Promoting competition and investment in fibre networks: Wholesale Fixed Telecoms Market Review 2021-26

Volume 2: Market assessment

Non-confidential version – redacted for publication [✂]

Contents

1. Introduction

1.1   In this volume we set out our product market definition, geographic market definition and significant market power (SMP) analysis for the markets we are reviewing. These markets are:

- Physical infrastructure.
- Wholesale (network) markets:

    – Wholesale local access (WLA);
    – Leased lines access (LL Access); and
    – Inter-exchange connectivity (IEC).

- Downstream (services) markets:

    – Wholesale fixed analogue exchange lines (WFAEL), wholesale integrated services digital network (ISDN)2 and ISDN30; and
    – Wholesale broadband access (WBA).

1.2   Where we provisionally find an undertaking has SMP, we propose remedies in Volumes 3 and 4.

1.3   Below we set out our overall approach in this review and why we consider it is important to consider multiple markets together.

Residential and business services included in this review

1.4   In this review we are considering telecoms services provided at a fixed location. These locations include residential and business premises. The main retail services delivered include:

- For residential customers:

    – telephony;
    – broadband; and
    – TV.

- For business customers:

    – telephony;
    – broadband, often in variants suited to businesses; and
    – managed high capacity services based on dedicated access and end-to-end connections.

1.5   Retail services provided at residential locations are provided over a local access network which may use different technologies: copper wires, a mix of copper and fibre cables, a completely fibre connection or coaxial cable. We call these connections 'local access'.

1.6   Retail services provided to business customers may be provided over the same local access infrastructure as for residential premises or may use a dedicated fibre connection known as a 'leased line'.

1.7   Larger businesses may rely more on leased lines, with Small and Medium sized Enterprises (SMEs) using more local access connectivity, although this will depend on the requirements of the business. For example, a large business with many sites may use a mix of leased lines and local access connections.

1.8   Leased lines are also used in some other circumstances – to provide connections to mobile network base stations, to provide connections to data centres[1] and as part of operators' networks (especially to provide 'backhaul' connections between BT exchanges and other operators' network locations).

1.9   Telecoms services provided to customers whilst on the move are not part of this review. However, wireless connections (using mobile, satellite or fixed wireless technology) may also be used to deliver some retail services at a fixed location (for example to deliver telephony and to provide broadband connections for some residential customers) and we, therefore, take these into account where relevant in this review.

Markets we are reviewing

1.10   In this review we are considering the wholesale markets that support retail telecoms services provided at fixed locations.

1.11   Figure 1.1 illustrates the value chain for these services.

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[1] Data centres are secure buildings that house computing facilities for cloud-based services such as data storage, application hosting, and data processing. They typically house network nodes which can include core and backhaul aggregation and traffic routing functionality as well as being used for interconnection to other networks.

Figure 1.1: Value chain for fixed telecoms retail services
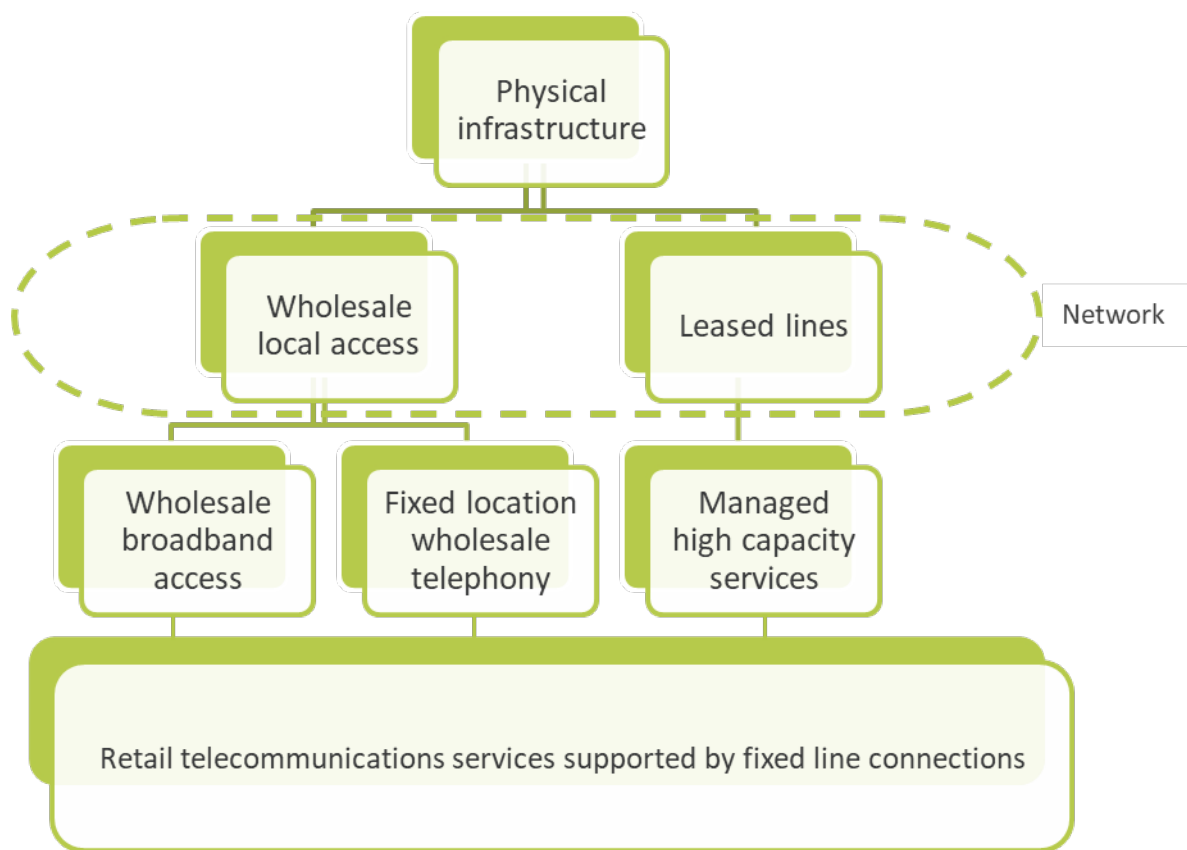
1.12   We have previously undertaken a series of separate reviews to consider many of these services:

- Physical infrastructure market review (PIMR), last review published 28 June 2019 (the 2019 PIMR Statement)[2];
- Wholesale local access market review (WLA), last review published 28 March 2018 (the 2018 WLA Statement)[3];
- Business connectivity market review (BCMR), last review published 28 June 2019 (the 2019 BCMR Statement)[4];
- Wholesale broadband access market review (WBA), last review published 31 July 2018 (the 2018 WBA Statement)[5]; and
- Narrowband market review (NMR), last review published 30 November 2017 (the 2017 NMR Statement).[6]

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[2] Ofcom, 2019. *Promoting competition and investment in fibre networks: review of the physical infrastructure and business connectivity markets. Volume 1: market analysis, SMP findings, and remedies for the Physical Infrastructure Market Review (PIMR).* Statement.
[3] Ofcom, 2018. *Wholesale Local Access Market Review: Statement.*
[4] Ofcom, 2019. *Promoting competition and investment in fibre networks: review of the physical infrastructure and business connectivity markets. Volume 2: market analysis, SMP findings, and remedies for the Business Connectivity Market Review (BCMR).* Statement.
[5] Ofcom, 2018. *Wholesale Broadband Access Market Review 2018.* Final Statement.
[6] Ofcom, 2017. *Narrowband Market Review: Statement.*

1.13   This review encompasses all of the markets previously considered in the PIMR, WLA, BCMR and WBA reviews. It also covers those narrowband markets that are concerned with local access – WFAEL, ISDN2 and ISDN30 exchange lines.[7]

1.14   There is now significant investment in deploying new networks which will deliver better services such as ultrafast broadband to consumers. We refer to these high capacity networks as fibre networks in this consultation. As set out in Volume 1, our strategy is to secure this investment – by both BT and other providers – by promoting network-based competition.

1.15   Different network builders will take different approaches to where and how they deploy their networks and the services that they provide. However, the general picture is that there is the potential for new competing networks to be deployed in large parts of the UK. Moreover, these networks are expected to support a wide-range of services, straddling product groups that we have previously analysed largely separately. Given this, it is important for us to take a holistic view across these services. We, therefore, consider it appropriate to undertake a combined review of the wholesale markets to ensure a consistent approach to regulation.

Our approach to this review

1.16   Competition in fixed telecoms services is primarily driven by the number of networks available to provide these services. In the period covered by this review, we expect investment in networks that will bring benefits to consumers in the form of better services and greater competition.

1.17   While we are already seeing network investment, the potential for investment in the future is greater than it has been previously because:

- the demand for broadband services continues to increase, in terms of higher speeds, greater capacity and improved quality, offering new opportunities and sources of competitive advantage to new fibre networks; and
- the economics of building new networks have improved, with the development of new deployment techniques and better access to existing infrastructure.

1.18   Some network builders may choose to build networks that are targeted at a specific group of customers, for example, a leased lines only network targeted at large businesses. These types of network tend to be very limited in their geographic availability, i.e. only available in areas where there is a concentration of large businesses. We identified and assessed these networks in our previous BCMRs.

1.19   Other network builders may choose to build networks that cover both business and residential customers. These types of network tend to have a larger geographic availability and provide a wider range of services, i.e. leased lines and broadband, and we refer to

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[7] We will consider the other markets within the NMR – wholesale call origination and wholesale fixed call termination separately, along with interconnection.

these as 'multi-service networks' (MSNs). The two largest networks in the UK, BT and Virgin Media, are MSNs and we assessed these in our previous WLAs and BCMRs.

1.20   Going forward the new networks being built could be either service-specific networks or MSNs.

1.21   A key focus of our review is to consider the coverage and capability of existing networks and to take into account the potential for deployment of new networks and extensions to existing ones.

Current networks and developments over this market review period

1.22   Currently the two main networks providing services to residential and business customers across large parts of the UK are BT (operated by Openreach[8]) and Virgin Media. These networks also provide leased lines and so are MSNs. We explain how BT's and Virgin Media's networks are deployed and operated in Annex 7.

1.23   Other networks currently deployed in the UK tend not to be MSNs:

- Providers targeting large businesses tend to only supply leased lines, and their networks are focussed in areas with high density of business such as large city centres. In the 2019 BCMR Statement, we identified a number of areas with multiple leased lines networks – central London (the Central London Area – CLA) and areas we called High Network Reach areas (HNRs). BT and Virgin Media are also competitors in these areas along with leased lines only networks.
- Some providers only provide residential services (often they provide only a broadband service but not a telephony service). These networks tend to be focussed on specific geographic areas (often rural areas) and/or specific customer segments, such as residents in multi-dwelling units (MDUs) such as apartment blocks.

1.24   There is now significant activity in deploying new networks, or expanding existing networks, in the UK.

1.25   Openreach is upgrading its network. Its network currently largely supports superfast broadband services using fibre-to-the-cabinet (FTTC) technology. However, it has also been deploying G.fast and fibre-to-the-premises (FTTP).[9] It covers approximately four million premises with G.fast and FTTP allowing it to supply ultrafast services to these premises.[10] It plans to extend its FTTP footprint to 15 million premises by the mid-2020s.[11]

1.26   There are several other significant deployments underway. These include the following MSN roll-out:

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[8] Openreach is the line of business of BT which comprises BT's access and backhaul network assets and the products and services provided using those assets and which Openreach Limited, a wholly owned subsidiary of BT plc, has responsibility for operating and managing on behalf of BT.

[9] Annex 6 explains FTTC, G.fast and FTTP technology.

[10] BT Q2 2019-2020 results [accessed 28 November 2019]. KPIs report 2.4 million G.fast premises and 1.8 million FTTP premises.

