



BT's response to Ofcom's consultation document

*“Business Connectivity Market Review
Timetable and initial call for inputs”*

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1. Introduction

Overview

1. Business connectivity markets in the UK are working well, delivering competition and choice for customers. This results partly from the framework that Ofcom put in place in earlier reviews, including the last Business Connectivity Market Review (BCMR 2013). However some aspects of that framework are now preventing the market from functioning to its full potential and holding back its development. In particular, in BCMR 2013 Ofcom did not recognise the full extent of competition, meaning that BT is still hampered by regulation in areas that are effectively competitive.
2. The challenge for Ofcom in the new review (BCMR 2016) is to ensure its analysis is forward-looking and based on a full assessment of competitive conditions. The fundamental changes in business connectivity markets that stakeholders and Ofcom observed in the last BCMR continue, and we believe they will intensify during the 2016-2019 lifespan of the regulation that will be set as a result of BCMR 2016.
3. To deliver proportionate regulation that supports sustainable competition and investment to the benefit of customers and the UK economy as a whole, the key outcomes of the BCMR 2016 must include:
 - further geographic deregulation in London and other metro areas, reflecting that strong competition in those areas is based on network build-out by other CPs as well as BT's active products;
 - definition of a wider, converged 'core' recognising the extent of other CPs' national infrastructure, and including on its boundary the major carrier-neutral data centres that now act as major network hubs;
 - an appropriate 'end of life' framework for legacy services, allowing them to decline naturally with no artificial extension of their life through regulation;
 - charge controls giving BT the flexibility to meet customer expectations, allowing full recovery of efficiently incurred costs and set on the basis of the most up-to-date information; and
 - rejection of passive remedies as unnecessary, intrusive and bad for customers.

Outline of this response

4. In this response we set out the BT Group answers to the questions posed by Ofcom in the Call for Inputs (CFI). The key points in our answers are summarised in the next section.
5. In section 5 of this response relating to quality of service, we give the perspective of BT Group and the downstream BT lines of business. Openreach has provided its own separate response to the CFI on service, which includes consideration of the root causes of recent issues in Ethernet provision and outlines its plans for resolving them.
6. We plan to provide further evidence and analysis to Ofcom during the course of this BCMR, including a number of papers in the near future: it is important that Ofcom should be receptive to such submissions from stakeholders as well as information supplied in response to its own information requests and consultations.
7. We welcome Ofcom commencing this review so early in order to allow sufficient time for analysis. Given the long timescales for the review and the dynamic nature of business connectivity markets, it is important that Ofcom keeps its models up to date and uses the latest data available at the end of the review.

2. Summary of our responses to Ofcom's questions

Market questionnaire

8. We support Ofcom's plan to obtain further information from stakeholders and plan to respond to the questionnaire. Exercises of this type are valuable as a way of giving Ofcom insight into the markets and supplementing information obtained through formal information requests. It is important though that Ofcom ensures it receives information from all industry players (using its formal information gathering powers where necessary), including those not traditionally on its radar such as providers of dark fibre, systems integrators and data centre operators.

Proposed approach to the review and developments that may be material to Ofcom's analysis of competition

9. The markets covered by the BCMR are functioning well, delivering for businesses in the UK. This is evidenced by the way the markets are changing to meet customers' evolving needs, including the growing demand for bandwidth driven by developments such as cloud computing, video conferencing, unified communications and mobile data growth.
10. At the high bandwidth end of the market, new 100G Optical and Ethernet services are being deployed, whilst at the opposite end, use of NGA and EFM to supply business connectivity is growing. Large carrier-neutral data centres are increasingly central to the way the industry operates, acting as hubs for interconnection between multiple Communications Providers (CPs). Traditional Interface (TI) services continue to decline, with an 80% fall in total bandwidth expected by 2019. CPs' coverage is growing, with expansion in major provincial cities such as Manchester and Birmingham as well as parts of London outside the WECLA geographic market defined in BCMR 2013, for example in Croydon and Stratford.
11. Competition is strong in a number of market sectors, and BT's key competitors enjoy significant advantages and strengths, notably Virgin Media (network claimed to cover 85% of UK businesses), TalkTalk (copper EFM footprint covering 87% of UK businesses), COLT (the market leader in London) and Vodafone (which can potentially exploit 4G as an alternative to fixed connectivity). Strong competition to BT at the retail level comes both from other network operators and CPs using Openreach active products.

Quality of Service

12. BT as a whole has a very strong interest in ensuring that service is good. Like other CPs using Openreach products to supply business connectivity services, BT's downstream businesses rely on Openreach to provide their customers with a good level of service, and they suffer just as much when there are problems with Ethernet provision. If service delivery is not predictable or reliable, customers can increasingly choose to switch to services provided over other CPs' networks.
13. Openreach also has strong incentives to deliver good service, including increasing competition from other networks and a rigorous Service Level Agreement/Service Level Guarantee (SLA/SLG) regime. Further detail is set out in Openreach's separate response on service. In summary, whilst service levels in Ethernet repair are high, Openreach recognises that recent provision performance has been below target levels. However, Openreach is clear on the root causes and is implementing a plan to deliver sustainable recovery, including recruitment, improvements to contractor performance and process re-engineering. The Openreach response also considers the roles that industry and Ofcom have to play in improving Ethernet provision service levels.

Broadband substitution

14. Broadband, especially NGA, can now be used to provide business connectivity where features provided by other options such as leased lines and EFM (for example uncontended and/or

dedicated access, low latency, resilience, more reliable customer premises equipment, etc.) are not required. Over the years to the end of the new review period in 2019, NGA may become a preferred access technology for lower bandwidth sites. However it is too early at this stage to judge how strongly this trend will play out.

Passives

15. We are concerned that Ofcom appears to take as a starting point for its analysis an assumption that passive remedies would be beneficial, leading to questions about common cost recovery and the types of passive remedies that could be imposed, and the issues that could be encountered in implementing them. This is the wrong starting point: Ofcom should instead start by assessing whether there are issues of lack of effective competition or of lack of effective regulation, and only if there are, then consider the proportionate remedies, including whether the relevant issues would be best resolved by changing the existing active remedies before considering introducing new passive remedies.
16. The current regulatory approach to business connectivity based on a wide range of active remedies has been confirmed in previous BCMRs and the Colt appeal against BCMR 2013. BT believes no major changes in the market have been identified that would warrant moving to a fundamentally different approach involving passives. The current approach is working: the last BCMR painted a picture of significant and increasing competition at the retail level and found that BT did not have SMP in a number of wholesale markets. Since then, other CPs have invested in business connectivity, and many have reported strong performance in their quarterly and annual results.
17. Our analysis shows that far from delivering significant incremental benefits, passive remedies would have a number of serious drawbacks. In particular, cherry picking by CPs using passive remedies would force BT to recover common costs elsewhere, to the detriment of end-users of the affected products, and CPs' incentives to invest in their own networks would be reduced. Further, the use of currently unallocated passive capacity by other CPs would negatively impact on BT's ability to use this capacity for future growth. This would violate the principle of allowing BT a "fair bet" on its investments.
18. It is also unclear how passive remedies could be restricted to business connectivity markets where BT has SMP, and this casts doubt on their proportionality and justification under the legal framework: it would be perverse to introduce such an intrusive remedy in markets where, for example, Ofcom saw no need to impose charge controls in the last BCMR.

Retail remedies for very low bandwidth TI services

19. We agree with Ofcom's views expressed in the CFI that the scope for harm in this market sector is diminishing through the end-user migration to alternative services. In addition, we understand that existing customers using low bandwidth lines in critical national infrastructure operations (such as energy, water and air traffic control) have plans to migrate to new services in accordance with BT's public announcements on the future of these legacy services. We therefore believe that all remaining regulation of retail leased lines should be withdrawn. As well as aligning with Ofcom's own regulatory principle of the minimum necessary intervention, this would bring Ofcom back into line with the EU framework and the views of the European Commission.

Charge control remedy

20. It is reasonable to expect that unit costs for TI services will rise as volume decline rapidly over the next control period. This suggests a further positive 'X' control. However, the TI market is declining so rapidly that the cost and effort involved in detailed charge control modelling may no longer be proportionate. In view of this, a basket control of CPI-0% would strike the right balance between costly regulation and protection of residual customers.

21. With regard to the Ethernet control, it is important that the broad basket structure is maintained to give Openreach as much flexibility as possible to react to developments in the relevant markets, which are characterised by high levels of uncertainty and innovation. The broad basket structure also allows Openreach to use pricing to encourage migration from legacy Ethernet to more efficient new products, while recognising that common cost recovery may change as a result. However, Ofcom should also make improvements to the control, in particular to allow term discounts to count towards compliance, to help Openreach to introduce the innovative pricing that customers want and that competitive markets would deliver.

3. Market Questionnaire

Question 1: *Is your organisation active in the provision of leased lines and related services? Would you be willing to help Ofcom with its analysis of the leased lines markets by completing a questionnaire?*

22. BT is one of the leading providers of leased lines and related services in the UK. We are subject to regulation across a wide range of our business connectivity activities, and we believe this regulation does not reflect the extent and growth of competition in the business connectivity services sector. Ofcom can only ensure that regulation reflects the real state of competition if it has accurate, comprehensive and up-to-date market information.
23. In view of this, we support Ofcom's plan to obtain further information through a questionnaire, and we would like to take part in this exercise. Exercises of this type are valuable as a way of giving Ofcom insight into markets and supplementing information obtained through formal information requests. They can play an important role in the dialogue between stakeholders during the course of a market review.
24. Ofcom should also make use of market information that is available publicly or from research companies. A good example is the information in Annex 1 on public sector bids, which is based on research by Current Analysis.
25. In addition, Ofcom should remain open to the proactive provision of relevant evidence and arguments by stakeholders throughout the entire course of the BCMR process: it would not be appropriate for Ofcom only to consider information supplied reactively in response to its own information requests or questionnaires, or to impose deadlines which close the door on further inputs.
26. However, Ofcom needs to ensure it obtains information from all relevant market players, including companies not traditionally on Ofcom's radar such as providers of dark fibre, systems integrators and data centre operators, using its formal information gathering powers where necessary.

4. Proposed approach to the review and developments that may be material to Ofcom's analysis of competition

Question 2: *Are there any developments since the last BCMR or prospective developments that may be material to our analysis of competition in this market? Please identify specific developments, explaining why they may be material.*

27. The business connectivity markets have changed considerably since the BCMR 2013 was concluded, and more so since Ofcom obtained much of the information it relied on in that review in early 2011. Many of the developments now unfolding will intensify or at least continue over the period of the next review to 2019. These developments broadly relate to:

- increased competition;
- the changing nature of customer demand;
- the increasingly important role of data centres in business connectivity markets; and
- investments by CPs.

Competition

28. BT faces strong competition in a number of market segments, and many of our competitors enjoy significant advantages and strengths, notably: Virgin Media Business, which claims its network covers 85% of UK business premises; TalkTalk, whose copper EFM footprint covers 87%; COLT, which is the market leader in London; and Vodafone, which can potentially leverage 4G as an alternative to fixed business connectivity.

