ensure that the conclusions of the analysis presented in this annex are not overstated because of the assumptions and the data used the Director considers it appropriate to carry out sensitivity analysis of the assumptions. This sensitivity analysis is summarised below and is presented separately for the comparison of no obligation to supply versus obligation to supply and obligation to supply versus terminating segments price control.

No obligation to supply versus obligation to supply

C.41 The assumptions adopted for two sensitivity analysis are set out in table C.8. The central assumptions are also set out for comparison.

Table C.8: Assumptions for sensitivity analysis.

	Central	Sensitivity 1	Sensitivity 2
Retail price reduction from wholesale obligation to supply	15%	10%	5%
Price elasticity of demand	-0.5	-0.3	-0.3
Form of demand function	$q = ae^{-bp}$	$q = ae^{-bp}$	$q = ae^{-bp}$
Discount rate	3.5%	3.5%	3.5%

C.42 The result of this sensitivity analysis is set out in tables C.9 and C.10.

Table C.9: Benefits over 10 years from imposing an obligation to supply with alternative assumptions (£m). Sensitivity 1.

	Consumer benefit	Welfare gain
<=8Mbit/s retail vs wholesale	364	26
>8Mbit/s retail vs wholesale	33	2

Table C.10: Benefits over 10 years from imposing an obligation to supply with alternative assumptions (£m). Sensitivity 2.

	Consumer benefit	Welfare gain
<=8Mbit/s retail vs wholesale	182	7
>8Mbit/s retail vs wholesale	16	1

C.43 The summary tables above illustrate that even when alternative, more conservative assumptions are adopted the quantified benefits of introducing an

obligation to supply, although diminished, remain significant, especially the benefit to consumers.

Obligation to supply versus terminating segments price control

C.44 The assumptions adopted for the sensitivity analysis when comparing the obligation to supply versus terminating segments price control for two sensitivities are set out in table C.11. The central assumptions are also set out for comparison.

Table C.11: Assumptions for sensitivity analysis.

	Central	Sensitivity 1	Sensitivity 2
Retail price reduction from obligation to supply	15%	10%	5%
Retail price reduction from Phase II Direction	35%	20%	10%
Price elasticity of demand	-0.5	-0.3	-0.3
Form of demand function	$q = ae^{-bp}$	$q = ae^{-bp}$	$q = ae^{-bp}$
Discount rate	3.5%	3.5%	3.5%
Value of X	7%	3%	3%
Proportion of retail costs that are terminating segments	42%	20%	20%

C.45 The results of this sensitivity analysis are set out in tables C.12 and C.13.

Table C.12: Benefits over 10 years from introducing an interim price control with alternative assumptions (£m). Sensitivity 1.

	Consumer benefit	Welfare gain
<=8Mbit/s retail vs wholesale	689	22
>8Mbit/s retail vs wholesale	87	3

Table C.13: Benefits over 10 years from introducing an interim price control with alternative assumptions (£m). Sensitivity 2.

	Consumer benefit	Welfare gain
<=8Mbit/s retail vs wholesale	367	6
>8Mbit/s retail vs wholesale	47	1

C.46 The total benefits for both sensitivity analysis of both the obligation to supply wholesale PPCs and the interim price control are set out in tables C.14 and C,15 for both of the markets.

Table C.14: Benefits over 10 years from introducing a wholesale obligation to supply and an interim price control (£m). Sensitivity 1. [1]

	Consumer benefit	Welfare gain
<=8Mbit/s retail vs wholesale	1,053	47
>8Mbit/s retail vs wholesale	120	5

1. Numbers may not sum due to rounding

Table C.15: Benefits over 10 years from introducing a wholesale obligation to supply and an interim price control (£m). Sensitivity 2.[1]

	Consumer benefit	Welfare gain
<=8Mbit/s retail vs wholesale	549	13
>8Mbit/s retail vs wholesale	63	1

1. Numbers may not sum due to rounding

C.47 The summary tables above illustrate that for the interim price control, when alternative, more conservative assumptions are adopted the quantified benefits, although diminished, remain significant, especially the benefit to consumers.

C.48 While it is not possible to analyse the benefits of all potential assumptions, the Director's view is that the sensitivities outlined above cover a range of possible values. In addition to these, the results of sensitivity analysis could also be presented calculated using more optimistic assumptions. These would show that the potential benefits of regulation would be greater than that derived from the central assumption scenario.

Qualitative cost benefit analysis

C.49 As outlined at the introduction of this annex, it is also important to recognise that there will be benefits and costs in addition to the monetary benefits of a price reduction. However, these are more difficult to quantify. A qualitative analysis of other benefits and costs are set out below.