[11] See BT's news release of 9 May 2019 [accessed 29 November 2019].

Table 1.2: Current MSN coverage of premises passed (excluding BT) and roll-out plans

MSN	Current coverage	Total planned coverage at 2025
Virgin Media	14.7 million[12]	17 million[13]
CityFibre	0.1 million[14]	5 million[15]
FibreNation[16]	0.04 million[17]	3 million[18]

Source: See footnotes.

1.27 In addition, there are developments focussed on providing broadband only services.[19] We provide more background on these deployments in Annex 7.

1.28 These potential deployments rely to differing extents on:

- **Access to existing telecoms physical infrastructure.** Access to BT's national network of ducts and poles has been available for deployments to provide WLA services since 2010, and unrestricted use was made available by regulation in the 2019 PIMR Statement. Network builders are working with Openreach to develop the physical infrastructure products and a number of the above deployments assume use of access to BT's ducts and poles to make the business case economic:

  - Access to BT's poles could significantly reduce the cost and disruption of providing final connections to customers, as well as allowing connections to be provided more quickly.
  - Access to BT's ducts in the spine network allows network builders to extend their roll-outs into areas they would not otherwise cover by allowing them to connect remote access deployments via the BT ducts back to BT exchanges where services can be picked up by a range of providers.
  - Access to BT's ducts also allows network builders to provide their own end-to-end fibre without significant civil dig costs.

- **Ability to sell wholesale access to retailers.** For example, Sky and TalkTalk have strong brands and/or existing customer bases that can be moved to and/or upsold services on the new network. These retailers have often built this base using existing regulation in the WLA and business connectivity markets. This is particularly important for

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[12] Virgin Media reports 15.7 million premises passed in UK and Ireland, and c. 1 million premises passed in Ireland. Virgin Media website: https://www.virginmedia.com/corporate/investors-overview, Liberty Global Ireland website: https://www.libertyglobal.com/operation/ireland/ [both accessed 21 November 2019].

[13] Initial Project Lightning announcement of build to 2020. https://www.virginmedia.com/corporate/media-centre/press-releases/virgin-media-and-liberty-global-announce-largest-investment-in-uks-internet-infrastructure-for-more-than-a-decade [accessed 29 November 2019].

[14] https://www.thinkbroadband.com/news/8578-cityfibre-fttp-footprint-passes-100-000-premises-mark [accessed 10 December 2019].

[15] https://www.cityfibre.com/network/ [accessed 10 December 2019].

[16] FibreNation is a company set up by TalkTalk to deploy fibre broadband networks.

[17] https://fibrenation.co.uk/news/fibrenation-and-makehappen-forge-multi-million-pound-partnership-for-uk-wide-fibre-rollout [accessed 10 December 2019].

[18] https://fibrenation.co.uk/about-us/ [accessed 10 December 2019].

[19] These include roll-outs by Hyperoptic, Gigaclear, B4RN, Community Fibre, Zzoomm, Toob, Trooli, Jurassic Fibre and Axione.

deployments covering a significant geographic scale, as is the case for several MSN deployments.

1.29   We also expect access to BT's ducts will support expansion of leased lines only networks. This could be to extend the distance over which they build customer-specific connections, to proactively extend existing network (either to cover a greater area or to have denser network within the existing footprint) or to build into completely new areas. Regulated access to ducts in order to expand leased lines networks was only made available very recently and leased lines providers are still considering how they expect to use it.

Our approach to the review given the potential for network roll-out

Physical infrastructure

1.30   Physical infrastructure is a key component of network build. Whilst network builders can build their own physical infrastructure, as outlined above, a number of telecoms providers assume access to existing telecoms physical infrastructure owned by BT as a significant element of their build plans.

1.31   Therefore, we start with considering the physical infrastructure market.

Consideration of network markets downstream of physical infrastructure

1.32   In the period of this review, it is important that we recognise the potential for network investment and roll-out. Network investment will ultimately lead to consumers having access to greater choice of providers and/or better services.

1.33   We want to support investment and network competition, whether in networks that support only one service or in MSNs that provide a range of services for residential and business customers. As explained above, much of the deployment that will have significant coverage (both geographically and in terms of numbers of consumers that could be served) is likely to be by MSNs, which will supply the full range of services and will compete across the various downstream markets. As such, it is important that our approach to regulation of particular services takes account of the impact that this may have on investment and competition in other services.

1.34   We have previously considered the markets downstream of physical infrastructure separately for WLA and leased lines. We have also considered access connectivity separately from backhaul connectivity. As such we have considered three markets: WLA, LL Access (in the Contemporary Interface (CI) access market in the 2019 BCMR Statement) and backhaul in the CI inter-exchange connectivity market (CI IEC).

1.35   The investment in MSNs could mean that the same networks compete to supply all services in any given geographic area. This could result in the extent of competition in an area being driven by the number of MSNs, with the competitive dynamics being similar for each of the services. In this case, considering a single market for networks – rather than separate markets for services supported on those networks - could be appropriate.

1.36   We think these conditions could well develop during the period of this review so that in future reviews there could be a strong case for considering a single product market for networks.

1.37   One way to anticipate the developments we expect during this review would be to consider a single product market encompassing all of these services.

1.38   However:

- we currently see geographic areas where there is different competition in the different services;
- network investment is at an early stage and so the business models may evolve over time; and
- some network deployments are focussed on only one of the services in scope, for example deployment of leased lines only networks using any PIA remedy we impose as result of this review.

1.39   As such, for this review, to allow us to take account of these factors, we continue to base our formal market analysis on separate product markets (WLA, LL Access and IEC). However, when considering our remedies, and especially in respect of our strategy of promoting competition and investment in new networks, we take into account the impact that MSN roll-out will have across all of these markets, to ensure that our objectives are best met.

1.40   As the extent of network roll-out will vary across the country, a central issue in our approach to geographic market analysis is to differentiate areas where there is good potential for new competition and geographic areas where there is limited potential. We base our analysis on the existing and planned MSN roll-out, giving a consistent view across WLA and leased lines.

1.41   In addition, we go on to consider whether there are some geographic localities where competition from service specific networks is particularly strong (which is currently largely related to existing leased lines only networks in central London and the HNRs).

Markets for wholesale broadband access and wholesale exchange lines services

1.42   As part of this review we have also reviewed the markets for WBA, WFAEL, ISDN2 and ISDN30. Given the changes to the markets since we last reviewed them and also prospective changes in how voice services are going to be offered in the future, we are proposing to deregulate them on the grounds that they are no longer markets susceptible for *ex ante* regulation.

Wholesale broadband access (WBA)

1.43   The WBA market sits between the WLA market and retail services. BT market power in this market has been progressively diminishing for many years due to the success of our regulation in the WLA market.

1.44   By the time of our last review in July 2018[20], we found that BT had SMP in the provision of WBA services to less than 1% of UK premises excluding the Hull Area (Market A), with no operator having market power in the rest of the UK excluding the Hull Area (Market B).[21]

1.45   We imposed a limited set of access remedies in Market A recognising the small size of the market and limited degree to which further wholesale regulation was likely to improve competition in Market A.

1.46   In this review we have considered whether we should still identify a WBA market and regulate it. Our assessment is that the number of premises without access to competitive provision of broadband services will continue to diminish throughout the period, due to a combination of commercial and government aided investments and that the market is no longer suitable for regulation, nor would regulation offer any benefit to consumers.

Wholesale fixed analogue exchange lines (WFAEL)

1.47   In our 2017 NMR Statement we defined the relevant product market as the market for the provision of WFAEL. This market included the provision by means of traditional copper voice access lines, cable access lines, full local loop unbundled access lines or FTTP deployments using voice over broadband.

1.48   We found that BT continued to have SMP in the provision of these services, though we noted that the degree of market power had significantly reduced and we anticipated that future reviews might find the market to be fully competitive. In response to this conclusion of diminished market power we decided to continue to regulate the provision of wholesale line rental (WLR) services by BT (supplied by Openreach), but we did not impose a charge control as we had done in previous reviews.

1.49   Since the 2017 NMR Statement, Openreach has consulted on its plans to withdraw WLR products and transition to IP voice services by the end of 2025. This will mean that Openreach will no longer provide voice services in this market.

1.50   This means that from 2025 BT will no longer be in a position to assert market power in this market.

1.51   We are reviewing the WLA market as explained above. Any regulation arising in this market ensures that there is no barrier to the provision of broadband lines, we consider that there no longer remains specific barriers to the provision of voice services that we need to address with regulation in this market. Accordingly, we propose to remove all regulation of the market.

1.52   Openreach has, however, made a voluntary commitment to continue to support WLR lines on the same commercial basis and quality of service for all customers wishing to continue to use them until their full withdrawal in 2025. Further, it has committed to providing a

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[20] 2018 WBA Statement.
[21] We separately found that KCOM had SMP in the Hull Area in July 2018. See Ofcom, 2018. *Wholesale Local Access and Wholesale Broadband Access Market Reviews. Review of competition in the Hull Area.* Statement. We will consider this geographic market again with the rest of the Hull Area markets in a separate review.

narrow (500Kbit/s) broadband service on its fibre lines to support voice only services in the future.

Integrated services digital network (ISDN)

1.53   In our 2017 NMR Statement we defined separate product markets for ISDN2 and ISDN30 lines. We concluded that BT had SMP in these markets. However, we observed a trend that the volume of ISDN2 and ISDN30 lines was continuing to decline steadily over time and so imposed a limited set of remedies including a charge control[22] only on existing but not new ISDN2 and ISDN30 lines.

1.54   Since the 2017 NMR Statement, Openreach has consulted on its plans to switch off the public switched telephone network (PSTN) and transition lines that are reliant on the PSTN, including ISDN2 and ISDN30, to Internet Protocol (IP)-based services by the end of 2025. This will mean that Openreach customers who use ISDN2 or ISDN30 will need to migrate to an IP-based service.

1.55   Accordingly, as with the WFAEL market, we expect that all of the remaining Openreach ISDN2 and ISDN30 volumes will migrate towards IP-based services, over the review period. As this migration progresses and the number of end users using IP-based services increases, the market will tend towards effective competition and continuing regulation of the market is no longer justified and we propose to remove it.

1.56   Openreach has, however, made a voluntary commitment to continue to support ISDN lines on the same commercial basis and quality of service for all customers wishing to continue to use them until their full withdrawal in 2025.

Structure of the rest of this volume

1.57   The rest of this volume is structured as follows:

- Section 2 sets out our view of the retail markets;
- Section 3 contains our proposals for product market definition in the physical infrastructure market;
- Section 4 contains our proposals for geographic market definition and three criteria test in the physical infrastructure market;
- Section 5 contains our proposals for SMP analysis in the physical infrastructure market;
- Section 6 contains our proposals for product market definition in the wholesale network services markets downstream of physical infrastructure;
- Section 7 contains our proposals for geographic market definition in the wholesale network services markets downstream of physical infrastructure, and the three criteria test for the inter-exchange connectivity markets;
- Section 8 contains our proposals for SMP analysis in the wholesale network services markets downstream of physical infrastructure;

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[22] The charge control limits price increases to the Consumer Price Index.

- Section 9 contains our proposals with respect to the market definition and three criteria test for wholesale fixed analogue exchange lines, ISDN2 and ISDN30; and
- Section 10 contains our proposals with respect to the market definition and three criteria test for wholesale broadband access.

2. Retail markets

2.1   In this section we set out background information on the retail markets for the provision of broadband and leased lines services. This covers:

   a) For broadband services:

   i)   Brief description of residential and business broadband products;

   ii) Current and forecast volumes and market shares;

   iii) Analysis of the drivers of the take-up of higher speed services and of recent trends in the use of data;

   iv) Analysis of retail broadband pricing for fixed and mobile services; and

   v)   Survey and other information on consumer preferences and behaviour.

   b) For leased lines services:

   i)   Brief description of leased lines products and customers; and

   ii) Discussion of current and future usage of leased lines services.