29. Public Sector Networks (PSN) are an example of a particularly competitive part of the market. Here, large buying consortia have emerged, with expectations of prices based on significant volume and term discounts (large private sector customers also expect this type of pricing flexibility).

30. Annex 1 based on research by Current Analysis (available to subscribers and not commissioned by BT) shows how competitors have won many of the major public sector bids in the last year, with especially strong performances from Capita, Updata, Virgin Media, MDNX and Daisy. (This is an example of type of data that we plan to submit to evidence the competitive nature of business connectivity markets, and that we believe Ofcom should also seek to obtain.) In addition, consolidation has been creating stronger players – for example, Capita has bought Updata, MDNX has acquired Easynet and Vodafone has purchased C&W. This has affected the whole market and not just the public sector.

31. Competitors' published results also show evidence of competition in business connectivity markets. For example, Virgin Media's published data revenues showed a compound annual growth rate (CAGR) of 13% at the retail level. In contrast, BT's CAGR for retail data services (excluding legacy private circuits) was 1% over the same period. IDC¹ estimates that market growth for IP-VPNs, Ethernet and Dedicated Internet Access from 2010 to 2012 was 3%: this demonstrates that Virgin Media has significantly exceeded market growth over this period compared to BT, which has slightly underperformed. TalkTalk is also a strong player in business connectivity services, reporting 11% growth in its corporate business in 2013/14 and total Ethernet and EFM volumes over 17,000, of which almost 4000 were added during the second half of the year.

32. In backhaul, common routes have become competitive, with CPs cherry-picking routes to build their networks closer to customers, reducing their use of BT's services. In access, competitors'

¹ IDC EMEA Telecoms database.

coverage has expanded incrementally in metro hotspots such as Manchester and Birmingham and in areas in London outside the existing WECLA geographic market, for example Croydon and Stratford. Price competition is especially intense in metro areas, with Virgin offering special prices for three-year contracts.

33. CPs also have extensive core networks, and this has not been fully recognised in earlier reviews. Rather than basing its analysis on presumptions of the BT network hierarchy, Ofcom should use the presence of other CPs' infrastructure to define a bigger unregulated core. This is an important issue for the entire industry since it has the potential to influence build/buy decisions and the extent to which CPs are encouraged to extend their own networks².
34. A further factor strengthening competition is the trend for Openreach customers to adopt dual supplier strategies, exploiting the increased availability of competing networks.

Changing nature of customer demand

35. Business demand for bandwidth continues to grow, driven by developments such as cloud computing, video conferencing, unified communications and mobile data growth. At the high bandwidth end of the market, new 100G Optical services are being deployed, whilst at the opposite end NGA increasingly substitutes for leased lines. Other trends include the importance of data centres as network nodes and the decline of TDM services (e.g. our DPCN network is scheduled for closure in 2021).
36. The mix of business connectivity access types is changing. This is illustrated by the information relating to BT's retail businesses, BT Global Services and BT Business, shown in confidential Figures 1 and 2 and accompanying notes below. These show a forecast of the various access technologies used to connect customer sites to our network nodes for our IP-VPN, Ethernet VPN and Dedicated Internet Access products.

[✂ Figure 1 redacted]

² This is one of the topics on which we plan to submit an economics-based paper to Ofcom.

[< Figure 2 redacted]

37. These forecasts demonstrate the following changes in customer demand:

- NGA (SFBB) grows at 125% CAGR and increasingly substitutes for TDM circuits, EFM and Ethernet 10M whenever higher bandwidths than ADSL are required and features specific to leased lines and EFM (for example uncontended and/or dedicated access, low latency, resilience, more reliable customer premises equipment, etc.) are not required;
- There is a continuing strong decline in legacy TDM circuits;
- There is moderate growth (3% CAGR) of the ADSL base but the relative percentage of the access base declines due to substitution by SFBB;
- Ethernet EFM access will experience reasonable growth (12% CAGR) but absolute volumes will be overtaken by SFBB in 15/16;
- Ethernet fibre 10M will decline at -7% CAGR but 100M and 1G are forecast to grow strongly at 25% CAGR and 32% CAGR respectively.

The role of data centres in today's industry

38. Data centres are showing rapid growth: last year CISCO's third annual Global Cloud Index report predicted that global data centre traffic would increase 300% by 2017. The nature of telecoms activities in data centres is very different to those at a 'normal' customer site. Data centres are typically large non-CP owned sites occupied by many end-users. At these locations many CPs will have run fibre into the building to enable them to provide the bespoke services that such demanding end-users require. As a result there is competitive supply of services in these locations based on CPs' own infrastructure. Another feature of data centres is that the owners often require CPs to pay rent to allow them to terminate circuits and house equipment there.

39. The whole telecoms industry is evolving to a new structure of interconnection whereby data centres are increasingly becoming major locations of traffic interconnection between multiple CPs. The switching activity required means that they are in effect core nodes of these CPs (Multi Carrier Core Node sites) as well as being points of competition for the end-users directly situated within the buildings themselves or indirectly linked to these centres.

40. Due to the competitive fibre provision at data centres, CPs at these sites are generally not reliant on BT for access infrastructure or services, and CPs other than BT offer highly bespoke arrangements for the provision of service to the data centre owners and resident customers as well as each other.

Investment

41. CPs are expected to continue to invest in developing their business connectivity capabilities and services. Competitive network coverage has expanded beyond the existing WECLA to nearby parts of London, for example Croydon and Stratford, and other metro hot spots such as Manchester and Birmingham. This is especially evident for connectivity to “higher value” sites using higher bandwidth technologies.
42. There has been increased investment by Openreach’s CP customers in Ethernet switches to aggregate demand and shorten the “tail circuits” required to connect customer premises. Evidence of this is seen through growing volumes of demand for “Local Access” variants of Openreach products. This demonstrates some of the viable alternative options available to CPs and also drives indirect price reductions in the market through changing mix of products.
43. Openreach’s CP customers are increasingly moving to dual supplier strategies – given the increased availability of networks other than Openreach. Although this shows the customer benefit to be derived from increased competition, there is also a consequential impact of the distortion that existing regulation drives – i.e. where there are uniform average Openreach published prices these tend to be “followed” by competitors who cherry-pick lower cost customer sites.
44. We have observed even greater price competition in WECLA and other metro areas, with Virgin’s three-year term pricing being cited by Openreach customer CPs as the price benchmark, and term pricing has become the norm with smaller Openreach CPs calling for three year price points from Openreach to spread set-up costs to compete.
45. In the upstream part of the Ethernet market, Openreach continues to invest in growing and evolving Ethernet and Optical capabilities. This investment stretches across various activities, including:
 - Innovative new products and services. Recent and forthcoming planned developments include:
 - EAD synchronisation, with planned developments to complement SyncE and facilitate accelerated 4G/LTE deployments;
 - EAD Street Access – evolving our current portfolio refreshing Street Access product variants to enable LTE/4G small cell connectivity;
 - Optical 40Gb and 100Gb – a new access product set launched in April 2014 that enables high capacity ROADM architecture and alien wavelengths – to facilitate flexible efficient networks which can also leverage CP core infrastructure (including metro rings);
 - EAD 100M services that can be upgraded to 1G remotely.
 - Additional possible future opportunities for new products and services developments are also being explored, such as:
 - EAD 10Gb – evolving the portfolio to replace legacy WES/WEES 10Gb giving a competitively priced 10Gb access circuit where scaling beyond 10Gb is not essential and space and power are limited as opposed to situations where scalable Optical product solutions are more suitable;
 - Hub and spoke architecture currently in development for December 2014 launch will enable better cost, space and power efficient solutions in the architecture many of our CP customers wish to use, aggregating up to 32 10G spokes into a single-rack hub;
 - Ethernet High Density Handover (HDH) – Openreach are considering a proposal that, in selected exchanges, based on volume demand, instead of deploying dedicated electronic equipment per circuit, a ‘large’ Ethernet switch could be installed in Openreach space offering singleton services and aggregated services at 1G and 10G handed over to the CP on fibre tails.

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46. Openreach is also investing significant sums in improving and transforming the day to day service processes and systems, to support moves to:
 - Improve customer confidence in agreed target delivery dates for circuit provision;
 - Give better ability to offer shorter lead times for circuit orders;
 - Deliver more effective communication between Openreach and the CP as provision work progresses, especially where unforeseen problem cause a need to re-schedule.
47. The Openreach “Ethernet Evolution” programme will deliver a range of service quality improvements during the coming months.
48. As market volumes increase, the ability of Openreach to target more investment to build network capacity in advance of specific circuit orders is also increasing – and several initiatives have recently been implemented, including pre-build of fibre to selected data centre sites and to other areas of high business density.

5. Quality of Service

Question 3: *What is your experience of the quality of BT's provision and repair of wholesale leased line services? Are there any consistent trends? Can you provide evidence to support your views?*

Question 4: *Do the KPIs that BT publishes / shares with industry give you sufficient visibility of its performance? If not, please explain what further information should be provided and why.*

Question 5: *If there are quality or timeliness concerns, how do these affect your business and how do they affect your customers? Please provide evidence to support your views.*

Question 6: *Do BT's current provision and repair services for wholesale leased lines meet your customers' needs, for example in relation to lead times, keeping appointments or adhering to agreed delivery dates? If not what changes do you think BT should make to its provision and repair services?*

Question 7: *Do you consider BT has appropriate incentives to provide the quality of service which you and your customers require? If not, what changes do you think should be made to BT's incentives?*

49. BT as a whole has a very strong interest in ensuring that service is good. Like other CPs using Openreach products to supply business connectivity services, BT's downstream businesses rely on Openreach to provide their customers with a good level of service, and they suffer just as much when there are problems with Ethernet provision. If service delivery is not predictable or reliable, customers can increasingly choose to switch to services provided over other CPs' networks. CP customers of BT Wholesale may also decide to buy direct from Openreach if they are dissatisfied.
50. In the majority of cases the level of service that Openreach provides is generally of a high standard. However there have been periods over the last year when it has not always been acceptable to the CPs, including BT's downstream lines of business, or their customers. This has been evidenced by an increase in customers' propensity to contact their BT suppliers about service delivery, and by the complaints they have made.
51. Delivery against a firm commitment, within a reasonable and predictable timescale, is a significant issue for customers. Businesses plan on the basis of the timescales they are originally given and do not want these to change at short notice due to the impact this has on their businesses or on other dependent suppliers. Business customers are also dissatisfied with the frequency of quality updates through the provision cycle, if inappropriately skilled engineers are assigned to their project, or if appropriate equipment to deal with the physical conditions of some business sites is not scheduled in advance.
52. Openreach also has strong incentives to deliver good service, including competitive pressure from other networks and a rigorous Service Level Agreement/Service Level Guarantee (SLA/SLG) regime. Further detail is set out in Openreach's separate response to the CFI on service. In summary, whilst service levels in Ethernet repair are high, Openreach recognises that recent provision performance has been below target levels. However, Openreach is clear on the root causes and is implementing a plan to deliver sustainable recovery, including recruitment, improvements to contractor performance and process re-engineering. The Openreach response also considers the roles that industry and Ofcom have to play in improving Ethernet provision service levels.
53. Although improvements are needed, they should be achieved through industry negotiation, rather than being imposed by Ofcom through SMP regulation. With their in-depth knowledge and understanding of the complex supply chain, CPs are best placed to judge what is feasible and desirable, and this approach also allows for more flexibility and agility when changes are needed. Alongside other CPs, the BT downstream lines of business are working closely with Openreach on its plans aimed at delivering a range of improvements quickly over the next two years: these will cut lead times by introducing increased proactive infrastructure discovery and build, customer

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self-appointing, and changes to charging arrangements for excess construction charges. BT would be keen to explore plans to accelerate the delivery of downstream benefits through increased collaboration between CPs and Openreach.