No obligation to supply versus obligation to supply

C.50 This analysis compares a situation in which BT faces no obligation to provide PPCs, and a situation in which BT is obliged to supply PPCs at a price it chooses. The former scenario reflects the actual situation up to August 2001, when BT first provided PPCs. The second scenario prevailed from August 2001 until February 2003, until the implementation of retrospectively regulated prices as a result of the PPC Phase 2 Direction.

Sources of benefits

Price reduction inducing higher demand and output

C.51 The introduction of compulsory provision of PPCs will reduce barriers to entry in the retail leased lines markets, thereby stimulating competition. Increased competition should lead to lower prices for retail leased lines. This price reduction should lead to an increase of demand and output and hence a gain in consumer surplus. This effect has been quantified above. The price that is chosen by BT will determine the extent to which the availability of PPCs is effective at lowering entry barriers and thereby promoting competition. That is, the extent to which the post-regulation price at the retail level is lower than the pre-regulation price. BT's price choice is constrained by the Competition Act prohibition of the abuse of a dominant position, which prevents BT from charging an excessive price.

Cost efficiency

C.52 The introduction of a wholesale product (without a price control) will not provide BT with an incentive to make efficiency gains in its provision of terminating segments. However, any increase in competition in the core network is likely to provide BT with an incentive to make efficiency gains on the trunk section of its network.

Avoidance of inefficient entry

C.53 If PPCs are provided by BT at a price lower than BT's retail terminating segments then inefficient entry into the terminating segment market might be avoided. This would occur since inefficient firms would be less attracted to enter the market as a result of the reduced prices. This type of inefficient entry would occur where other communications providers' costs of providing leased lines were greater than the costs for BT to provide the equivalent leased lines.

Increased competition in data services that use leased lines as an input

C.54 The introduction of PPCs should, by reducing the prices of the inputs, allow other communications providers to compete more vigorously in the provision of data services. Indeed a range of data services use leased lines as an access circuit input. Other communications providers would be able to use PPCs to provide access to these data services. This should lead to lower prices for these services, a higher demand and a higher output, hence welfare gains.

Increased choice

C.55 The availability of PPCs at cost oriented prices should enable other communications providers the opportunity to offer more choice to end-users in

terms of location, quality of service requirements, and diversity of product options.

Innovation

C.56 Increased competition arising from the introduction of PPCs may lead to increased innovation in the provision of leased line services. Other communications providers may develop a greater range of products and services, using PPCs as inputs, to meet diverse consumer needs.

Sources of costs

Compliance costs

C.57 Enforcement of the requirement on BT to supply PPCs is expected to generate compliance costs for BT and for Oftel as compared to no control at all. However these costs are expected to be mainly of a one-off type, relating to the development and production of regulatory accounts for the PPCs.

Interconnection costs

C.58 It is expected that an increase in the demand for PPCs will be accompanied by an increase in points of connection between other communications providers' networks and BT. If this materialises, then the obligation to supply PPCs leads to additional costs, namely those of setting up these new points of connection between other the communications providers' and BT's networks.

Increase in average costs

C.59 At the retail level, the increase in demand for leased lines induced by the price reduction is likely to be accompanied by a re-distribution of the leased lines volume among the other communications providers and BT, with BT's share being eroded in favour of the other communications providers' shares. This may imply (depending on the market growth rate) that BT will enjoy lower economies of scale and hence face an increase in average costs. However there will be offsetting resource gains to the economy due to the increasing economies of scale experienced by the other communications providers. It is not clear which of the two effects will dominate. At the wholesale level, there is likely to be an overall increase in volumes and an accompanying overall increase in economies of scale.

Obligation to supply versus Oftel price control

C.60 This analysis compares a scenario in which BT is obliged to supply PPCs (without any price cap) and a scenario in which BT is obliged to provide PPCs at

prices regulated by a price cap. This CBA therefore assumes that BT must supply PPCs, and then compares the absence of price regulation policy with the price cap policy. The analysis reveals a number of sources of benefits and of costs.

Sources of benefits

Price reduction inducing higher demand and output

C.61 At both the wholesale and the retail level, a price reduction is expected with the introduction of a price cap on PPCs. However, price controls have a number of benefits over *ex-post* powers that can be used to prevent excessive pricing.

C.62 Within telecoms markets, there are frequently significant economies of scope. This means that it is more efficient for the same firm to supply a number of different services rather than for each to be provided by a different firm. It also means that there are likely to be significant common costs that cannot be causally attributed to the provision of any one service.