Retail broadband

Retail broadband products

2.2   Figure 2.1 below shows that a large majority of consumers now take broadband as part of a bundle of services. Our consumer research shows that, in 2019, 80% of UK adults took a bundle of services, the majority of which include broadband, with 37% taking landline and broadband in a bundle with Pay TV. Looking ahead, we expect that a large majority of businesses and homes will continue to take broadband as part of a bundle of services. We focus in this review on the provision of broadband services. Broadband services are typically purchased as a part of a bundle of services, and the features of the broadband service are important in driving customer choice.

Figure 2.1: Bundling of retail broadband, voice, mobile and TV services[23]
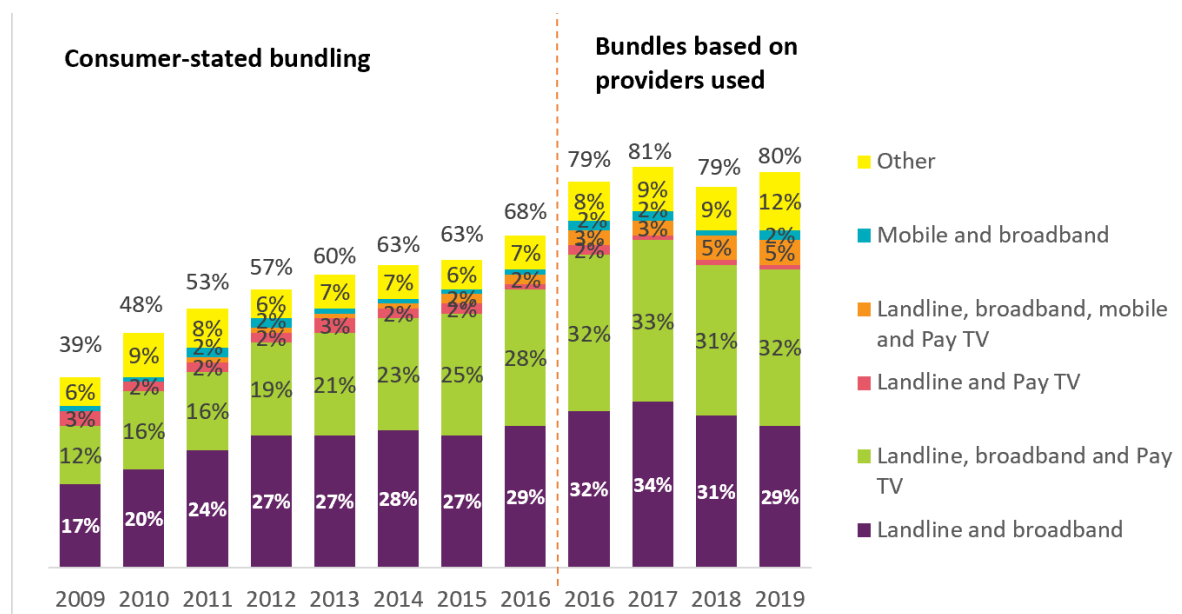
Source: Ofcom Technology Tracker, data as at H1 2009-2019.[24]

"Other" includes a number of different bundle combinations: broadband and pay tv; landline, mobile and broadband; landline and mobile; mobile, broadband and Pay TV; landline, mobile and Pay TV; and mobile and Pay TV.

2.3   All internet service providers (ISPs) offer a range of residential products differentiated on the services included, choice of headline broadband speeds and performance. There may also be differences in contract length (most common contract lengths being 12, 18 or 24 months) and the availability of discounts or other offers (for example, reward cards and affiliate vouchers).[25] This differentiation of packages and speeds offered is accompanied by a range of different price points.

2.4   Some of the ISPs providing residential services also offer a range of broadband packages targeted at business users. There are also a large number of smaller ISPs who are specialist providers of business broadband services.[26] These products typically offer a range of additional features (compared with residential broadband products) such as increased

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[23] The methodology was revised in 2016 to report the proportion of UK adults purchasing multiple services from a single provider, based on the stated main provider used for each service. Previously, the data related to the proportion of customers self-reporting a 'bundle' of services. Analysis from 2016 onward now also includes those who pay line rental in addition to their broadband service as a bundle.

[24] Respondents were asked QG1 'Do you receive more than one of these services as part of an overall deal or package from the same supplier?' / Q. Do you receive a discount or special deal for subscribing to this package of services? (latter question used for consumer-stated bundling figures). Base: All adults 16+ (2009, 6090) (2010, 9013) (2011, 3474) (2012, 3772) (2013, 3750) (2014, 3740) (2015, 3756) (2016, 3737) (2017, 3743) (2018, 3730) (2019, 3909). Base excludes those who do not know the provider for one or more services.

[25] See: [✂] response dated [✂] to the s.135 notice dated [✂], [✂]; and [✂] response dated [✂] to the s.135 notice dated [✂], [✂].

[26] Ofcom, 2015. *Broadband Services for SMEs: Assessment and Action Plan*, paragraph 5.11.

customer support and higher service standards.[27] Products may also be tailored to the needs of different types and size of organisation.[28] However, around 30% of SMEs subscribe to residential broadband products.[29]

Retail service providers and market shares

2.5   The vast majority of residential and businesses customers buy services from BT (across its main BT brand and the other brands it owns – EE and Plusnet), Virgin Media, TalkTalk, Sky or Vodafone. More recently, several new network operators such as Hyperoptic and Gigaclear have entered the market as vertically integrated providers offering fibre services to homes and businesses.

2.6   Table 2.2 provides estimates of the share of active retail market broadband connections in the UK in 2018, by retail ISP. This shows that BT, Virgin Media, TalkTalk and Sky, taken together, accounted for the vast majority (89% share) of retail broadband connections.

Table 2.2: Retail shares of different ISPs in 2018

ISPs	Share of broadband connections (%)
BT	35
Sky	23
Virgin Media	20
TalkTalk	11
Others	11

Source: Ofcom, Communications Market Report 2019: Interactive Data, Telecoms industry: Fixed, Lines and connections, Fixed broadband connections by ISP (%) (page 16, accessed 11 December 2019)
Note: BT includes Plusnet and EE. The share of 'others' includes Gigaclear, Hyperoptic and Vodafone.

Broadband connections by speeds

2.7   Broadband connections can be grouped into three broad categories of download speeds as follows:

   a)   standard broadband (SBB): download speeds of up to 30Mbit/s;

   b)   superfast broadband (SFBB): download speeds from 30Mbit/s up to 300Mbit/s; and

   c)   ultrafast broadband (UFBB): download speeds of 300Mbit/s and above.

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[27] Other examples of additional features include cloud apps (e.g. Office 365 or Dropbox), static IP addresses and faster upload speeds.
[28] For example, Virgin Media offers products for Small (1-20 people), Medium (20-250 people) and Enterprise (250+) businesses, the public sector and for partners. See https://www.virginmediabusiness.co.uk/connectivity/internet-access/business-broadband/?CMP=ext_b2c_bb_mnu?CMP=ext_b2c_bb_mnu [accessed 14 November 2019].
[29] Ofcom, January 2017. *The SME experience of communications services: research report*.

2.8   As of September 2018, nearly all UK premises had access to SBB, 95% of premises had access to SFBB and over half had access to UFBB speeds (largely as a result of Virgin Media up-grading its network to offer 300+ Mbit/s broadband services).[30]

2.9   Figure 2.3 shows an analysis of connections by advertised broadband speeds over the period of 2013 to 2018. This shows that in 2018 around a third of residential broadband customers subscribed to SBB products (i.e. those with an advertised speed of <30Mbit/s) and around two thirds to SFBB products (i.e. those with an advertised speed of ≥30Mbit/s and <300Mbit/s).

Figure 2.3: UK residential broadband connections, by advertised speed: 2013 to 2018[31]
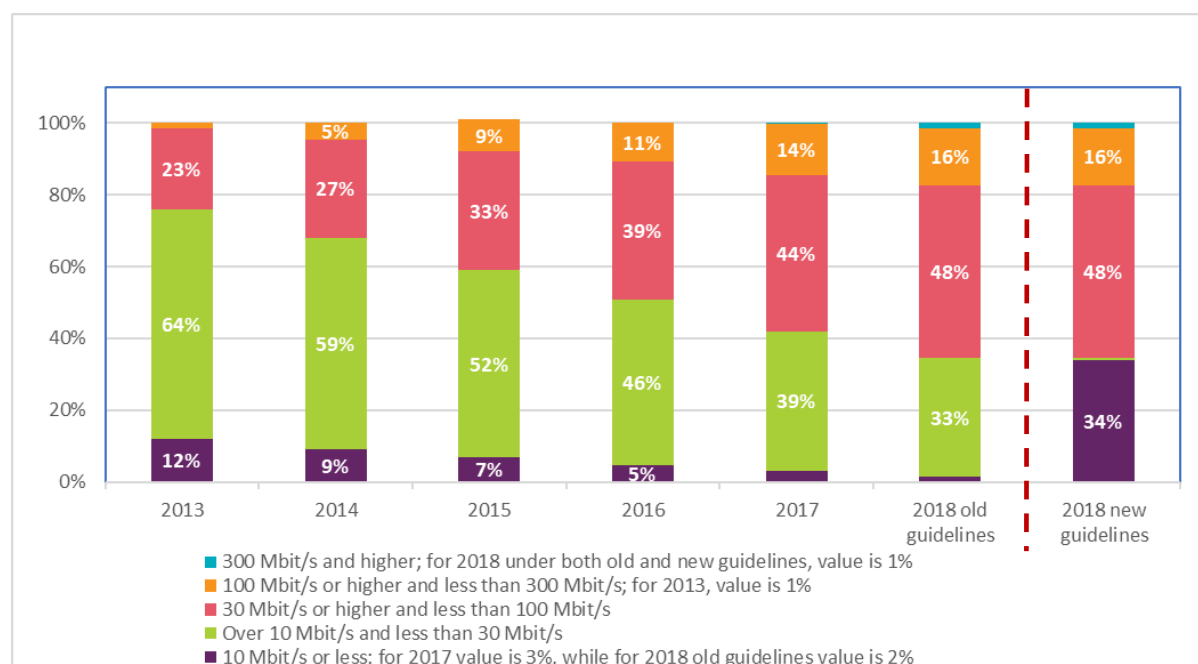

Source: Ofcom, November 2018. UK fixed-line broadband performance – Research Report, page 10.

2.10   Figure 2.4 below shows results of an indicative forward-looking analysis of connections by broadband speeds based on data provided by network operators (see Annex 9 for further details on sources of information and calculations). This shows the number of SBB connections falling from around a third of connections today to less than 5% by end 2025. This is associated with an increase in the number of subscriptions to both SFBB and UFBB services. By end 2025, network operators expect that around 1-in-5 connections will be an UFBB service.

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[30] Ofcom, 2019. *Connected Nations Update*.

[31] There has been a shift in guidelines with regards to use of speeds in broadband advertising. Whereas the old rules said the advertised speeds should be based on the maximum speeds received by the top 10% of people on a package, the new rules say that they have to be received by half of customers at busy times. This meant that the advertised speeds for copper-based services (i.e. ADSL and FTTC) changed, and the chart shows the advertised speeds for most ADSL2+ services falling from 14-16Mbit/s to 10Mbit/s. Other changes did not affect the chart.