54. Generally BT sees quality of service as a shared responsibility between Openreach and its customers. Openreach's CP customers, including BT's downstream lines of business, need to help to drive improvements in order quality and validation, reduce end to end test failures at point of handover and work closely with Openreach to facilitate an improved planning process as well as more effective and speedy flow of information to proactively address customer questions and enquiries during the provision process.

6. Broadband substitution

Question 8: *Can broadband, particularly NGA-based services be used effectively for the delivery of business connectivity? Has this changed over the last three years? How do you think this might change over the coming three years?*

55. Broadband, especially NGA, can now be used to provide business connectivity where features provided by other options such as leased lines and EFM (for example uncontended and/or dedicated access, low latency, resilience, more reliable customer premises equipment, etc.) are not required.
56. Many local government customers have migrated their networks from leased lines (both Short Haul Data Services and TDM) to ADSL and NGA. The pace of change has increased in the last three years with improvements in the speed and availability of ADSL and more recently NGA, which can provide symmetrical speeds of around 10M, which appears to be the critical bandwidth. As roll out increases over the coming years, NGA may become a preferred access for lower bandwidth sites, replacing EFM, lower bandwidth EAD and leased lines. However it is too early at this stage to judge how strongly this trend will play out and what impact it will have had by the end of the next review period in 2019.

Question 9: *Are new business customers that would traditionally have taken leased line products now opting for a broadband service? If yes, what type of broadband service are these business customers taking.*

57. New business customers that would traditionally have taken leased line products are now increasingly opting for broadband, especially NGA, in order to save money and obtain higher bandwidth. However, as already noted, NGA is not a suitable leased lines substitute for customers requiring features provided by leased lines, for example electricity companies and Network Rail, which continue to use CP-supplied or own-build private circuits.
58. Use of NGA for business connectivity is illustrated by the recent introduction of an NGA access option on our dedicated internet access product BTnet. BTnet has traditionally used leased lines (TDM or Ethernet) to provide high speed uncontended internet access for high end SME and Enterprise customers. An increasing number of customers now use NGA access on BTnet for their dedicated internet access requirements.

Question 10: *Are existing business customers actively migrating from leased lines to broadband products? If yes: which types of business customer are migrating? which types of leased line product (interface and bandwidth) are they migrating from? which types of broadband service are they migrating to? does switching vary between different areas of the country (e.g. depending on NGA availability, the number of broadband providers present or other factors)? What are the barriers (if any) to switching from leased lines to broadband products?*

59. Existing business customers are actively migrating from leased lines to broadband products in some circumstances.

Which types of business customer are migrating?

60. Examples where BT has won the replacement business contracts include:
- [3<] – migration to a mix of NGA, ADSL and EFM;
 - [3<] – NGA FTTP being used where possible;
 - [3<] – IP Connect network branches had 2M access and these have been moved to broadband.

61. Examples where BT has lost the contract include:

- [redacted] – lost to Updata which is migrating SHDS and LearningStream to a mix of services;
- [redacted] – migrating from LearningStream (2M TDM) to TalkTalk broadband;
- [redacted] – the traffic light networks were controlled using analogue circuits and these have been migrated to TalkTalk broadband.

Which types of leased line product (interface and bandwidth) are they migrating from?

62. Services which are being replaced include: analogue circuits, sub 2M TI, X.21, 2M X.21/G703, and 10M Ethernet. High bandwidth 34M and 155M TI have now virtually disappeared.

Which types of broadband service are they migrating to?

63. BT products included ADSL Connect and NGA-based services.

Does switching vary between different areas of the country (e.g. depending on NGA availability, the number of broadband providers present or other factors)?

64. The coverage of ADSL and NGA may play a part in some circumstances. For example, LearningStream (2M TDM) now only exists in locations where it cannot be replaced by other services.

What are the barriers (if any) to switching from leased lines to broadband products?

65. For many customers, we do not perceive there to be major barriers to switching from leased lines to broadband services. Increasingly customers are comfortable with a mixed economy of access solutions including standard and fibre broadband as well as leased lines. However there are barriers in certain locations or in relation to customers with specific requirements, for example:

- Non-availability of broadband or NGA in cases where high speeds are required. For example, BT's IP Connect service cannot run Class of Service over IP Stream, so it is necessary to use leased lines for access where ADSL2+ is not available;
- Service repair level requirements. A standard seven-hour SLA is not a major issue for most customers, but it is a barrier to use of broadband for connectivity for some customers, for example in the water industry;
- Requirement for time /delay critical applications such as electricity, NATs, Network Rail;
- Need for high-level security and specialised CPE, for example in the police and defence sectors and elsewhere where encryption is deployed.

7. Passives

BT's views on passive remedies in business connectivity

66. It is a key part of the overall regulatory strategy to determine at what point in the overall value chain it is most efficient to target regulatory intervention in order to promote long run sustainable effective competition and investment incentives. Under Ofcom's statutory duties there is a clear requirement to ensure that such a regulatory strategy ultimately promotes the interests of end users of electronic communications services. The current regulatory approach focuses on the provision of active remedies. At the most fundamental level, BT does not consider any major changes in the relevant markets have been identified which warrant moving to a significantly different outcome.

There is no underlying market failure warranting passive remedies

67. The first question which needs to be addressed is whether there is effective competition or whether regulation is effectively providing a substitute for such competition where SMP has been found. That is, would a change in regulatory approach provide demonstrably better outcomes for end users of business connectivity services than the current mix of active remedies and competition is already providing or could provide following any changes in the next BCMR statement. Business connectivity markets are currently functioning effectively and are increasingly competitive. Such competition is based both on CPs using active remedies as well as CPs' own investment in their own network infrastructure (including the passive elements). The last BCMR relatively recently recognised that there was significant growing competition in these markets, and we do not consider that there has yet been any reason to change this view. For example:

- Substantial and vigorous competition was found in the last BCMR in the London area, which led to Ofcom significantly reducing and in some cases removing regulation in the WECLA area. A number of other CPs, most notably Colt, have significant network and presence in this area;
- More generally, the last BCMR review painted a picture of significant and increasing competition at the retail level based on the current set of wholesale active remedies. Ofcom also reconfirmed its view that retail markets are competitive, with SMP found only for very low bandwidth legacy analogue services. Virgin Media is now extremely active in many sectors as are new entrants such as Updata, using bonded copper, and EFM;
- There was a further finding of no SMP nationally in relation to very high bandwidth TDM circuits and the potential for competition in the provision of high bandwidth optical services outside WECLA, which was recognised by Ofcom not imposing a formal charge control on these products. This further points to the picture of strongly developing competition.

68. Since the last BCMR, other significant CPs have also expressed confidence in their ability to grow and invest in business markets. This further reinforces this overall picture of a vibrant and healthy market which is able to serve the needs of end users. For example, TalkTalk Group's recent preliminary results point to significant growth over the last year in business revenues and position business markets as a key growth area in the coming year.³ Overall this current highly competitive retail market is based on active wholesale products with a wide range of CPs buying Ethernet and other business connectivity products. Differing scales of CP are able to compete effectively and successfully win business.

³ See, for example, pages 27 to 30 of <http://www.talktalkgroup.com/~media/Files/T/TalkTalk-Group/pdfs/presentations/2014/full-year-preliminary-results-presentation-13-14.pdf>.

69. It is also the case that there are competing network infrastructures with their own passive elements and indications that further investment in these will emerge. Passive remedies would negatively impact on these and this would come at a significant competitive cost. Most obviously Virgin Media's network has significant geographic coverage and Virgin Media is a vigorous competitor in business connectivity markets.⁴ Specifically in relation to the provision of mobile backhaul, mobile network operators have a number of competing options available to them including use of microwave backhaul infrastructure. BT provided detailed views as part of the last BCMR on the extent to which this was a viable option in many scenarios. As such there are no benefits and considerable risk in introducing passive remedies to provide mobile backhaul. In the relevant UK markets, the existing wide range of wholesale products, competing provision from existing networks and the self-build options (including microwave access) provide sufficient competing options. We do not consider there is evidence that mobile operators have not been able to use existing products to acquire sufficient, competitively priced, backhaul capacity to meet their expanding needs, given the current and projected state of 4G roll out and usage in the UK.
70. It is certainly true that the structure of business markets is different to that currently seen in residential markets, with a much more diverse set of CPs providing business services or different scales and with different focuses both in the product and geographic space. However, this is not an indicator of the weakness of competition in these markets but actually another pointer towards competitive vigour. The end user requirements in business connectivity are themselves more diverse and the network requirements and scale required to service these requirements are also different. It would be more surprising if the market structure was not different to that seen in residential markets. The mere fact that a different market structure and pattern of market shares is observed is therefore of little or no evidential value in relation to the competitiveness of these markets.
71. As such BT sees no evidence that there is any underlying failure or end user detriment which needs to be addressed in these markets in relation to the current state of competition. Any issues which do need to be addressed to improve provision for end users (see for example the discussion in section 5 of this response above and the separate Openreach CFI response on quality of service) will not be improved by the introduction of passive remedies. In fact, for the reasons discussed in more detail in responding to consultation Questions 17 and 18 below, the introduction of passive remedies could make it more rather than less challenging to improve service levels.

Lack of incremental benefits from passive remedies

72. If, contrary to this, Ofcom does consider it can identify specific issues which need to be addressed through further specific measures to promote competition, basing this on passive remedies is unlikely to provide significant incremental benefits over an approach which uses and evolves the existing suite of highly developed active regulated products. The reasons for this are discussed in more detail in the specific responses to the consultation questions below. The incremental

⁴ The Virgin Media Business website claims coverage of 85% of businesses for its fibre optic network based on 330 Ethernet PoPs (see <http://www.virginmediabusiness.co.uk/PageFiles/858/tlw105-VRB.html> and <http://www.virginmediabusiness.co.uk/About-us/How-we-do-it/Our-network/>).