C.63 The existence of significant common costs complicates the assessment of excessive pricing under *ex-post* powers since it may be difficult to establish that prices in any one market are excessive without taking into account the extent of common cost recovery from other markets. A requirement for prices simply to be below stand-alone costs (the sum of incremental and common costs) could allow the firm to make excess profits since it would in effect allow multiple recovery of common costs. The corollary of these excess profits is of course the reduction in consumer welfare caused by prices being above and hence quantities below the competitive level.

C.64 A price control will include the attribution of common costs to the provision of certain services, thereby avoiding the problems outlined above.

C.65 Where there is a risk of a firm setting excessive prices due to a lack of competition, a price control with transparent, easy to monitor compliance conditions can help ensure that Oftel achieves its goal of providing the best possible deal for the customer in terms of quality, choice and value for money.

C.66 The expectation that the prices quoted by BT are likely to be higher than the price cap is likely to restrict the ability of other communications providers to offer lower retail prices. Hence the introduction of a price cap should lead to a larger price reduction at the retail level. This in turn will further increase demand and output at the retail level, and hence will generate a welfare gain.

Cost efficiency

C.67 Price controls can also introduce benefits in addition to ensuring that a firm with SMP does not price excessively. In particular, the RPI-X form of price control creates incentives on the price controlled firm to increase its efficiency, thereby mimicking the effect of a competitive market. If Oftel were to rely on its *ex-post* powers to prevent excessive pricing, this efficiency benefit would be foregone.

C.68 Cost efficiency is likely to arise from two different directions. First, the increase in competition at the retail level will increase pressure on BT to make cost efficiency gains. Second, the wholesale price cap on terminating segments will also include an expected efficiency gain in the regulated price. Since the price reduction at the retail level is expected to be higher under a price cap than in its absence and since price cap regulation generates an additional source of cost efficiency via the value of X, cost efficiencies are likely to be higher under the price cap. However, as the proposal is for the interim control to have a one year duration, this effect is likely to be limited.

Avoidance of inefficient entry

C.69 Inefficient entry occurs where other communications providers' costs of building out terminating segments are greater than the costs for BT to provide the equivalent terminating segments. If the non-controlled price of terminating segments is higher than the capped price, then a certain amount of inefficient entry is expected under the non-controlled price. This is because the capped price will be set on a cost oriented basis and will not by definition be artificially high.

Increased competition in data services that use leased lines as an input

C.70 The introduction of a price control for PPCs should allow communications providers to compete more vigorously in the provision of data services. This should lead more quickly to lower prices for these services, a higher demand and a higher output, hence to welfare gains.

Increased choice

C.71 The availability of PPCs at regulated prices should enable communications providers to offer more choice to end-users in terms of location, quality of service requirements, and diversity of product options.

Innovation

C.72 Capped prices for PPCs are expected to lead to increased competition that in turn may induce increased innovation in the provision of leased line services.

Other communications providers may develop a greater range of products to meet diverse consumer needs.

Sources of costs

Compliance costs

C.73 A price cap for PPCs is expected to generate increased compliance costs for BT and for Oftel. Compared with the situation where BT is only obliged to supply PPCs, the introduction of a price cap will generate additional compliance costs, namely those linked to complying with a new price control regime. Oftel too will bear increased compliance costs associated with developing and implementing a price control regime. However, Oftel may also benefit from reduced licensing and competition complaints associated with the pricing of BT's leased lines.

Interconnection costs

C.74 Compared with the situation where PPCs are to be supplied without a price control, the introduction of a price cap for PPCs might lead to an even larger increase in points of connection between other communications providers' networks and BT.

Increase in average costs

C.75 The price capping of PPCs is likely to reinforce the re-distribution of the leased lines volume among other communications providers and BT, with BT's share being more greatly eroded in favour of other communications providers' shares than would be the case if there were no price control. As before, it is not clear how this reinforcement will modify the previous result where it was not known which of the two effects would dominate.

Conclusion of qualitative cost benefit analysis

C.76 The qualitative analysis above shows that in addition to the monetary benefits that have been quantified in the preceding section through analysing the effects of a reduction in prices, there is potential for significant other benefits. The qualitative analysis also highlighted that there are a number of sources of costs associated with the imposition of regulation. However, in this instance it appears to the Director unlikely that the costs will outweigh the benefits because the potential welfare gains from developments such as cost reductions are significant.

Overall conclusions of the cost benefit analysis

C.77 Overall, it is clear that there are potentially significant benefits of different sorts to be earned from regulating the PPC market, both in terms of requiring BT to offer a wholesale product and imposing an interim price control. These conclusions continue to hold even when more pessimistic assumptions relating to the quantitative analysis are adopted. However, under these assumptions, as would be expected, the potential benefits are reduced.