Figure 2.4: Forecast UK network connections, by speed: 2019-2025
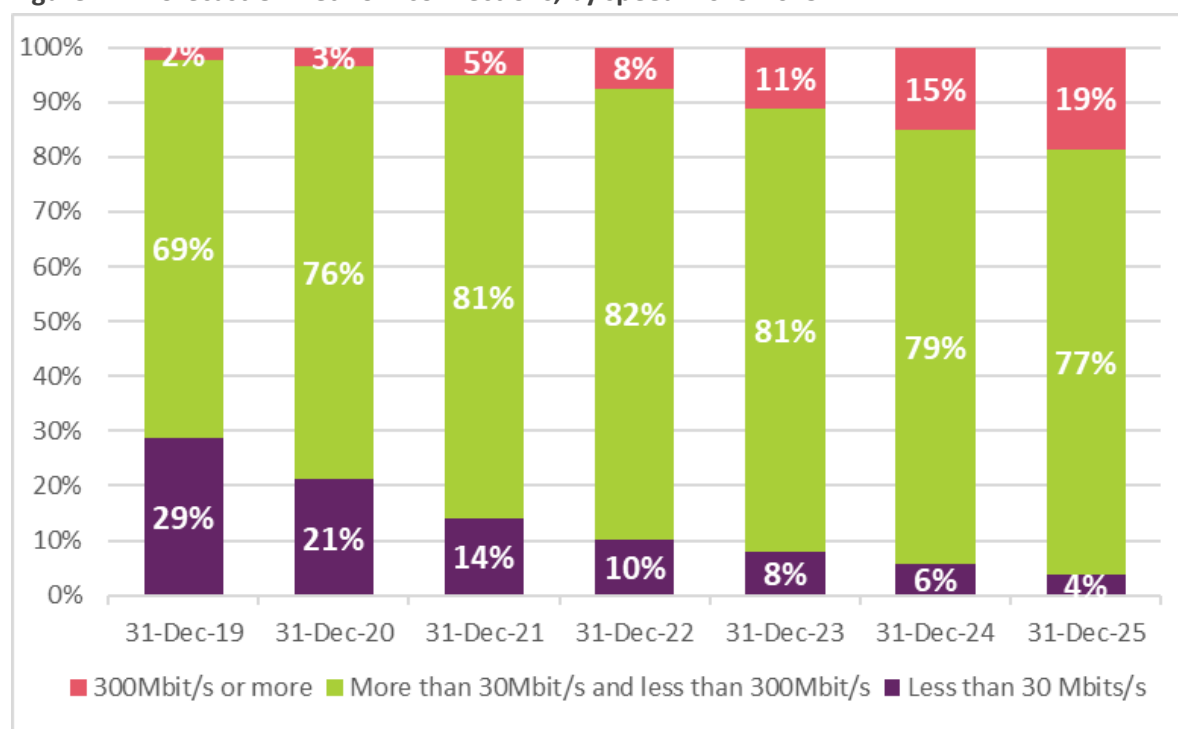
Source: Ofcom forecast based on information provided by relevant parties. [32]

2.11   Table 2.5 shows an analysis of BT, TalkTalk, Sky and Virgin Media customers, in June 2019, by advertised broadband speeds. This shows that there are material differences in the take-up of SFBB services. Statements in internal documents suggest that all ISPs expect the trend in the take-up of higher speed services to continue.[33]

Table 2.5: Customers by different broadband speeds – BT, Sky, TalkTalk and Virgin Media

Broadband speed	Take-up (in %) as of June 2019			
	BT	**Sky**	**TalkTalk**	**Virgin Media**
SBB	[✂]	[✂]	[✂]	[✂]
SFBB	[✂]	[✂]	[✂]	[✂]
UFBB	[✂]	[✂]	[✂]	[✂]

Source: Ofcom estimates based on operator take-up data.

2.12   We asked ISPs to provide information on the volume of people moving to higher and lower speeds (referred to as upgrading and downgrading) excluding supplier-led moves. While

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[32] [✂] response to the s.135 notice dated [✂]; [✂] response to the s.135 notice dated [✂]; [✂] response to the s.135 notice dated [✂]; [✂] response to the s.135 notice dated [✂]; [✂] response to the s.135 notice dated [✂]; [✂] response to the s.135 notice dated [✂]; [✂] response to the s.135 notice dated [✂]; [✂] response to the s.135 notice dated [✂]; [✂] response to the s.135 notice dated [✂]; [✂] response to the s.135 notice dated [✂].

[33] [✂] report that its residential customer mix has trended towards higher speed packages over 2013-19. See [✂] response dated [✂] to the s.135 notice dated [✂], [✂], page 27; and [✂] report an increase in the proportion of its customers taking fibre services from 2015 onwards and forecast that this will continue to increase in the coming years. See [✂] response dated [✂] to the s.135 notice dated [✂], [✂].

the data only captures customers changing speed with the same provider (i.e. it excludes those changing speed when switching provider), the information provided indicates more upgrades than downgrades (as expected when the market is generally moving towards higher speeds). We cannot fully establish the extent to which upgrades were driven directly by the ISP (for example through forced migration or attractive pricing to encourage migration) versus customer-led actions. However, as discussed below, the evidence suggests that a substantial proportion of the upgrading from SBB to SFBB services and from 40/10 to 80/20 based SFBB services, has been the result of supplier-led initiatives to move their existing customers at no extra charge to faster services.

Openreach WLA volumes by speeds

2.13   Figure 2.6 gives a breakdown of Openreach wholesale broadband lines by speed. This shows that the 40/10 service and below[34] accounted for 75% of all Openreach lines in 2017/18 falling to 66% in 2018/19 (if the figures for the 55/10 products are added to the 40/10, the figures are [✂]% to [✂]% respectively[35]). The corresponding volumes for the 80/20 service increased from [✂]% to [✂]% of total Openreach lines.

Figure 2.6: Openreach wholesale broadband lines 2017/18 to 2018/19, in absolute and relative terms

[✂]

Note: the standard broadband values are BT Group financial reports. All other volumes were provided by Openreach in response to an s.135 request.[36]

2.14   We also asked Openreach and the three largest ISPs (BT, Sky and TalkTalk) for their forecasts of volumes by speeds.

2.15   Openreach forecasts that take-up of the FTTC 40/10 service will increase from 20- 30% [✂]% of all Openreach lines by 2019/20 to 35- 40% [✂]% by 2023/24 (adding the 55/10 service these figures are [✂]% and [✂]% respectively). The corresponding figures for higher speed services (80/20 and above) are [✂]% and [✂]% respectively (see Figure 2.7). Therefore, Openreach is forecasting that speeds of 40/10 (55/10) or below will continue to account for the majority of Openreach's sales by 2023/24, notwithstanding Openreach's efforts to move FTTC volumes onto higher speeds (see below for details of Openreach's GEA discount schemes).[37]

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[34] BT's 40/10 FTTC service which provides download speeds of up to 40Mbit/s and upload speeds of up to 10Mbit/s.
[35] 55/10 provides services broadly similar to those of a 40/10 connection. We are not aware of any non-BT ISPs signing new customers up onto the 55/10 product.
[36] Standard broadband values 2017/18 and 2018/19 are from two BT Group financial reports. See: https://www.btplc.com/Sharesandperformance/Financialreportingandnews/Quarterlyresults/2019-2020/Q1/Downloads/KPIs/BTGroup-Q12019-20-KPIs.pdf (for 2017/18 values); and https://www.btplc.com/Sharesandperformance/Financialreportingandnews/Quarterlyresults/2019-2020/Q1/Downloads/KPIs/BTGroup-Q12019-20-KPIs.pdf (for 2018/19 values) [both accessed 29 November 2019]. For all other speed data, see Openreach's response dated [✂] to the s.135 notice dated [✂], response to question 8.
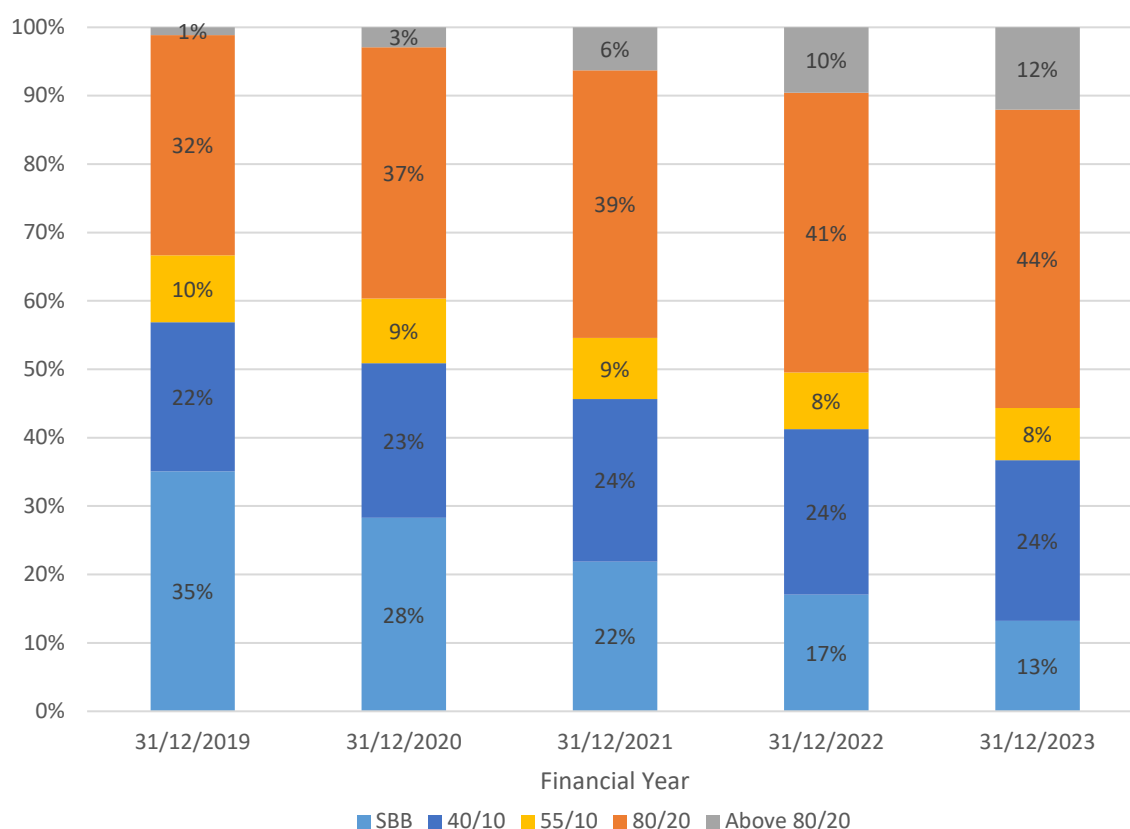[37] Openreach's response dated [✂] to the s.135 notice dated [✂].

Figure 2.7: Openreach forecasts of consumers on different bandwidths

[✂]

Source: the standard broadband forecasts are from the Ofcom 2019 WLA Volumes Module (see Annex 16). All other forecasts were provided by Openreach in response to an s.135 notice.[38]

2.16   Figure 2.8 shows forecasts based on information provided by BT[39], Sky and TalkTalk (which, taken together, account for 85%[40] of Openreach lines). We note that these suggest a slightly faster uptake of 80/20 (or higher) speeds than Openreach's forecasts. In particular, these cumulative forecasts suggest that by the end of 2023, 56% of their customers will be subscribing to services provided using Openreach's 80/20 service or a higher speed service.

Figure 2.8: Proportion of customers on different bandwidths, BT, Sky, and TalkTalk cumulative forecasts

Source: Cumulative forecasts provided by BT[41],Sky[42] and TalkTalk[43].