In recent years, Virgin Media Business has also been able to win significant multi-year contracts providing mobile backhaul services to the Mobile Network Operators. Most recently, for example, see <http://www.virginmediabusiness.co.uk/News-and-events/News/News-archives/2014/Virgin-Media-Business-future-proofs-backhaul-network-for-Three-in-multi-million-pound-deal/> and the deal announced with O2 last year at <http://www.virginmediabusiness.co.uk/News-and-events/News/News-archives/2013/Virgin-Media-Business-selected-by-Telefonica-UK-to-boost-data-speeds-ahead-of-O2s-4G-launch/>

benefits which passive remedies can provide are not significant, whereas there are significant costs to introducing them. As the CFI identifies, the impact on BT's pattern of common cost recovery is one important potential issue here. The introduction of passive access products could lead to cherry picking which would lead to BT's common costs being shifted from being recovered from already competitive areas to being recovered from areas where there is less competition or other regulated markets. We do not consider that this would be in line with Ofcom's statutory duties to protect all end users. Such cherry picking would undermine the ability to price differentiate across different bandwidths which would likely shrink the overall market and reduce net welfare. Further it would mean that BT is not able to compete downstream on a level competitive playing field in key areas and would adversely impact on dynamic efficiency through distorting investment incentives for all CPs concerned. Specifically in relation to BT's investment incentives, the passive approach would violate Ofcom's "fair bet" principle by expropriating BT's spare capacity currently available for future growth (discussed further in response to consultation Question 14).

73. Where in the overall supply chain Ofcom chooses to target regulatory intervention in order to promote sustainable effective competition is a central strategic regulatory question. A change in the current approach requires a clear and robust diagnosis both of what problem needs solving and the best way to do so. Approaching the issue in this way in our view provides no justification for moving towards any use of passive products in business connectivity markets.
74. Any such switch in the strategic regulatory approach would also raise serious questions about the on-going regulation of active products. Regulatory intervention at multiple levels of the supply chain creates serious problems in itself. The co-ordination of different remedies will not be a simple matter and the risks of regulatory failure (which itself negatively impacts on investment incentives both in the affected markets and more widely) increase significantly. Not least, multiple sets of remedies at different levels of the supply chain reduces regulatory focus in relation to any specific set of remedies and stretches the resources of the regulator and other stakeholders more thinly. More fundamentally, if it is the case that passive remedies are appropriate then that logically casts serious doubt on the ongoing need for active remedies. If both co-exist then it is likely that the markets in which active remedies will be further constrained and distorted (for example in relation to what is feasible and efficient in relation to on-going bandwidth gradients).

Regulatory framework

75. It is one of Ofcom's core regulatory principles that it "will always seek the least intrusive regulatory mechanisms to achieve its policy aims". Passive remedies would represent a significantly more intrusive approach which would decrease BT's degrees of freedom for little or no gain in policy terms for Ofcom. Adding passive remedies to existing active remedies would represent a step change increase in the level of intrusiveness of regulation – again for little or no identifiable policy gain.
76. The link to the relevant legal framework also needs to be considered with some care. Obviously remedies can only be imposed where SMP has been found in a relevant market and such remedies need to be appropriate and proportionate to the resulting issues that SMP is found to create. Passive remedies, by their very nature, cut across the relevant markets Ofcom defined in the last BCMR. BT was not found to have SMP in all of those markets and Ofcom did not impose the same level of regulation in all those markets. Introducing a more intrusive remedy which impacts on markets where, for example, a price control was not considered appropriate is, to say the least, counter intuitive. (The importance of a proper legal basis for this analysis is further discussed in the response to consultation Question 11 below.)
77. The specific questions raised in the CFI document are each addressed below. These responses should be read in light of, and in conjunction with, these more general issues of principle. BT

considers such issues to be vitally important to any consideration of the broader question of whether to mandate passive access in any form. In summary, Ofcom needs to address the passives issue not only from the detailed assessment of specifically identified costs (such as the impact on the pattern of common cost recovery) and any alleged benefits but also taking account of the wider policy framework and a clear view of what problem, if any, can be potentially solved by the introduction of an intrusive new form of regulation.

Question 11: *Do you have any comments about the scope of our planned work on passive remedies?*

Issues raised in the Call for Inputs

78. The consultation questions and the bullets in paragraph 1.33 of the CFI certainly identify important issues all of which will need to be considered in the context of assessing the case for and against introducing passive remedies in the BCMR. We note that the list of areas which Ofcom is minded to investigate, set out in paragraph 1.33, is somewhat wider than the specific questions on which it is seeking views at this stage. For example, the relationship between passive and active remedies and whether they can or should co-exist would be a complex issue. Not only will any such assessment need to cover the practicalities of whether both sets of remedies can co-exist but also whether they should in principle and, if so, what the impact is on existing regulation of active products. Once Ofcom has had the opportunity to reflect on the responses it receives to this CFI it would therefore be extremely useful to stakeholders for Ofcom to set out further thoughts on how it intends to gather views on these wider issues and any others which are raised by the CFI responses prior to formulating its views for the Spring 2015 consultation. It will clearly make sense for this process to be iterative to some extent. Understanding the scope of the types of passive remedy under consideration will impact on subsequent issues such as assessing the detail of the appropriate pricing approach, and the costs and potential incremental benefits which such passive remedies will create.
79. It is also implicit within the issues identified in paragraph 1.33 and the consultation questions that there is also the non-trivial issue to consider of the costs of transitioning to and implementing any new passive remedies. It would be beneficial if Ofcom could explicitly identify this as a necessary package of work which would be required as part of the assessment of the costs and benefits of passive remedies. Implementation costs would need to include the interaction with active remedies, any transition costs for BT and the wider industry in any reduction in the scope of active remedies, any costs of ensuring that any remaining active remedies can co-exist with new passive remedies in the least distortive way possible, increased regulatory activity required by Ofcom (for example in determining disputes around the price of any passive remedies) and so on.

Issues not addressed in the Call for Inputs

80. More fundamentally, BT is concerned that Ofcom is approaching this issue from the wrong initial starting point. The text in the CFI is close to implying that the starting point is that passive remedies would be a priori beneficial, but the relevant question here is whether the costs and difficulties of introducing them leads to a conclusion that they should not be. The correct starting point instead needs to be whether there is problem of lack of competition or lack of effectiveness of existing regulation which is adversely impacting end users in the business connectivity markets. That is, what is the issue which passive remedies may solve? If such issues can be identified then the next logical step is an assessment of whether addressing these clearly identified issues is best done through making appropriate changes to existing regulatory approaches (i.e. active remedies) or through the introduction of the new and untested approach of passive remedies. Ofcom should maintain an open mind at this point as to the eventual outcome of this assessment.

81. BT therefore considers that Ofcom should expand the scope of its consideration of passive remedies to include these prior questions. In BT's current view these considerations would in themselves rule out the need for passive remedies as set out above. These need to be addressed before turning to the question of whether the benefits outweigh the costs. At the very least these questions need to be considered alongside the issues set out in the CFI which essentially jump straight to the issues of whether passive remedies are workable and whether they would have incremental benefits which outweigh any adverse impacts of their introduction.
82. As is clear from the initial part of paragraph 1.33 Ofcom accepts that there is a significant issue in relation to the potential impact of passive remedies on BT's common cost recovery. We welcome the recognition of the importance of this issue and believe that a proper assessment of this issue will identify significant dangers from the introduction of passive remedies. BT looks forward to engaging with Ofcom on a proper assessment of these issues. However, we do not believe that this is the appropriate starting point and that Ofcom's approach is essentially viewing this issue through the wrong end of the telescope.
83. As discussed above, a key relevant question which is not identified in the CFI in terms of the scope is how any introduction of passive remedies would be reconciled with the overall SMP framework. That is, relating the discussion above concerning what problem is allegedly being addressed by passives to the formal assessment of what issue identified in what relevant market, where BT has SMP, is being addressed by passive remedies in a proportionate and appropriate way. Closely related to this is how any practical implementation of passive remedies can be isolated to only address markets where BT is found to have SMP (to avoid an intrusive regulatory approach which impacts and influences effectively competitive markets). For example, if a passive remedy obligation was imposed in the AISBO market in the WECLA area (which is currently regulated), how could Ofcom be sure that any passive take up was not also used to provide MISBO services in WECLA (which is currently an unregulated market).

Question 12: Which of the following types of passive remedy might be technically feasible and suitable for leased lines? Physical Infrastructure Access (i.e. duct and pole sharing); Dark fibre; Wavelength unbundling; Other passive remedies (please specify).

84. We agree that it is vital to start any consideration of passive remedies by a clear identification of exactly what is being proposed and an assessment of its technical feasibility. The term "passive remedies" is a generic term which encompasses different forms of network access: each of which potentially raises significantly different issues. More detailed assessment of the feasibility and suitability of specific forms of passive access will be required during the course of this BCMR as part of the overall assessment of whether any benefits arising from different concrete types of passive access outweigh their considerable costs and disbenefits. BT considers that this will need to be done in the context of much greater specificity of the exact form and scope of access forms being assessed.
85. At this early stage, this response focuses on the two types of passive access which various CPs proposed in the last BCMR and the associated Colt appeal as suitable for leased lines: namely, physical infrastructure access (especially duct sharing) and dark fibre provision. If this consultation process raises a need to assess other forms of passive access, which may be conceptually identified, then these will also need to be assessed in detail in terms of their technical feasibility and suitability. The response to Question 18 below focuses on some of the technical and practical challenges which would need to be overcome were passives remedies mandating access in these forms to be introduced. The even more considerable commercial and economic issues which arise are also dealt with in subsequent responses below.
86. The CFI specifically also mentions wavelength unbundling as a potential alternative. BT is not clear exactly what is being proposed for what potential uses here. In particular it is not clear whether this type of access is properly considered as an "active" or "passive" form of access or

the extent to which this is, in fact, different to products already provided by BT. In particular, Openreach has launched optical wavelength transport products which effectively sell individual wavelengths over a fibre. Openreach supplies optical equipment at each end of the fibre. These products are already meeting current industry needs in this area and the benefits of any regulatory intervention here are not clear.

Physical infrastructure access

87. Turning to physical infrastructure access, this can be considered as pure passive access, where a CP would provide and be responsible for the installation of all active electronics and any fibre itself which would use BT's duct (and potentially using BT's poles). In theory, this is technically possible for leased lines but there are considerable practical challenges which would mean that such a solution would not be available in all circumstances.
88. Such third party fibre would need to be installed in plastic sub-duct within the existing duct. The actual installation would need to be undertaken by Openreach or suitably accredited engineers: the practical arrangements involved are non-trivial and would need careful assessment and design. It also needs to be recognised that not all stretches of duct would be suitable for such installation. The quality of duct varies considerably across the network. Some older forms of duct are likely to be misshapen or distorted in ways which mean that they would not accommodate additional fibre sub-duct. Even where newer plastic duct is available, certain stretches will already be full. For example it would only take two fibre sub-ducts and a large copper cable to fill a bore. Typically a duct may contain one or more bores and all can be full. In this way existing duct can easily be filled just by Openreach meeting its customer needs in a particular area. Further, the actual physical location of the existing duct needs to be considered when assessing the suitability for a particular use. Openreach's network has been built using a tree architecture which may be incompatible for widespread use in networks using alternative basic designs (such as a ring architecture).

Dark Fibre

89. Dark fibre can also be considered as a passive product as it would simply be the provision of an end to end fibre (in practice a number of different fibre sections spliced together), with the associated active electronics being provided by the purchasing CP. The provision of such a product would also entail a significant degree of technical complexity. For example, an additional dedicated fibre may need to be blown down new sub-duct in existing duct in order to provide such a product which raises similar issues around the quality, location and capacity of existing duct discussed above in relation to duct access. It should also be noted that beyond a certain distance (between 20 and 80 kilometres depending on technical conditions) even dark fibre will require repeaters or amplifiers. For example, a fibre between London and Manchester would require at least two repeaters. These electronic repeaters need to be set up for a given data rate and wavelength and house in suitable intermediate buildings. Exactly what form a dark fibre product would take is therefore not yet clear and needs to be considered as part of the overall assessment of its feasibility and commercial/economic impact.
90. Another important set of complexities involved in any dark fibre access relates to responsibilities for fault monitoring and repair. Existing active products include fault monitoring equipment at the ends of the relevant cables. This provides a remote testing ability and hence improves quality of service and the speed with which any faults can be identified and repaired. A dark fibre product would still be an Openreach product with Openreach responsibility for the provision of the fibre itself. However, Openreach would have no remote testing capability as with existing active services: even identifying whether the relevant fault was on Openreach's or the purchasing CP's network may be complicated. (Such difficulties could also arise in relation to understanding location and responsibility for repair of faults of third party cables housed within Openreach duct in a physical infrastructure access regime.)

91. In practice, in such a scenario fault identification and repair will require many more engineer visits and are likely to take longer to fix individual faults (including the need to co-ordinate with the purchasing CP's engineers). Further, from current experience many faults will actually be due to the end customer's equipment. Analysis BT made of August 2013 faults suggested as many of 65% of reported faults were not in fact fibre faults. With active products this can be identified rapidly using line testing equipment and the true source of the fault identified. With no BT electronics at either end to provide remote monitoring, fault finding on a dark fibre product would require an actual engineer visit to determine the cause of the fault. Moreover, with Openreach-owned active electronics, Openreach is able to have continuous in-service monitoring which detects and characterises faults as they happen. Without this, it can be extremely difficult to find intermittent faults (where the circuit tests correctly at the specific time of the engineer visit). Not only would this lead to a longer time to fix that individual fault, but the increased number of engineer visits required would lead to a significant cost increase specifically due to the impact of introducing a dark fibre product. It is therefore highly likely that the introduction of passive remedies (especially mandating dark fibre products) would lead to a decline in overall quality of service and maintaining current service level agreements in relation to fibre active products would not be possible in relation to dark fibre products.

Capacity allocation issues across different forms of passive access

92. Finally, there are a range of policy and economic issues concerning use of capacity (and where new capacity may be required) in relation to all potential passive products. From a purely technical feasibility perspective, if new capacity was required (i.e. additional duct or additional duct to accommodate a new dark fibre) this will not always be possible in all locations for various practical or planning reasons. Providing additional fibres over existing routes may also reduce the efficient use of existing fibres through reduced active product use (which is one aspect of network duplication costs associated with the introduction of passive remedies). Even where it is possible it may only be so at considerable additional expense.
93. In summary, while passive remedies may be theoretically feasible for use in business connectivity markets, in practice there will be considerable technical complexities and additional impacts (for example on quality of service achievable) which will need to be taken into account. The actual circumstances around duct in particular locations could also mean that passive access is in fact not feasible. This is quite apart from BT's wider view that passive access is simply not suitable for business connectivity needs for wider policy reasons as discussed further below and the economic and operational issues which would arise were passive remedies to be introduced.

Question 13: *For what applications could communications providers use each of the types of passive remedy listed in question 12 above?*

94. This is a question for putative access seekers rather than BT. It is clear that there are a wide range of potential use cases for the range of potential passive remedies discussed in the response to the previous question. Many of these were identified as part of the last BCMR process and in the subsequent Colt appeal on this topic. We note that none of these applications was considered as providing a convincing benefit compared to the costs of introducing passive remedies in that process, which was only relatively recently concluded. The important question is the extent to which there are realistic business cases for these different uses and what the wider impacts, both negative and positive, would be where there are feasible business cases.
95. Further work better to understand the potential impact of introducing passive remedies and the consequent impact on the pattern of common cost recovery will clearly be an important issue. BT looks forward to engaging with Ofcom on these issues and inputting its own views and analysis.

Question 14: *How might passive remedies extend the geographic reach of infrastructure competition?*

96. The relevant question here is whether, not how, there would be an overall extension in the geographic reach of infrastructure competition (which should be defined to include infrastructure competition based on some use of active products as well). The introduction of passive remedies would lead to a range of different impacts in terms of the level of investment by different network operators in different geographic areas. It is by no means clear that the introduction of passive remedies would lead to an overall increase in the degree of network based competition, given the ways in which passive remedies would change and distort the investment incentives on all sides.
97. A range of different issues need to be taken into account here both in terms of the extent to which BT is able to roll out its network in future and the impact on the network reach of other CPs.

Impact on BT's investment incentives

98. Adding an additional network access point in the passive layer will increase complexity and therefore the risk associated with any individual network extension from BT's perspective. The uncertainties involved around demand for active products provided over any individual extension of network reach would be increased. The impacts on fixed, common and joint cost recovery arising from the cherry picking effect (described and discussed above) would also increase the risk associated with the potential return which could be earned on such investments. Increasing the risk associated with such investments will inevitably lead to a reduction in the capex to increase network reach which will be viable and economic i.e. this additional risk will reduce the speed at which BT's network is extended and enhanced.
99. Further, Ofcom should recognise that infrastructure competition, and competition more generally, is possible based on use of active as well as passive remedies. Currently, BT is able to expand and dimension its network based on its views for potential growth in demand. As such, BT makes its own assessment of the demand risks involved and invests taking a forward looking view of these uncertainties.
100. Such investments represent what Ofcom has termed a "fair bet". Where demand materialises at or above the level which BT assumed then it is able to reap the consequent rewards. If demand is lower, then BT bears the resulting cost. If the capacity which BT has built into its network to accommodate demand is removed through being required to be used through the provision of passive remedies, this would represent an ex post and asymmetric removal of BT's freedom to grow its business. Presumably passive remedies using this currently available capacity would only be used where the demand was materialising. As such, the fair bet principle would be violated with BT's investments not being available to accommodate future growth where it exists and where demand does not materialise BT having to bear the cost of the resulting excess capacity. This significant disadvantage would apply across all potential forms of passive products.

Impact on other CPs' investment incentives

101. Clearly, if other CPs were to use passive products then the reach of their own networks would increase accordingly. Assuming that the build or buy calculus was being rationally undertaken, this would involve these networks extending the areas they covered beyond what they would chose to do if they have to invest in their own passive infrastructure. The key policy issue here though, is the extent to which the geographic extent of competition is extended, not the geographic reach of individual competitors. Ultimately this feeds back into the question, discussed above, about what benefits would be provided for end users.
102. The situation here is far from clear and it should not be assumed that passive remedies would extend competition to wider geographic areas than currently:

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- First, the geographic area over which competition based on active products is feasible would be smaller than would be the case without passive remedies for the reasons described above;
- Second, the increased risk involved with passive infrastructure investment would also apply to other CPs who invest in their own duct. Their investment incentives will therefore also be impacted such they may reduce the reach of their networks compared to a continuation of the existing set of remedies. These impacts will occur not only in relation to those with existing passive infrastructure but will also reduce the incentive for CPs who are currently considering rolling out more of their own fibre networks;
- Third, the impacts of the price associated with any potential passive remedy will also need to be taken into account. The level of such pricing will impact on the build or buy decision and there is therefore a risk that a price determined at the wrong level will lead to allocatively and dynamically inefficient investment. In itself this could also inefficiently distort the geographic reach of competition. If passive prices turn out to have been set at an inappropriate level, then the extent of competing passive infrastructure built could reduce, reducing overall competitive intensity. Using passive products will involve its own network design and roll out challenges and investment in its own right. If a CP decides to sink resources into this investment this will also incline them more to the use of further passives rather than build out their own duct further. This will be another impact that introduction of such remedies would have on the build or buy decision;
- Finally, and crucially, Ofcom will need to investigate the extent to which the introduction of passive remedies would actually extend competition (rather than individual competing networks) to areas where such competition does not currently exist. It is highly likely that much of the take up of passive remedies would in fact only increase competition where it is already effective.

Question 15: *Would the presence of physical infrastructure belonging to other CPs affect usage of passive remedies? For example would you expect passive remedies to be used only or mainly in areas where only BT has passive infrastructure or would you also expect passive remedies to be used in areas where other CPs have passive infrastructure?*

103. This question is impossible to address in generic terms. We would expect it would depend on the exact form of passive access being envisaged, the regulatory conditions associated with it, the specifics of the particular location involved and the associated business case of the access seeker.

104. If the relevant regulatory remedy mandated the provision of passive access on a nationwide basis then some CPs may well seek to use this facility regardless of whether there are other competing physical passive infrastructures. Clearly the extent to which this occurs will depend on how and where any passive remedies are introduced (including both the structure of prices and how their overall level is set). The key question here is whether this would be efficient. We consider it would harm allocative, productive and dynamic efficiency.

105. BT also questions the basis on which passive remedies would be imposed in areas where there is existing infrastructure competition to the extent that there is existing physical infrastructure competing with BT. Where there are alternatives available to using BT's network (whether those be through competing duct networks or through alternative technologies such as microwave access) it is not clear why a remedy as intrusive as passive remedies is justified. One key area where there is competing infrastructure is the current WECLA, however that is defined in the next BCMR.

106. Further as identified above the introduction of passive remedies would reduce BT's investment incentive which would in itself also reduce the extent of geographic competition.

Question 16: *What are the benefits that passive remedies might offer in comparison to active remedies? Please consider specifically: Service innovation benefits e.g. the ability to differentiate service features and functionality (such as fault finding, configuration options, etc.); Network innovation benefits e.g. the ability to configure the network in a different way to BT's network configuration; Technology innovation benefits e.g. the ability to adopt new technologies, or introduce new technologies earlier than they might otherwise have been introduced; Avoiding duplication e.g. the ability to avoid the duplication of network elements for network monitoring purposes; Other benefits (please specify)*

107. BT considers that passive remedies would not lead to any significant benefits which could not also be achieved from the use of active remedies. That is, given the existing situation, the incremental benefits of introducing passive remedies over and above what can already be achieved using active remedies is negligible. Certainly such benefits are not sufficient to outweigh the costs which passive remedies would create, the costs of implementing and introducing passive remedies and the potential costs arising from the interaction between passive and active remedies co-existing (were that the approach to be taken).