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[38] Openreach's response dated [✂] to the s.135 notice dated [✂], response to question 8.
[39] The forecast is for BT wholesale and retail divisions including Plusnet and EE.
[40] Ofcom calculation based on provider data.
[41] BT's response dated [✂] to the s.135 notice dated [✂], response to question 1.
[42] Sky's response dated [✂] to the s.135 notice dated [✂], response to question 1.
[43] TalkTalk's response dated [✂] to the s.135 notice dated [✂], response to question 1.

Role of wholesale arrangements in driving take-up of higher speeds

2.17   In the 2018 WLA Statement we noted that Virgin Media had upgraded its SBB customers to SFBB.[44] We also found that BT had upgraded SFBB subscribers whose line could support faster speeds to an 80/20 service.[45] Since then we have seen more customers being upgraded to SFBB services, free of charge. Internal documents suggest that these upgrades have been motivated by both Openreach pricing (see below) and the opportunity to reduce churn. For example, [✂] internal documents suggest free regrades to fibre were a method to mitigate churn risks.[46] [✂] told us that free of charge upgrades could increase customer satisfaction and, hence, reduce churn as well as a response to Ofcom's consumer fairness agenda. Both [✂] and [✂] did not tell customers by how much they could expect their speeds to increase. For example, [✂] just notified customers that "[w]e are making your broadband faster, for free."[47]

2.18   In 2018 [✂] signed up to an Openreach 'GEA discount' scheme offering significant discounts contingent on achieving targets for increasing their volumes of FTTC connections, over a five-year period.[48] If an ISP achieves its targets the wholesale charge differential between 40/10 and 80/20 FTTC decreases from £4.82[49] to £1 a month[50] until 2023.

2.19   The scheme also contains a "try before you buy" provision which allowed ISPs (within the first year of signing the contract) to migrate customers from 40/10 or 55/10 to 80/20 for twelve months free of additional charges.[51] We understand that this provision has been an important driver of recent fibre uptake.

ISP migrations

2.20   [✂] told us that it used the "try before you buy" GEA provision to migrate [✂] customers from 'basic' SFBB to 'fast' SFBB.

2.21   Independent of an Openreach offer, Sky migrated customers from SBB to SFBB[52] [✂].[53]

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[44] 2018 WLA Statement page 74.

[45] 2018 WLA Statement page 184.

[46] [✂] response dated [✂] to the s.135 notice dated [✂], [✂].

[47] [✂] response dated [✂] to the s.135 notice dated [✂], [✂].

[48] Based on the generic contract available on the Openreach website, by 2022, a volume equal to: 84% of an ISP's total broadband base in 2018 must be supplied using FTTC; 25% of that base must be on 80/20; and 12.5% of the total 2018 base must be supplied superfast using G.fast or FTTP. See https://www.openreach.co.uk/orpg/home/products/super-fastfibreaccess/downloads/Openreach_Special_Offer_GEA_Volume_Agreement.pdf [accessed 29 November 2019].

[49] Openreach's current advertised list price differential between 40/10 and 80/20 FTTC is £3/month (£12.70/month compared to £17.52/month).

[50] Generic GEA contract gives the following prices: £4.99/month for 40/10; £5.99/month for 55/10 and 80/20; and £7.99/month for 160/30.

[51] After twelve months the appropriate rental charges resume but no modification charges accrue to remain on that speed or to be downgraded to the original speed.

[52] Sky's response to 2019 Approach to remedies Consultation, page 20, [accessed 17 December 2019].

[53] All customers who [✂] were migrated to [✂]. See Sky's response dated [✂] to the s.135 notice dated [✂], page 3.

2.22   [✂] also confirmed that they made use of the GEA provision to migrate existing superfast customers onto 80/20. We understand that, in May 2019, it used this provision to migrate [✂] customers from 55/10 to 80/20 at no extra charge.

2.23   BT intends to upgrade around 700,000 SBB customers to SFBB superfast at no extra cost to the customer by mid-2020.[54]

Wholesale prices

2.24   The evidence from Openreach and rival network operators is that, looking forward, prices for FTTP wholesale services will be set with reference to the prevailing prices for the Openreach FTTC services (in particular the Openreach 40/10 product).

2.25   Openreach's internal documents suggest that its strategy is to set prices for lines supporting 80/20 and above headline speeds which are low enough to motivate ISPs to move customers up the 'bandwidth ladder' but maintains enough of a premium that 'value is retained'.[55] They also suggest that FTTP wholesale services will [✂].[56]

2.26   [✂].[57] [✂].

2.27   FibreNation told us that their pricing strategy for FTTP [✂]. At present, FibreNation's standard wholesale price is [✂].

Use of data

2.28   In recent years we have seen a move to unlimited broadband packages (i.e. with no restrictions on the volume of data used). We found that the volume of data used by broadband customers has increased in recent years (average monthly data use in 2018 was 241 GB compared to 190 GB in 2017 and 143 GB in 2016[58]). Sky estimates that data usage is [✂].[59]

2.29   Market research carried out by telecoms providers suggests that data volumes will continue to increase. Research conducted by Gigaclear indicates that internet traffic per household in the UK is [✂] from 2017 to 2022.[60]

2.30   Figure 2.9 below shows average monthly data usage by broadband connection speed, as well as average monthly data use across all speeds, in 2018.[61] This shows that people subscribing to SFBB and UFBB services used, on average, more data than those subscribing to SBB.

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[54] BT, 9 October 2019. *BT launches new products, services and skills programme to help boost the UK's potential*. [Accessed 6 December 2019]. [✂].
[55] Openreach's response dated [✂] to the s.135 notice dated [✂], [✂].
[56] [✂]. Openreach's response dated [✂] to the s.135 notice dated [✂], [✂].
[57] [✂] response dated [✂] to the s.135 notice dated [✂], page 4.
[58] For average data use figures in 2017 and 2016, see 2018 WLA Statement, Annex 5, footnote 111.
[59] Sky's response dated [✂] to the s.135 notice dated [✂], [✂].
[60] Gigaclear's response dated [✂] to the s.135 notice dated [✂], [✂].
[61] Ofcom, 2018. *Connected Nations 2018: Interactive Report*.

Figure 2.9: Fixed broadband usage, average monthly data volumes by speeds, 2018 (Gigabytes)
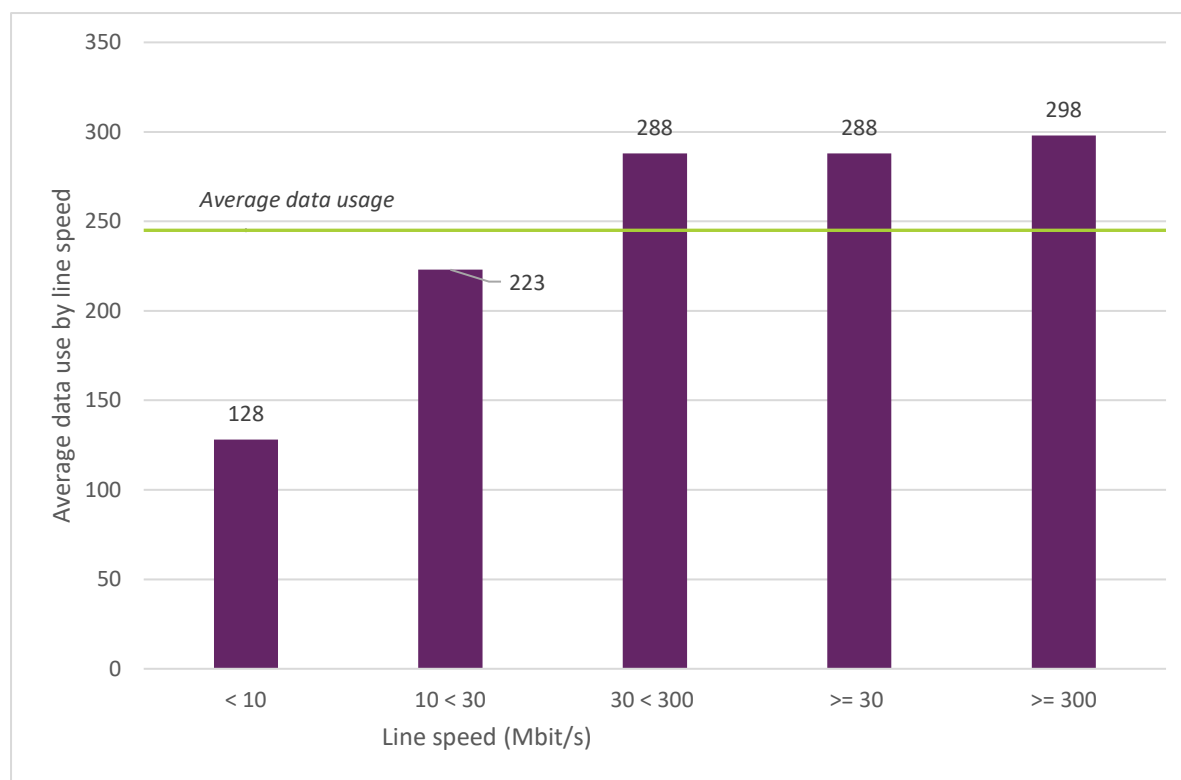
Source: Ofcom forecast based on data from providers.

Retail broadband pricing

2.31   In this sub-section we look at how advertised retail prices for broadband packages have compared between ISPs and broadband speeds. Making comparisons is not straightforward for several reasons. First, as discussed above, ISPs offer a range of packages with different features. Second, ISPs might offer temporary promotions or promotions with limited availability, or other discounts and rewards.

2.32   In addition, many existing customers are not paying advertised prices, and may be paying more or less depending on a number of factors. For example, as discussed above, some ISPs have automatically upgraded broadband speeds for large numbers of customers at low or zero incremental price motivated by Openreach pricing and reducing churn. Also, as discussed below, Ofcom's review of the prices being paid by new in-contract, re-contracted and out-of-contract fixed broadband customers found that there is a wide variation in prices paid for the same broadband service.[62]

2.33   Bearing this in mind, we looked at advertised prices for dual play packages (i.e. broadband and landline) and triple play packages (broadband, landline and TV), by ISPs and broadband speed.

2.34   As noted above, ISPs offer packages differentiated on a number of dimensions. We have looked at a snapshot of retail products in the market. We have looked at how these

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[62] Ofcom, 2019. *Helping consumers get better deals: A review of pricing practices in fixed broadband*.

compare between ISPs, with a particular focus on how packages offered compare on price and speeds. We note from internal documents that ISPs carry out similar exercises. Figure 2.10 provides details in relation to the range of broadband and landline products in the market as surveyed on 4 and 6 December 2019. For each product it identifies the ISP, price and broadband speeds.

Figure 2.10: Advertised dual play prices and headline broadband speeds by ISP, December 2019
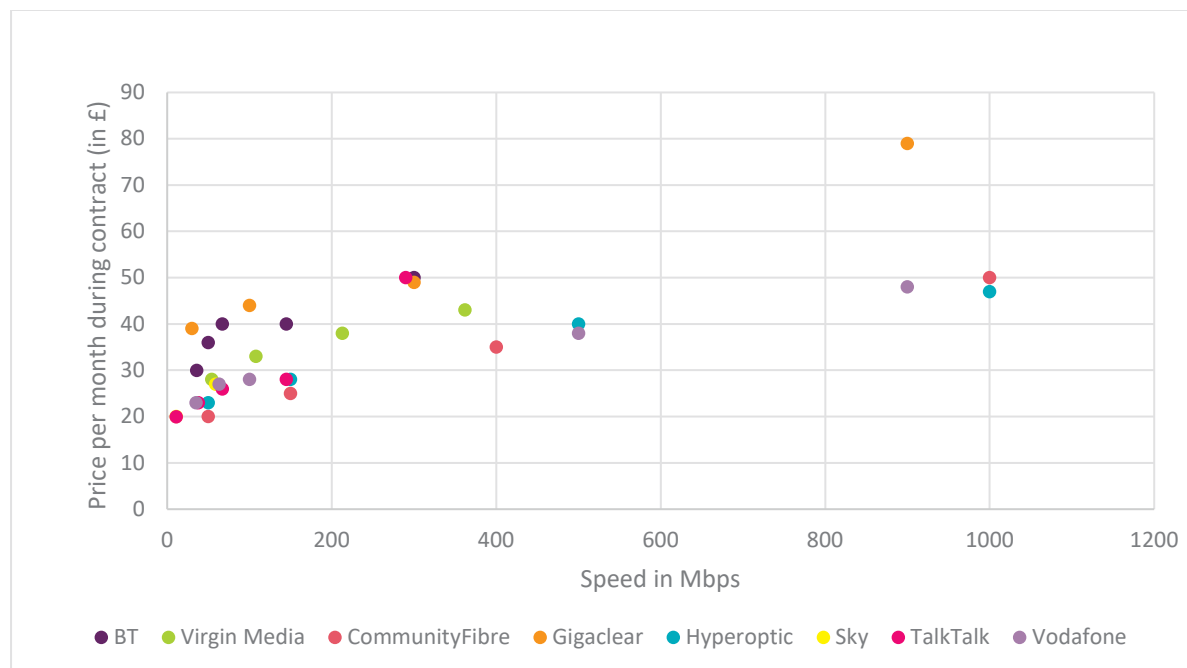
Source: Provider websites.

2.35 This analysis shows that the largest ISPs all offer customers a choice of products offering different broadband speeds, charging a premium for packages offering higher speed.[63] Some ISPs offer more products than others and there are differences between ISPs in the range of speeds offered. It also shows that, across the market, there is not a simple relationship between price and speeds. There are several examples of higher speed products being available at prices that are the same as, or even lower than, those for products offering lower speeds. We also looked at information on historical headline retail prices; this showed a similar picture.

2.36 We also looked at prices for triple play packages (i.e. those including landline, broadband and Pay TV services). Whilst not all ISPs offer triple play bundles, we found a similar relationship between price and broadband speeds. In particular, we found considerable overlap between ISPs in the prices of packages offering different broadband speeds. Advertised prices were in the range of around £30 to £55 for packages offering headline speeds of around 100Mbit/s or less. Some of this range reflected the availability of different TV packages at the same broadband speed. We also noted that some ISPs give

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[63] For any given provider, offers differ primarily in terms of the broadband speed, but in some cases on the extent of additional features available such as, for example, the number of devices on which antivirus protection is available or the amount of upfront fees.

customers the option of paying more to subscribe to access extra TV channels, and that access to premium TV packages may be limited to packages offering higher broadband speeds.

2.37   A recent development is that Sky has chosen to market a single FTTC-based product, rather than offering two products, one based on FTTC 40/10 and another based on FTTC 80/20.[64] Where a customer's line is capable of providing a speed above 40Mb they are supplied using FTTC 80/20, otherwise they are supplied using FTTC 40/10.[65] We understand that the reason for this was for simplification prior to adding faster products to their offering. We note that in moving to a single FTTC product, the average speed which Sky can advertise for the product reflects the average across both the FTTC 40/10 and 80/20 services (and is, therefore, lower than the average speed Sky could advertise for a product based exclusively on FTTC 80/20 services).

2.38   In relation to existing customers, Ofcom's review of pricing practices in fixed broadband described how many customers do not pay new in-contract advertised prices. At the time of the research around 21% of customers were customers within their first contract with an ISP.[66] The majority had either re-contracted with their existing provider or were out-of-contract. The review found a wide variation in prices paid for the same broadband service. It found that for customers who stay with their provider beyond their original contract period, prices appear to be linked to factors such as their willingness or ability to engage with their provider and negotiate a new deal, and their provider's approach to re-contracting, as well as broadband speed. This review also found overlaps in the prices being paid (including new in-contract, re-contracted and out-of-contract) for different broadband speeds.[67]

Retail customer experience and preferences

2.39   In this sub-section we set out information on consumer's behaviour and preferences. This draws largely on results of surveys and other research conducted by ISPs.

Factors in choice of products

2.40   Surveys undertaken for different ISPs suggest that price is the most important factor in the choice of broadband packages, followed by reliability and speed. A survey commissioned by Openreach found that the most important reason for switching provider is to save money, not to obtain a faster connection.[68] In particular, when those who had switched were asked about the reasons for switching, [✂]% said they had switched to save money, [✂]% said faster speeds and [✂]% said more reliable broadband. When those who said that they were likely to switch broadband providers in the future were asked why they

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[64] https://www.sky.com/shop/broadband-talk/ [accessed on 11 December 2019].
[65] Email from [✂] dated 25 November 2019.
[66] Ofcom, 2019. *Helping consumers get better deals: A review of pricing practices in fixed broadband*. Table 2.
[67] Ibid paragraphs 2.21 and 3.11
[68] Openreach's response dated [✂] to the s.135 notice dated [✂], [✂].

would be likely to switch, [✂]% said to get a better price and [✂]% said to get a faster speed.[69]

2.41   BT research found that [✂].[70] [✂],[71] [✂].[72]

2.42   Research commissioned by [✂][73] found that ignoring brand, price was the most important driver of choice for copper and FTTC products ([✂]%), followed by broadband speeds ([✂]%).[74]

2.43   Similar findings have also been reported by other market research.[75]

Satisfaction with broadband speeds

2.44   Figures 2.11 and 2.12 below show results of Ofcom research on customer satisfaction. Figure 2.11 shows that, overall, satisfaction levels with the reliability of the broadband service were slightly higher than with speeds.

Figure 2.11: Satisfaction with home broadband service
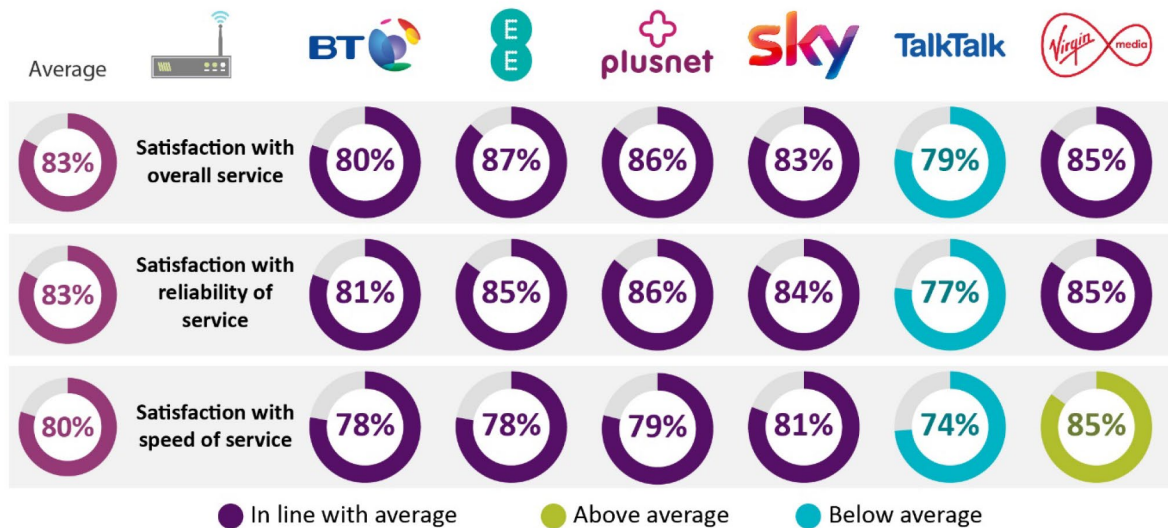
Source: Ofcom Customer Satisfaction Tracker 2019.

2.45   Figure 2.12 shows that 12% of broadband consumers were found to be dissatisfied with their broadband speed in 2019 with an additional 8% found to be neither satisfied nor dissatisfied. This suggests to us that some consumers are not receiving broadband speeds which meet their needs or expectations, but the large majority are satisfied. Research

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[69] Openreach's response dated [✂] to the s.135 notice dated [✂], [✂].
[70] BT's response dated [✂] to the s.135 notice dated [✂], [✂].
[71] BT's response dated [✂] to the s.135 notice dated [✂], [✂].
[72] BT's response dated [✂] to the s.135 notice dated [✂], [✂].
[73] [✂] response dated [✂] to s.135 notice dated [✂], [✂].
[74] Ibid - and then [✂].
[75] [✂] response dated [✂] to s.135 notice dated [✂], [✂]. [✂] response dated [✂] to s.135 notice dated [✂], [✂].

conducted for Virgin Media found levels of satisfaction with current broadband speeds to be in the range of [✂]% depending on the ISP.[76]

Figure 2.12: Satisfaction with speed of fixed broadband service while online
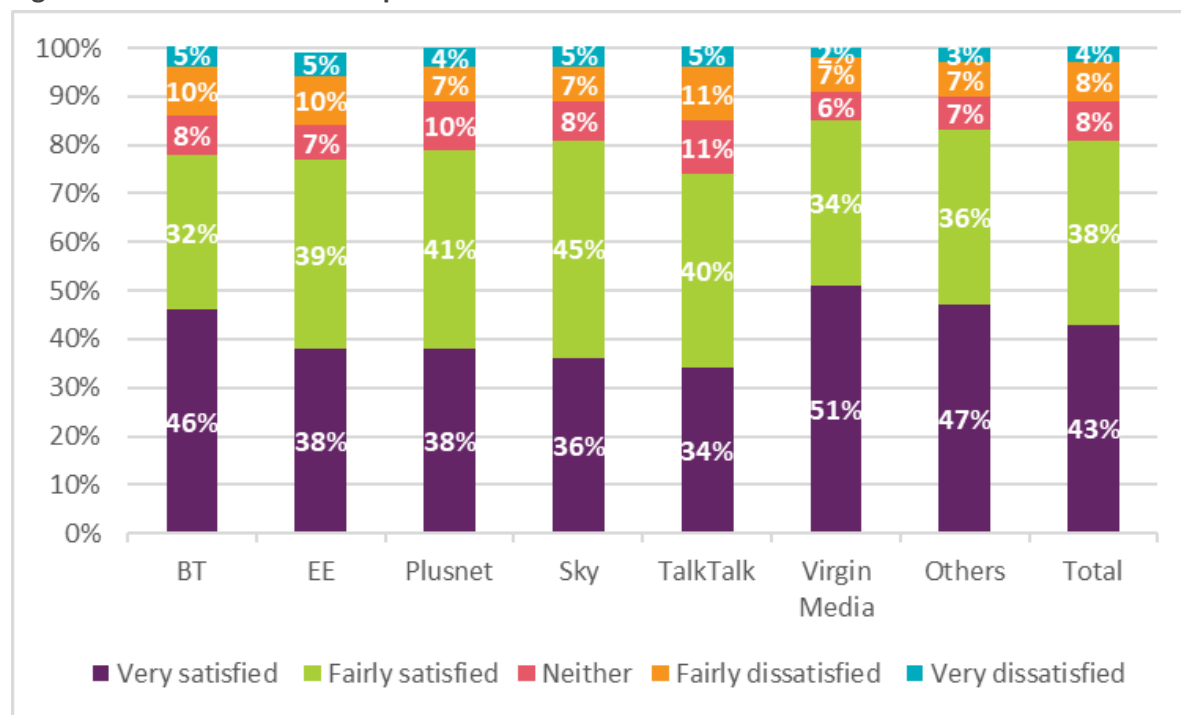
Source: Ofcom Consumer Satisfaction Tracker 2019.