108. Our view on the illusory nature of the benefits which passive remedies could offer in comparison to active remedies was set out in BT's submissions in relation to the Colt appeal of the last BCMR. Those submissions dealt with the benefits which it was alleged arise from passive remedies in relation to that appeal and we refer Ofcom to the detail set out in those documents, which we consider is still relevant and applicable. BT would expect to be able to provide similar comments and assessment in due course of any alleged benefits of passive remedies which are identified in the current BCMR.

109. Considering each of the categories of benefits identified in the consultation question:

- *Service Innovation benefits:* competition based on use of active products already allows operators to differentiate their services to a significant extent and the statement of requirements (SoR) process exists to enable operators to request additional products if they consider these are required. The configuration options available on BT's active products are the result of extensive testing to ensure that all platforms are robust. For the reasons set out in the response to Question 18 below, the use of passive remedies is likely to make fault finding and resolution more complex and costly, and take longer;
- *Network innovation benefits:* it is not clear how passive remedies in and of themselves would allow competing CPs the ability to configure networks in different ways. BT's duct has been built using a particular architecture and if CPs wish to use alternative approaches they will need to build their own passive infrastructure. As discussed in some detail as part of the Colt appeal it is not the case that an operator using, for example, a ring architecture would be able significantly to recreate that with individual stretches of BT's own passive network;
- *Technology innovation:* the argument that passive remedies would enable CPs to introduce technological innovation faster or more effectively than is currently the case is discussed in more detail in response to consultation Question 17 below;
- *Avoiding network duplication:* at one level it is inevitable that any degree of infrastructure competition will lead to some degree of network duplication. Clearly competition based on active remedies will involve some duplication of assets between competing operators and the consequent complexity this raises. The relevant question here is the scale and scope of the duplication of assets. When assessed as a whole, the assessment needs to consider whether the costs of the duplicated assets outweigh the benefits of additional competition i.e. whether there is a net welfare enhancement. BT considers that passive remedies would lead to there being excess capacity in some areas at the expense of network investment (i.e. under capacity) in other areas. This represents both an increase in allocative inefficiency as well as a negative distortion to investment incentives.

Question 17: *How valuable would the innovation benefits of passive remedies be? Would they be sufficient for you to choose passive remedies if there was no overall cost advantage compared with active remedies (i.e. if the price of the passive remedy was exactly equal to the price of the active remedy less the cost of the network components that you would need to provide)?*

110. In the last BCMR and the subsequent Colt appeal on these issues, the key alleged benefit of introducing passive remedies raised by CPs seeking to use such access related to innovation benefits. The argument made was that passive remedies would enable competing CPs to introduce other technologies faster or more effectively. This assertion needs to be considered with some care and does not stand up to detailed scrutiny:

- *Incentives to innovate:* the question of whether greater innovation would occur cannot be divorced from the incentives to innovate. Such incentives arise from the competitive imperative to win business. Firms do not innovate simply for the sake of it, but because it provides a benefit to end users and hence confers a competitive advantage. The logical corollary of this is that passive products would only lead to greater innovation where they are able to increase competition. BT does not consider either that there is a problem of lack of competition in business connectivity markets (as discussed at the start of this section) or that the introduction of passive remedies is capable of leading to a step increase in competition (see our response to Question 14 above);
- *BT innovates in business markets:* BT is recognised as an innovative company both within the UK and globally. It participates in relevant standards and innovation forums and has a strong track record of developing new products (at both the retail and upstream levels). This arises from the strong competitive imperative which BT has to ensure its network is able to compete effectively both at a UK level and in global markets. CPs purchasing wholesale inputs from BT and Openreach directly benefit from this innovation by being able to purchase products on an equivalence of inputs (EOI) basis under the Undertakings from Openreach's network. Maintaining the development of a constant stream of innovative products requires scale and significant financial resource, both of which BT is able to provide;
- *The incremental innovation benefits of passives are unclear:* the case has not yet been effectively made of what innovation would be enabled by the provision of passive remedies which could not already be provided using active products (including appropriate use of the SoR process to develop new product variants where it can be shown there is sufficient demand based on end user benefits arising from the relevant innovation). Again this was a topic debated as part of the Colt appeal of the last BCMR. The Competition Appeal Tribunal did not reach any conclusion on the impact of passive remedies on innovation or any of the other alleged benefits of passive remedies. It based its decision on its finding that Ofcom had undertaken an appropriate process to balance all of the relevant factors rather than making findings on the individual alleged costs and benefits of passives.

111. As such, BT continues to believe, as it argued in the Competition Appeal Tribunal proceedings, that the innovation benefits alleged are not dependent on the introduction of passive remedies.

Question 18: *What are the technical and operational challenges associated with deploying and using passive remedies and how might these be addressed?*

112. The technical complexities involved in the introduction of passive remedies are outlined in the response to Question 12 above. These are the difficulties and technical impacts which can be identified when considering passive remedies in general. It is highly likely that a whole range of more detailed issues would arise when a specific and specified form of passive access product was considered in appropriate detail. In general the following will need to be taken into account:

- Ensuring that passive access does not adversely impact existing network and its customers; especially where physical infrastructure access is provided there will be a need to ensure that

operationally this does not adversely impact or increase faults in relation to existing fibre and copper in the same duct. There will need to be a requirement that only Openreach or Openreach accredited engineers have access to its duct;

- An important element of this will be ensuring that there are appropriate arrangements in place for where two networks connect with each other (whether that is the active electronics on the end of dark fibre including its location or the physical connection of Openreach duct with the purchasing CP's duct);
- There would also be a significant challenge in setting up appropriate arrangements and confidentiality requirements for the mutual sharing of relevant information required to make any passive infrastructure access possible. This will include designing and implementing safeguards to ensure that any such sharing adequately protects any commercially and security sensitive information which may be involved. It would be important to ensure that no party was able to gain an unwarranted or unfair competitive advantage through access to information intended solely to facilitate purchasing of passive products;
- Fault identification and repair will also represent a significant challenge. BT currently expects that passive access would inevitably lead to a deterioration of achievable SLAs. Systems and approaches will need to be in place to ensure appropriate sharing of costs and information about the relevant infrastructure required to fix the fault, to enable and facilitate allocation of responsibilities for fixing different types and locations of faults;
- Not all stretches of duct will be able to take an additional fibre in sub-duct. This could be because of the age and quality of the duct or because it is already full. Any particular end to end route may include many individual stretches of duct and even one section of blocked duct could render that end to end route impossible (or require it to be much longer and hence more expensive). There will be significant technical and operational challenges relating to identifying and ensuring the availability of individual routes requested.

113. Mandating passive access would also raise an additional set of practical challenges essentially relating to how capacity would be managed. It is likely that in many existing plastic ducting there is at most room for one additional fibre contained within sub-duct (where the duct currently has a copper cable contained within it). Even where a stretch of duct is only used for fibre, there is only a limited number of additional sub-ducts which will fit. As more CPs seek access in a specific location it is likely that a situation will rapidly evolve where new duct capacity would be required. Fairly apportioning the resulting costs and fairly providing access to limited capacity (including growth of BT businesses' usage) will be a significant challenge. Sharing of any existing capacity, the consequent impact on investment incentives and the cherry picking issue discussed above are all aspects of this.

Question 19: *What are the strengths and weaknesses of different pricing structures that might be adopted for passive remedies, in particular; uniform prices that do not vary either by geographic area or the use to which the passive remedy is put (e.g. residential NGA versus leased lines); and prices that do vary according to geographic area or the use to which the passive remedy is put, and which reflect the value of the services provided or geographic differences in the intensity of passive infrastructure usage, more like the way BT's prices active products now?*

114. Were passive products to be introduced as an input into business markets, the approach to pricing them would be key. There is significant risk of regulatory failure here which would distort competition and investment incentives. This was implicitly recognised by the Competition Appeal Tribunal in the Colt appeal when they reached their decision on the basis of whether Ofcom had undertaken a suitable approach to balancing the various factors they considered needed to be taken into account. As such, the Tribunal emphasised that this was a matter of the regulator's judgment.

115. Any quantitative assessment of the impact of passive remedies will also need to take some view of the likely approach to pricing passive products. BT notes the comments which Ofcom made in the last BCMR that any assessment leading to how passive products should be priced in business connectivity markets would need to be specific to those markets.⁵ As such, the existing Physical Infrastructure Access prices appropriate for use in NGA markets are not necessarily appropriate for the types of access being considered in this market review. BT considers this remains just as much the case today.
116. Against this background, Ofcom needs to articulate the criteria by which it would assess what its preferred passive pricing structure and approach would be, were such remedies to be introduced. The consultation question refers to strengths and weakness associated with one particular aspect of this (namely the extent to which passive product prices should be differentiated). This is by no means the only relevant question which would need to be addressed in due course. Any serious consideration of passive remedy pricing would therefore require significant further work and consultation (potentially prior to the full BCMR consultation next year). This will need to address issues such as the basic approach taken to pricing such products, what regulation of these prices is or is not appropriate and how Ofcom would assess the appropriate level of prices.

Potential costs and dangers in passive remedy pricing structures

117. Turning to the specific issue raised in this consultation question, Ofcom will clearly need to consider this issue in the context of the impacts on different relevant markets through the lens of which of its statutory duties it considers most appropriate here. The next stage will therefore need to go significantly beyond a simple weighing of strengths and weaknesses. A more detailed assessment is hard at this stage in the process before some of the prior questions around passive remedies are determined as discussed. However, one clear issue which needs to be considered in relation to the potential structure of prices is feasibility. The very nature of passive products means that it is the purchasing CP which has the control over the use to which its own active electronics and lit fibre (within the purchased passive infrastructure) are put. It is therefore not clear how, or even if, it would be possible to set differentiated prices on the basis of for what the passive infrastructure is used or the value of the services thereby provided. Even if there was a sensible way of constructing such prices in theory for the initial use, there would be considerable challenges in enforcing this over time on passive product users.
118. Clearly distinguishing prices on the basis of geography would be more practical although this would also raise significant implementation issues: for example, in relation to how boundary issues and products which crossed pricing boundaries were treated. The “strengths and weaknesses” of such approaches will depend on what criteria are applied in order to geographically differentiate prices. For example, we would expect there to be no case for mandating passive remedies in areas where the relevant downstream markets had been found to be competitive or near competitive (as is the case in the current BCMR in relation to the WECLA area). A clear strength of such an approach is that it would align with the requirement to find SMP and only implement remedies appropriate to deal with the identified issues that SMP creates. Related to this, such an approach would also need to ensure that existing competition in such areas was not undermined.
119. Further geographic price differentiation beyond this may well also be appropriate. This would be needed to minimise as far as possible the cherry picking which would *inter alia* undermine the efficiency of existing active pricing; and other negative impacts of introducing passive remedies

⁵ See Ofcom “Business Connectivity Market Review: review of retail leased lines, wholesale symmetric broadband origination and wholesale trunk segments” Statement published 28 March 2013, in particular paragraphs 8.42-5. Some of the issues which would be raised here were discussed by Ofcom in more detail in the last BCMR at paragraphs 8.80-8.92.

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(on competition and investment incentives as identified above) but this in turn could lead to reduction in take up of passive remedies, making their introduction worthless. Any more detailed consideration of the pros and cons of such an approach is difficult in the absence of a clear specification of exactly what is meant by passive access in this context and prior to more detailed assessment of the qualitative and quantitative impact of introducing such passive remedies. BT expects to engage further with Ofcom on these issues as the current BCMR develops.

8. Retail remedies for very low bandwidth TI services

Question 20: Do you think we should continue to regulate BT's retail analogue and Kilostream services after March 2016? Please provide reasons to support your views.

120. BT agrees with Ofcom's current view (at paragraph 1.39 of the CFI), that *"given the prospective withdrawal of these services, the declining volumes and the extended notice already given to users of critical applications, the scope for harm is likely to have diminished considerably by the time [Ofcom] conclude this BCMR....any risk of harmful action by BT would be likely to be mitigated by accelerated migration of end-users to alternative services. In light of this...it may not be proportionate for [Ofcom] to maintain retail regulation after March 2016."*
121. BT is of the opinion that Ofcom should deregulate BT's retail analogue and Kilostream services as soon as possible. Ofcom is aware of BT's views on the continued regulation of these services as expressed both informally and in our formal responses to the BCMR 2013. This is supported by the European Commission: *"the Commission requests OFCOM to monitor the evolution of this migration closely and to withdraw retail regulation as soon as migration has occurred to a sufficient degree, which would render continued retail regulation obsolete."*⁶ On this basis, BT considers that deregulation of these services should take place at the latest by March 2016, and that Ofcom should actively consider such deregulation sooner than March 2016.
122. As acknowledged by Ofcom, the services concerned are legacy in nature with volumes in steady and consistent decline (circa 10% for analogue and 20% for Kilostream p.a.) with little or no interest in market entry from other CPs, which are quite rationally promoting newer alternatives such as EFM and broadband.
123. As expressed previously, BT believes that Ofcom took a narrow view of the market in BCMR 2013, failing to adequately allow for the presence and effect of alternatives such as EFM and broadband. BT's existing customers of these legacy services are successfully migrating to alternative services, evidenced by the steady decline in volumes.

Question 21: Are BT's retail analogue and Kilostream services used for any other critical applications that might have difficulty migrating to alternative services?

124. BT is aware of a number of its customers for these legacy services that could be deemed as running critical national infrastructure operations. These include the energy (electricity and gas) and water sectors, national air traffic control services, defence, rail transport and traffic light control management. To BT's knowledge, the majority of these customers have plans in place to effect timely migration in accordance with BT's public announcements regarding the future of these services. BT continues to communicate with its customers about its intentions relating to these legacy services.
125. BT cannot comment in detail on whether or not any particular difficulties with migration may occur but it is reasonable to assume that issues may present as migration activity occurs, as would be the case in any period of technological change. However, in our view any difficulties are more likely to involve small numbers of niche applications and/or localised geographic areas which can be resolved on a case-by-case basis and which, in BT's view, are insufficient reasons for Ofcom to maintain ex-ante regulation.

⁶ Commission Decision concerning Case UK/2013/1428 "Market for wholesale terminating segments of leased lines in the United Kingdom; Markets for wholesale trunk segments of leased lines in the United Kingdom; Market for retail leased lines in the United Kingdom. Comments pursuant to Article 7(3) of Directive 2002/21/EC – C(2013) 1824 final", 21 March 2013

9. Charge Control remedy

Question 22: *How effective do you consider the current leased line charge control has been in balancing Ofcom's objectives? Please provide evidence or give reasons/examples for your views.*

126. The current leased line charge controls are only just entering the second of the three years of the control period and it is therefore very difficult to assess their effectiveness in terms of meeting Ofcom's various objectives (as set out in paragraph 1.41 for the CFI). We would expect the forthcoming market review to assess these issues and BT will be seeking to provide the evidence and information it has to facilitate this task.

127. Certainly, it is BT's impression that the market for the provision of Ethernet services has grown significantly since 2012 and CPs have been installing their own infrastructure to meet much of this demand. It is certainly not the case that, where BT was deemed to have SMP in 2012, the level of SMP is uniform. On the contrary, there are marked variations across geographies and services in the competitive conditions. Indeed, AISBO (AI) services probably represent the most complex and multi-faceted markets which Ofcom has to consider. We believe a major challenge for the forthcoming review will be to understand these differences and then to apply and/or design remedies (including charge controls) accordingly.

128. BT agrees with Ofcom that it is now time to reconsider the imposition of charge control on TISBO (TI) services and we explain our position in response to Question 24 below.

Question 23: *If you do not consider that the current charge control has been effective in achieving Ofcom's objectives, what changes do you consider should be made and why?*

129. We list below the changes we consider should be made to charge controls of AI and MISBO (MI) services. The changes we consider should be made to charge controls of TI services are set out in our response to Question 24 below.

130. As Ofcom recognises, charge control is not only about the recovery of costs but it is also a key policy vehicle for Ofcom to set the right incentives for competition to develop. It follows that the charge control remedy should not inhibit Openreach's AI and MI pricing flexibility, to the extent that economically beneficial commercial investment and innovation are stifled to the detriment of market development and end-users.

131. In this respect, BT believes that in terms of charge control design:

- A broad basket structure should be maintained for AI and MI services;
- Prices which reflect customer commitments should count towards charge control compliance; and
- Ofcom should maintain the present prior weighting framework for compliance purposes.

These three issues are briefly discussed below.

a) Benefits of broad baskets

132. The AI and MI markets are characterised by high levels of uncertainty and innovation. In such circumstances, it is appropriate to provide Openreach with as much commercial flexibility as possible to react to market events and hence a broad basket structure is preferred.

133. There is a high level of common costs between services in the AI and MI markets and between the AI and MI services. Given the extent of common costs between services it is preferable that the broad basket structure for MI and AI is maintained. Any narrowing of the basket structure would require assumptions to be made regarding changes in relative cost allocations which, in a fast moving market, would risk distortion solely due to modelling assumptions.

134. Furthermore, broad baskets allow Openreach the freedom to maintain sensible relative prices between services which ultimately encourage more efficient purchasing decisions: narrower

baskets would limit this flexibility and might ultimately lead to relative prices being set at levels which are not aligned with commercial realities in the market(s).

135. Lastly, combining legacy and new technology products within a basket gives the ability to price flexibly between products to encourage migration, to the benefit of BT and CP customers alike.

b) Charge control prices and recognition of customer commitments

136. BT's average charges are calculated on the basis of its standard annual rental charge. CPs are increasingly requesting that Openreach introduces a wider choice of price for the same product, in particular prices which are guaranteed for a period of time, consistent with the end-user contracts they are looking to meet. For example, a common request is that Openreach offer a standard three-year rental product in order that CPs can plan their lifecycle costs with confidence. Such a product would also help them in assessing build or buy options. In other circumstances, CPs are seeking even longer price guarantees, reflecting the fact that when providing large WANs their customers are in turn seeking long term contracts. In a competitive market, such requests would be considered on their merits.

137. However, such contracts do not currently count towards BT meeting its charge control, meaning that price reductions made in exchange for commitments have to be made over and above the rate of decrease of prices mandated by Ofcom (and designed to bring average annual prices in line with average costs). The effect of the control is therefore to discourage the very types of innovative pricing which customers seek, and which competitive markets would deliver. Customers for these services do not think in annual terms, but regulation considers only an annual view of prices and provides little headroom for demand commitments to be recognised. We would urge Ofcom to reconsider its approach in order to provide Openreach with commercial incentives to respond to customer requirements involving special prices in return for demand certainty i.e. commitments. We believe that this would be consistent with Ofcom's objectives as set out in paragraph 1.41 of the CFI, including: (i) to ensure prices are subject to appropriate controls, for example, in allowing BT to retain sufficient flexibility in the way it sets its prices; and (ii) to provide regulatory certainty for BT and its customers.

c) Use of prior year weights

138. During this control, there is expected to be a continued decline in legacy AI services and a rapid rate of growth (relative to the overall basket) in new AI and MI services. In these circumstances, any price reduction on newer AI and MI services will have a much smaller impact on compliance with the revenue formula compared to the actual amount customers will benefit from the price reduction. We believe that Ofcom's current approach to prior year weights is a fair way to address this issue, and should be maintained. It balances the need for certainty, in terms of basket compliance, with more up to date information for weighting total price reductions in the control formula(s). If Ofcom were not to maintain this approach, it would risk BT being unfairly and disproportionately penalised for making sensible and efficient price changes. In addition, ultimately it risks customers paying higher prices for services using obsolete technology.

Parallel running costs

139. Clearly, it is appropriate and proportionate that any charge control remedy allows BT the opportunity to recover its efficiently incurred costs (as acknowledged by Ofcom at paragraph 1.41 last bullet point). For AI services this raises the question of how legacy WES and BES costs are treated given the migration from legacy WES/BES technology to new technology such as EAD and EBD.

140. There will be parallel running of the legacy and new services and some costs for WES/BES services which are unavoidable until the last few customers have migrated away. For example, even with very low WES/BES circuit volumes, costs will still be incurred in terms of the element managers and the OSS network to manage individual NTEs; ECOX for legacy ordering and repair

and Openreach's last time buy stores. It is imperative that Ofcom recognises these costs to ensure BT recovers all its efficiently incurred costs.

141. As legacy TI and analogue services decline Ofcom should allow for a redistribution of common costs away from traditional services towards AI and MI services.

Question 24: *Given the expected decline in TI service volumes over the current control period, do you consider an alternative type of control, such as a simple charge control with charges capped by reference to their current level, would be more appropriate and proportionate in the next control period? If so, why?*

142. BT agrees with Ofcom that given the expected decline in TI services over the current charge control period, there is a need to reconsider the charge control over these services.

143. TI total bandwidth is set to decline by 80% and the number of rentals by 70%, by the end of the next charge control period. This massive decline in market size questions whether the cost and effort involved in detailed modelling remains proportionate.

144. The costs of providing the TI service comprise some elements which are variable whilst others are fixed at the platform level. For example, BT is obliged to maintain the geographic coverage of the TI network and is unable (or in many cases it is uneconomic) to remove equipment until the final circuit running through the equipment is ceased. As the footprint of the TI services equipment is relatively fixed, costs can be viewed as largely fixed over the charge control period.

145. It is reasonable to expect unit costs will increase as the (fixed) platform cost must be recovered from an ever-smaller volume of circuits. This is exacerbated by the decline in other services that share the SDH (20CN technology) platform. For example, 20CN broadband is migrating to 21CN whilst PSTN has seen volumes continue to decline due to migration to mobile and other forms of communication.