2.46   Research conducted by ISPs suggest higher levels of dissatisfaction amongst 'copper' customers (we understand this to be referring to those with speeds of up to 17Mbit/s). For example, Sky reports that [✂]% of copper customers are "interested" in upgrading, and that [✂]% of Sky copper customers report "Don't need faster speeds" as the reason that best describes why customers do not currently have fibre broadband.[77] An Openreach survey found that among 'copper' customers, [✂]% were likely to upgrade to SFBB. Of those who intend to upgrade, [✂]% gave "I'd like to have faster broadband speeds" as one of the reasons.[78]

Demand-side drivers of take-up of higher speed broadband services

2.47   The evidence suggests that both demand and supply-side factors will drive take-up of higher speed broadband services over the review period.

2.48   On the demand side, we have been told that the main drivers of residential demand for higher speeds have been an increase in the use of video-on-demand and gaming, and the simultaneous use in a home of multiple devices. Openreach research finds that the proportion of consumers streaming video-on-demand services at home has significantly

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[76] Virgin Media's response dated [✂] to the s.135 notice dated [✂], [✂].
[77] Sky's response dated [✂] to the s.135 notice dated [✂], [✂].
[78] Openreach's response dated [✂] to the s.135 notice dated [✂], [✂].

increased from [✂]% in 2017 to [✂]% in 2019.[79] Vodafone estimates that its consumers are using broadband to connect [✂] on average.[80] Research commissioned by Gigaclear found that online video and gaming traffic are expected to grow at [✂] from 2017 to 2022, respectively, and that gaming traffic is expected to account for [✂]% of total IP traffic by 2022, up from [✂]% in 2017.[81]

2.49   Research conducted for Openreach also found that [✂]% of all customers were 'extremely likely' to up-grade to 1Gbit/s broadband driven by the use of broadband for work purposes. Further, it found males, younger consumers in the 18-34 age group, to be the key groups likely to upgrade to 1Gbit/s ultrafast broadband. This research found that upgrading might be driven by pull factors (e.g. liking the idea of faster broadband) as well as push factors (e.g. being unhappy with their current connection).[82]

2.50   ISPs have told us that rollout and take-up of ultrafast broadband is still in its infancy. Internal documents suggest that ISPs are exploring various approaches to attracting more customers to products supported on networks capable of offering superfast (and potentially ultrafast) speeds, and then 'moving customers up the ladder'. For example:

a)   An internal BT document identified ISPs: [✂].[83]

b)   BT is considering the options for the design of packages including [✂].[84]

c)   Vodafone has used a [✂],[85] [✂],[86] [✂],[87] [✂].[88]

d)   Virgin Media [✂][89] [✂].[90] [✂].[91] [✂].[92]

Willingness to pay for faster services

2.51   ISP have told us that most people have a low willingness to pay for faster broadband speeds. Several factors were identified as contributing to this including: high levels of satisfaction with current speeds, that many people do not currently need higher broadband speeds and, more generally, a lack of awareness of their existing speeds and experience of the benefits of higher speeds. This is supported by survey evidence.

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[79] Openreach's response dated [✂] to the s.135 notice dated [✂], [✂].
[80] Vodafone's response dated [✂] to s.135 notice dated [✂], [✂].
[81] Gigaclear's response dated [✂] to the s.135 notice dated [✂], [✂].
[82] Openreach's response dated [✂] to the s.135 notice dated [✂], [✂].
[83] BT's response dated [✂] to the s.135 notice dated [✂], [✂].
[84] BT's response dated [✂] to the s.135 notice dated [✂], [✂].
[85] Vodafone's response dated [✂] to the s.135 notice dated [✂], [✂].
[86] Vodafone's response dated [✂] to the s.135 notice dated [✂], [✂].
[87] Vodafone's response dated [✂] to the s.135 notice dated [✂], [✂].
[88] Vodafone's response dated [✂] to the s.135 notice dated [✂], [✂].
[89] Virgin Media's response dated [✂] to s.135 notice dated [✂], [✂].
[90] Virgin Media's response dated [✂] to s.135 notice dated [✂], [✂].
[91] Virgin Media's response dated [✂] to s.135 notice dated [✂], [✂].
[92] Virgin Media's response dated [✂] to s.135 notice dated [✂], [✂].

2.52   BT research found that the most important reasons for not upgrading to ultrafast are satisfaction with current speed and the price of faster internet.[93] This is supported by research commissioned by other ISPs.[94, 95]

2.53   Openreach research asked 'copper' customers (see above) whether they would be likely to up-grade to SFBB services, where available.[96] Results suggest that around [✕]% of these customers said that they would be unlikely to up-grade and of these:

a)   around three quarters 'don't use broadband for work purposes' and a third 'don't stream TV content';[97] and

b)   [✕]% or more 'don't want to spend more money on broadband', 'are happy with their current speed' and/or 'didn't think they need superfast broadband'.[98]

2.54   Sky told us that although customers expect faster speeds, they are not willing to pay more for them. Sky consider that the "willingness to pay is decreasing as the market becomes more competitive".[99] Research conducted for Sky found that among Sky SBB customers, [✕]% gave "I don't want to pay the higher price" and [✕]% "I don't need faster speeds" as the reason for not having SFBB.[100]

2.55   Research commissioned by Sky suggested that some people are willing to pay a premium for higher speed products (for example, [✕]) and that consumers currently with [✕] services have a substantially higher additional willingness to pay for 1Gbit/s broadband than those with lower bandwidths.[101]

2.56   Virgin research found that [✕]% of existing Virgin customers would be willing to pay a premium for faster download speeds.[102] Virgin believes that there is a potential to monetise faster speeds of 1Gbit/s in areas with more network capacity and consumer demand.[103]

2.57   Openreach analysis[104] suggested that a 20% reduction in the price of fibre would only increase fibre's share of connections by [✕]% where fibre includes SFBB and UFBB services.[105]

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[93] [✕] meeting 25 September 20-19, [✕].
[94] [✕] response dated [✕] to the s.135 notice dated [✕], [✕].
[95] [✕] response dated [✕] to the s.135 notice dated [✕], [✕].
[96] Openreach's response dated [✕] to the s.135 notice dated [✕], [✕].
[97] These proportions for copper customers who claimed they would not upgrade to fibre broadband were significantly higher than those for the entire sample.
[98] Openreach's response dated [✕] to the s.135 notice dated [✕], [✕].
[99] Sky's response dated [✕] to the s.135 notice dated [✕], [✕].
[100] Sky's response dated [✕] to the s.135 notice dated [✕], [✕].
[101] Sky's response dated [✕] to the s.135 notice dated [✕], [✕].
[102] Virgin Media's response dated [✕] to s.135 notice dated [✕], [✕].
[103] Virgin Media's response dated [✕] to s.135 notice dated [✕], [✕].
[104] Openreach's response dated [✕] to the s.135 notice dated [✕], [✕].
[105] Openreach considered what would happen in the scenario where prices of certain fibre packages of BT, Sky, TalkTalk and Vodafone were reduced by 20%. The packages whose prices were reduced by 20% had speeds of either 38 or 52 or 76 Mbit/s. Openreach looked at 15 packages to begin with. Of these 3 (one each from BT, Sky and TalkTalk) were classified as copper and had a speed of 17Mbit/s. 12 were classified as fibre and had speeds of 38 or 52 or 76 Mbit/s. Three packages from Virgin Media were classified as cable; these had speeds of 50, 200 and 350 Mbit/s.

2.58 A survey commissioned by Gigaclear (of people in current and planned Gigaclear areas who had heard of 'full fibre') found that over [✂]% of respondents would not be willing to pay more for full fibre, although the report indicates that [✂].[106] Research commissioned by [✂][107][✂].[108]

Wireless services

2.59 Broadband services could be provided to fixed locations using wireless services. We discuss the three main ways to do this below.

Satellite

2.60 Traditionally, satellite services have been offered using geostationary (GEO) satellites. GEO satellites are positioned a significant distance from the Earth, leading to lower speeds and larger response times. A new generation of satellites in low earth orbit (LEO) are being deployed. This could offer a better quality of service. GEO and LEO satellite services are explained in more detail in Annex 6.

2.61 Services provided on GEO satellites have been traditionally used to provide commercial broadband connections of up to 30Mbit/s. The available subscription packages cost around £45 and have data caps of 30-50 GB per month. This data cap is much lower than the typical usage of a fixed broadband connection. Typically, satellite broadband involves large upfront charges for equipment, which can be in the region of £300.

Mobile

2.62 Customers could also use mobile networks to provide their broadband services. However, as with satellite broadband, usage allowances in this case may be restrictive for the majority of customers. Table 2.13 below suggests that, as consumers now use around, on average, 240 GB per month on a fixed connection, data caps are low compared to the average user's needs. However, mobile network operators (MNOs) have started to lift restrictions on data usage for some packages. For example, Vodafone's new unlimited plans only place a cap on download speeds and EE also offers an unlimited data package.

Table 2.13: Illustrative examples of 4G mobile packages provided by EE, O2, Three and Vodafone, 4 December 2019, by contract duration[109]

Contract length	30 days		12 months	
MNO	Data	Price	Data	Price

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[106] Gigaclear's response dated [✂] to the s.135 notice dated [✂], [✂].
[107] [✂] response dated [✂] to the s.135 notice dated [✂], [✂].
[108] [✂] response dated [✂] to the s.135 notice dated [✂], [✂].
[109] The information reported in this table relates to 4G packages with 30 day and 12 month contract lengths. Also, where relevant, we selected the basic version of the relevant package. We note that packages offering different contract lengths, data allowances and other features may be available.

EE	20 GB	£27	20 GB	£22
	40 GB	£32	100 GB	£27
			Unlimited	£34
O2	15 GB	£25	20 GB	£20
	25 GB	£30	25 GB	£28
	50 GB	£47	100 GB	£30
Three	20 GB	£25	20 GB	£22
	40 GB	£27	40 GB	£24
	100 GB	£29	100 GB	£26
Vodafone	20 GB	£22	20 GB	£20
	Unlimited	£25	Unlimited	£23

*Sources: https://shop.ee.co.uk/sim-only/pay-monthly-phones, https://www.o2.co.uk/shop/sim-cards/sim-only-deals#deviceType=phone&contractLength=P12M,
http://store.three.co.uk/view/searchTariff?priceplan=&deviceType=SIM_ONLY_MBB&availableContractLength=12, https://www.vodafone.co.uk/mobile/best-sim-only-deals [accessed 4 December 2019].*

2.63   Mobile coverage is evolving and 5G has the potential to offer higher speeds than 4G (see Annex 6). However, while 91% of the UK has good 4G coverage from at least one operator, 5G is not as widespread yet. 5G has been launched by all four main MNOs in 2019. However, it currently has very limited reach, with operators making it available in select areas of the biggest cities in the UK.

Fixed Wireless

2.64   Fixed Wireless Access (FWA) technology can be used in a number of scenarios[110]:

- by fixed wireless operators using unlicensed/lightly-licensed spectrum and fixed access services for backhaul;
- by mobile network operators using their 4/5G spectrum to connect from cell sites to the premises; or
- by fixed networks to connect from a nearby distribution point to the premises (i.e. wireless lead-ins)

2.65   FWA may use unlicensed or licensed spectrum. The use of unlicensed spectrum tends to be by smaller networks in providing broadband services to more rural areas. They often have a high set-up charge. Speeds vary, with basic packages offering speeds from 2Mbit/s, sometimes up to 30Mbit/s, and often have data caps. Interference from nearby services operating on the same frequencies is common and capacity constraints and LoS issues can make it difficult to scale these services. These FWA services usually come with substantial setup fees (typically around £100-200).

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[110] See Annex 6 for description of these uses of FWA technology.

2.66   Licensed spectrum is used to provide 4G or 5G fixed wireless services. Fixed wireless on 4G has had relatively low take up so far. These services have often had data caps and may also have had lower speeds and patchy coverage as compared to fixed broadband (depending on the specific network deployment and customer locations).