146. The fixed costs typically comprise labour, energy and accommodation, maintenance, powering and housing of the fixed footprint of equipment. The depreciation and cost of capital is expected to decline as the platforms reach the end of their economic lives, and so will not be a significant contributor to the fixed costs. In general, input costs of labour, energy and accommodation are all likely to increase more rapidly than CPI over the next few years.

147. These factors led to a price control higher than inflation in the current LLCC, and similar factors in the future would result in a positive 'X'. However, to establish the increase in unit cost with sufficient precision would require a reasonably complex model that would not be justified by the size of the remaining market.

148. A basket control of CPI-0% would seem to strike the correct balance between costly regulation, protecting residual users from over-pricing yet still encouraging them to move to more efficient, modern technologies.

Annex 1: *Current Analysis* view of public sector connectivity wins, Q1 2013 to Q1 2014

BT is submitting this annex as evidence of growing competition in public sector contracts. The information provided is illustrative of increasing competition across a number of market segments, and the type of information that we plan to provide to Ofcom in the course of BCMR 2016. It is also a good example of one of the types of information that we believe Ofcom needs to obtain to support its consideration and analysis of business connectivity markets.

UK Public Sector Services Market Review: Q1 2014		
Framework Win - SWAN		
Capita	<p>Capita has won a nine-year contract to be the primary supplier to the SWAN framework – a Scottish version of the PSN framework designed to deliver a single network available for the use of any, and potentially all, public service organisations within Scotland.</p> <p>The initial phase of the programme will deliver services to the four SWAN Vanguard Partners: NHS Scotland, Education Scotland, Pathfinder North (the Highland Council, Argyle and Bute Council, Orkney Island Council, Moray Council and Comhairle nan Eilean Siar) and Pathfinder South (Dumfries and Galloway Council and The Borders Council).</p> <p>The Vanguard Partners have aggregated their demand and were responsible for the procurement. The initial 'Vanguard' contract is worth up to GBP 110 million over seven years, with the whole SWAN contract estimated to be worth up to GBP 325 million over nine years. The contract was won in partnership with Udata, which has now been acquired by Capita (see above).</p>	<p>High: SWAN is one of the largest PSN-type contracts available in the UK, making this a significant victory for Capita, which beat BT and a Vodafone/Virgin Media Business joint bid for the contract – although BT has criticised the bid process and is presently seeking legal action. The primary SWAN contract is centred on networking and connectivity services, however Capita is now very well positioned to bid for wider IT services contracts in Scotland, and it has already registered a win with Dunbartonshire County Council for managed ICT services in 2014. The contract win is a major boost for Capita in the fixed services space and stands as a strong case study for its ability to get the best out of the newly acquired Udata.</p>
Contract Win - PSN-type Access		
Udata	<p>Udata has won a three-year contract from Derby City Council to provide connectivity for 60 schools in Derby.</p>	<p>Low: Udata has been one of the most successful 'independent' providers in the PSN era. Udata had previously signed a PSN LAN/WAN deal with Derby City Council in September 2013 so this is in effect a contract extension, but also provides an example of how PSN contracts can expand.</p>

UK Public Sector Services Market Review: Q4 2013

Service Provider	Description	Market Impact
Customer Win – Internet Access		
Capita	Capita has been awarded a GBP 3 million contract for the provision of improved Internet access for corporate offices, schools, libraries and remote sites in North Ayrshire. The five-year deal will provide additional bandwidth and improved network speeds to council buildings across 340 square miles. Capita has won the contract in partnership with Udata.	Low: This is a relatively modest win for Capita, but it does underline that traditional telcos should not expect Internet/WAN access deals to be solely in their domain. However, the majority of SIs will rely on partners for these contracts, so there are still opportunities to be won, especially for those providers which are not traditionally strong in the UK public sector, e.g., Colt. This win is also another feather in Udata's cap.
Customer Win - Utilities		
Fujitsu	Fujitsu has won a ten-year contract with United Utilities to transform the company's ICT estate. This includes designing and building a fibre optic network between its existing data centre in Warrington and a new site in Manchester, which is set to open mid-2014. Fujitsu will manage and maintain the network on a 24/7 basis, providing engineering capability on site. United Utilities provides water and sewerage services to approximately seven million people in the North West of England.	Moderate: Although no financial details have been released, this is clearly a significant win for Fujitsu with one of the UK's largest utilities providers. It is also a boost for Fujitsu as it continues to try to occupy more of the traditional telco space in the UK alongside its core SI strengths.
Contract Win – PSN-type Network		
Udata	Udata has won a GBP 1.2 million, five-year contract with the East Coast & Hertfordshire Control Room Consortium (ECHCRC), a group of four fire and rescue (FRSs) services from Hertfordshire, Humberside, Lincolnshire and Norfolk, to design and manage a new shared WAN, connecting the Consortium's four emergency control rooms. Udata will also provide perimeter security, remote access and application security services.	Moderate: Consolidation of emergency services control rooms is a relatively niche market, but one that has delivered contract wins for providers such as Kcom and Udata. Udata continues to be one of the emerging stars of the PSN era, and this is another respectable win, as well as a win that underlines its security credentials in the regional public sector space.

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Customer Win – PSN-type Network		
Virgin Media Business	Virgin Media Business (VMB) has been chosen as the preferred supplier for the West Midlands Public Services Network (WMPSN). WMPSN is a collaboration of public service bodies to procure and run PSN-compliant network across the region, as part of the UK government's PSN programme. Procurement on behalf of WMPSN has been led by Solihull Council. The partnership also includes Warwickshire County Council, Birmingham City Council and Worcestershire County Council. Other members of the programme board include West Midlands Police, Herefordshire County Council and the Black Country Local Authorities.	High: 2013 has been a relatively slow year for VMB in terms of reference customer wins in the public sector, its most important vertical for B2B revenues. This is also a significant win as it covers, in Birmingham, the UK's largest council and its largest city outside London. It is also valuable to VMB as it covers large urban, suburban and rural areas.

UK Public Sector Services Market Review: Q2 2013

Service Provider	Description	Market Impact
Customer Win – Network		
MDNX	MDNX has been awarded a contract to provide a data network for Your Housing Group covering 60 sites across the UK. The contract was awarded through the PSN Connectivity Framework Agreement.	Low: MDNX is presenting its Your Housing Group win as a strong example of its integration capabilities. The contract involves managing connectivity from TalkTalk Business, BT, Virgin Media and Exponential-e.
Customer Win – Network		
MDNX	MDNX has won a contract with Wales and West Utilities, to provide an integrated wide area network with connectivity across 22 offices and 1,500 telemetry sites across Wales and southwest England. The network will deliver speeds of up to 100 Mbps to its head office in Newport, South Wales, and offices across the region.	Low: MDNX's win with Wales and West Utilities is a useful reference with a large utility provider. The deal involves managing a large number of connections and covers around one-sixth of the UK's geographic area. This and the Your Housing Group win are also further evidence of MDNX's traction in the public sector space.

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Customer Win – PSN-type Network		
Updata	Updata has been selected to provide managed network services for Bolton and Wigan Councils. The network is part of a GBP 47 million ICT project including WAN, LAN, telephony, service desk, application support, desktop services and Bolton's CRM tool, Lagan. The primary contract was awarded to Agilisys, as part of a PSN-type shared services arrangement between the two authorities, with Updata's network services selected by Agilisys.	Moderate: In Q1 2013, Update secured a contract with another Greater Manchester authority, Tameside Council, and highlighted that it is working with other Association of Greater Manchester Authorities (AGMA) members with the intention of creating a single PSN style interconnected network for the whole of the Greater Manchester region. Working under a partner such as Agilisys makes sense for a network-focused provider such as Updata. With Wigan and Bolton on board, the provider now has three of the ten Greater Manchester councils signed up to its vision of a PSN for Greater Manchester. The provider will gain a significant reputation boost from the progress it has made in the region, and can now claim that it is involved in one the largest PSN-type projects outside London.

UK Public Sector Services Market Review: Q1 2013

Service Provider	Description	Market Impact
Customer Win – IP VPN		
Level 3	Level 3 has won a contract with the NATO Communications and Information Agency (NCIA) to install and maintain an IP VPN to be used by the NATO-Russia Council Cooperative Airspace Initiative. The system will provide 24/7 real-time monitoring of commercial airspace activities.	Moderate: Whilst this is not by any means a UK specific win, as Level 3 gears up in its attempts to take a larger share of the UK government's ICT spend, it is a very useful reference win for Level 3. The NATO name carries a lot of weight when it comes to reliability and security – a point that is particularly important to Level 3 as it seeks to build on its strengths in areas such as justice and the UK's police services.
Customer Win		
Level 3	Level 3 has won a four year contract with the UK Forestry Commission for data and voice network, collaboration and broadband services. Level 3 has stated that the Commission's ICT spend will be reduced by around 35% to GBP 1.3 million annually. The contract has been awarded under the Managed Telecommunications Convergence Framework (MTCF).	Low: Level 3 has provided services to the Forestry Commission since 2005, so this is not a new customer win for Level 3. However, it is an expansion of the relationship which is a positive reference for Level 3. The disparate nature of the Commission's activities also allows Level 3 to highlight that it is a national public sector provider, not just London centric. Level 3 can also point to its use of collaboration tools such as audio, web and video conferencing as part of its flexible working solutions that are driving efficiency savings for the Commission.

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Customer Win – Network		
MDNX	<p>MDNX has been awarded a seven year, GBP 14 million contract with Brighton and East Sussex Councils to provide managed integration services for the region’s ‘LINK’ PSN network. MDNX will build and manage a 10 Gbps MPLS network for LINK as well as providing and supporting wireless and 4G access. In total, LINK will connect more than 100 local public sector bodies including the two councils, schools and local emergency services as well as various local health organisations. More local councils and organisations are expected to join LINK which could take the total contract value up to as much as GBP 30 million.</p>	<p>Moderate: MDNX’s contract win with Brighton and East Sussex Councils is a major reference customer for the integrator and marks MDNX out as a serious competitor in the UK local public sector market. MDNX has adapted well to the PSN programme and is becoming a more common fixture on the later stages of procurement processes for large deals beyond its traditional market of relatively modest deals for single, small to medium sized, public sector bodies.</p>
Customer Win – WAN		
Udata	<p>Udata has won a contract to provide a ‘PSN ready’ WAN for Tameside Metropolitan Borough Council (MBC) – one the Greater Manchester Authorities. The new network will provide connectivity for around one hundred corporate sites council offices and libraries.</p>	<p>Moderate: This contract is a sign of the genuine momentum that Udata is generating in the local government sector, following on from Udata’s GBP 81 million deal with Essex County Council in December 2012. Udata’s deal with Tameside MBC contract also has significant potential for expansion. Tameside is one of the ten Greater Manchester councils that, along with the Greater Manchester Transport, Police, Fire and Waste authorities, form the Association of Greater Manchester Authorities (AGMA) covering an area of around 2.4 million residents. Udata already provides services with Rochdale MBC and it is talks with other AGMA authorities about developing a PSN type shared services infrastructure.</p>