2.67   MNOs (EE, Three and Vodafone) offer home broadband services using their mobile networks, using 4G and, more recently, 5G. These services share many of the characteristics of mobile broadband but are optimised for home usage. Table 2.14 gives details of products available as at 10 December 2019. It appears to us that the prices for these services are, at best, similar to those for fixed broadband products offering UFBB speeds. Also, for many there are up-front fees, cap on data volumes, availability is limited to certain areas, and speeds may be variable with location.

Table 2.14: 4/5G Home broadband packages provided by EE, Three and Vodafone, 10 December 2019

MNO	Data	Price /month	Contract length	Upfront fee
EE 4GEE Router	100 GB	£35		
	200 GB	£40	18 months	£0
	300 GB	£45	or	or
	500 GB	£50	1 month	£100
Three HomeFi 4G broadband	Unlimited	£27	12 months	£29
		£22	24 months	£0
Vodafone 5G Gigacube	100 GB	£30	18 months	£100
	200 GB	£40	or 30 days with £325 upfront fee	£50
	Unlimited	£50		£50
Vodafone 4G Gigacube	100 GB	£30	18 months	£0
	200 GB	£40	or 30 days with £100 upfront fee	£0
	Unlimited	£50		£0

Source: https://shop.ee.co.uk/dongles/pay-monthly-mobile-broadband/4gee-router/details#; http://www.three.co.uk/store/broadband/home-broadband; https://www.vodafone.co.uk/gigacube/ [accessed 4 December 2019].

2.68   Stakeholders have provided views on the potential of 5G FWA as an alternative to fixed (wired) broadband. Fixed network operators tend to be of the view that 5G FWA was unlikely to be a service that could be supplied to sufficiently large numbers of customers to generally compete with fixed services. Whilst mobile network operators tend to support this view in the longer term, they identified that 5G FWA could be used in the shorter term whilst their 5G networks are less heavily loaded with mobile traffic and could continue to support customers without access to fibre networks (such as rural locations) or in locations

where mobile coverage was particularly good. They also considered they could be a viable alternative for consumers with lower bandwidth requirements.

2.69   One area where both fixed and mobile operators noted 5G FWA could have a role was in providing the final connection (i.e. using FWA as a replacement for a fixed lead-in). However, this approach would rely heavily on a fibre network providing connectivity to close to the customer premises.

Summary of broadband analysis

2.70   In summary, based on the evidence presented above, we find that:

a)   The majority of customers take broadband services as part of a package of services. ISPs offer a range of differentiated packages including packages offering different speeds and packages tailored to the needs of business customers. Price and value are the most important factors in the choice between available broadband packages followed by reliability and speed.

b)   Currently around 95% of people have access to SFBB services and over 50% to UFBB (largely as a result of Virgin Media upgrading its network), but around a third of people are still subscribing to SBB services.

c)   Looking forward, indicative forecasts based on information provided by network operators and ISPs suggest that by 2026 fewer than 5% of people will be subscribing to SBB, over 75% to SFBB and around 20% to UFBB services.

d)   Analysis of the advertised prices for products being offered by different ISPs, as well as prices being paid by existing customers, shows that there is considerable overlap in the prices of products offering different speeds.

e)   In addition, ISPs are actively migrating their SBB customers to 40/10 and 80/20 based services, at no or a small additional charge, motivated by Openreach pricing and the potential for reduced churn.

f)   Dissatisfaction with the quality of broadband services (including speeds and reliability) has been a key driver of churn. This combined with evidence on growth in the use of data suggests that there is a demand for faster and more reliable broadband services.

g)   However, it also appears that SFBB speeds are currently adequate to meet the needs of most people (which seems to be reflected in current levels of satisfaction with broadband speeds). Most people have a low willingness to pay for higher speeds, but there are some people who would be prepared to pay a substantial premium for 1Gbit/s services.

h)   MNOs have recently launched 4G and 5G based home broadband services and the prices for these are similar to or more expensive than those for fixed broadband services. But these services may have up-front charges and data caps and availability is limited to certain areas and speeds vary with location.

Leased lines

2.71   Leased lines provide users with high quality business connectivity services between two or more locations. These services tend to be symmetric (the capacity is the same in both directions), uncontended (the capacity is guaranteed and not subject to reduction by the presence of other telecoms services), and typically, dedicated. Leased lines are significantly more expensive than broadband services.

Uses

2.72   Leased lines are typically used to provide[111]:

a) connectivity between business sites;

b) business connectivity to virtual private networks (VPNs), the internet and cloud computing;

c) mobile network connectivity (often referred to as mobile backhaul) which provides connectivity from mobile cell sites (antennae) to the MNO's network; and

d) broadband network connectivity (often referred to as fixed broadband backhaul or local loop unbundling (LLU) backhaul) which provides connectivity from broadband providers' equipment located in BT exchanges back to the operators' own networks.

2.73   The different leased lines services may be purchased and used in different ways. Mobile backhaul and LLU backhaul are purchased by other network operators to build parts of their networks. Other leased lines, used to provide business connectivity, may be purchased directly by the retail customer. Alternatively, other telecoms providers could purchase them on a wholesale basis. The retail service may comprise individual leased lines or may be a package of multiple leased lines and/or other Information Technology services, such as cloud-based applications and storage. The supply chain may be quite complex and may involve companies that aggregate services together.

2.74   Network aggregators buy services from network operators to offer their customers (who are typically value-added resellers) end-to-end to network connectivity. Systems integrators and value-added resellers purchase network connectivity services from network operators or aggregators and resell them to end customers. A company in the supply chain may operate in several of these roles – a network operator could also act as an aggregator using both its own network and services purchased from other operators.

Products

2.75   The main types of leased lines are Ethernet services; Wavelength Division Multiplex (WDM) services and dark fibre. Ethernet services account for the majority of installed leased line circuits in the UK.

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[111] See Annex 6 for description of these uses of leased lines.

2.76   Point-to-point leased lines are generally based on Ethernet standards and are specified by bandwidth (e.g. 100Mbit/s, 1Gbit/s, or 10Gbit/s). Ethernet leased lines are typically delivered over fibre and changing the bandwidth involves changing, or reconfiguring, the electronics at both ends.

2.77   WDM is also a fibre-based technology with features suited for high capacity routes (e.g. between core nodes and to data centres) and for higher capacity backhaul connections. WDM is particularly attractive where demand is expected to grow over time, as additional circuits can be provided over different wavelengths, and can allow additional flexibility for customers as it can support protocols other than Ethernet (and different protocols can run over different wavelengths on a single fibre).

2.78   Dark fibre providers install and sell fibre to connect between two sites, with the purchaser of the dark fibre adding the active electronics to provide services such as Ethernet or WDM. Dark fibre is, therefore, attractive to wholesale customers, in particular (for example, MNOs), but also potentially some end customers that are able to manage the provision of the electronics. As the electronic equipment is provided by the customer, rather than the fire provider, it allows greater choice in how services are provided over the fibre than an Ethernet or WDM service.

2.79   Ethernet in the first mile (EFM) is a copper-based technology offering speeds typically in the range of 20-30Mbit/s. EFM relies on access to BT's copper access network (via the local loop unbundling remedy), which is available at all BT exchanges. However, the availability of EFM is typically limited to larger exchanges where business site density is higher. EFM cannot be used for backhaul or core connections.

2.80   Total demand for Ethernet and WDM services has been increasing and is forecast to continue to increase. The demand for dark fibre to deliver these services instead of active variants is uncertain but is likely to depend on the availability and attractiveness of any service from Openreach, which may in turn depend on regulation resulting from this review. We expect demand for EFM to decline as demand for higher speeds increases as discussed below.

Demand by speeds

2.81   Figure 2.15 shows that in recent years demand for low bandwidth traditional interface (TI)[112] leased line connections has declined as the demand for higher bandwidth requirements has increased. Currently, for wholesale Ethernet services, BT prices 10Mbit/s almost identically to 100Mbit/s services, and provides it using the same equipment as a 100Mbit/s service.[113] 100Mbit/s and to some extent 1Gbit/s are viewed as entry level speeds. This growth in demand for higher bandwidth means that products which can support only lower speeds, such as EFM, are becoming increasingly less attractive.

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[112] Traditional Interface (TI) uses legacy technologies, such as Synchronous Digital Hierarchy (SDH) or Plesiochronous Digital Hierarchy (PDH). These are being replaced by Ethernet services.
[113] The electronics for 10Mbit/s and 100Mbit/s are the same, using 'autosensing' to select the correct transmission speed.

2.82   Very high bandwidth circuits (VHB) i.e. circuits with a bandwidth over 1Gbit/s, make up a relatively small proportion of leased lines compared to circuits at 1Gbit/s and below, but forecasts indicate the use of VHB services will increase over time.

Figure 2.15: Growth for leased lines services by bandwidth
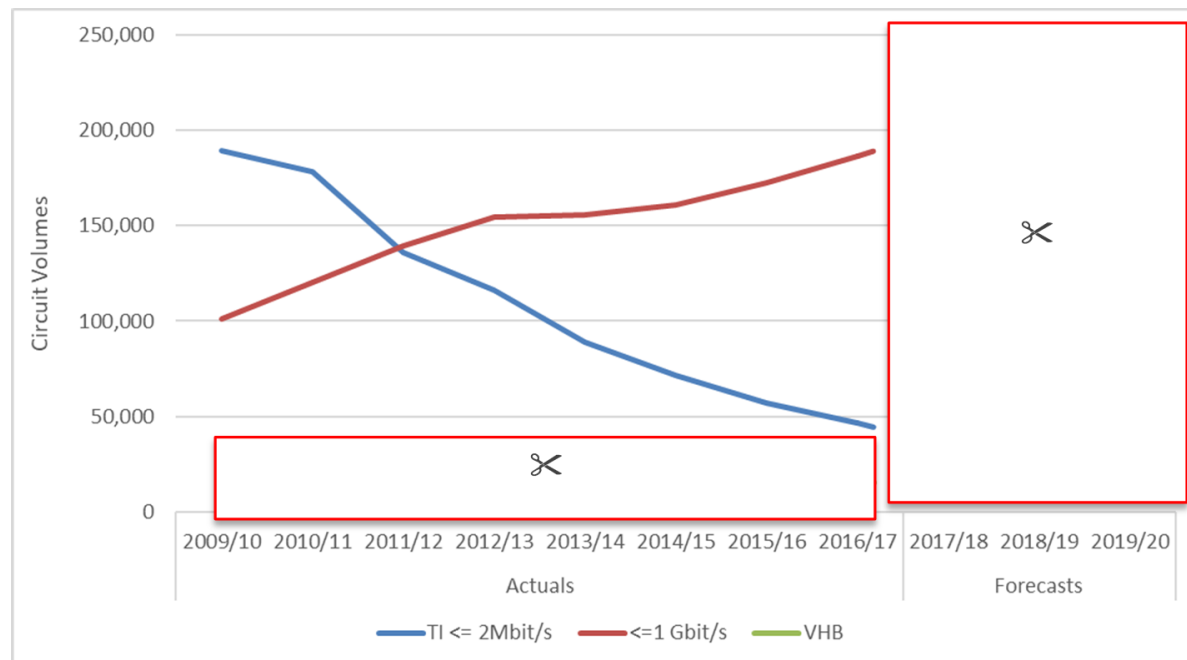
Source: See 2019 BCMR Statement, Figure 3.10.

Demand by user types

2.83   In the 2019 BCMR Statement we found that demand for online services, mobile data and business demand for increased productivity and new applications had driven an increase in the capacity of leased lines networks, growing by around 20-25% per annum over recent years.[114]

2.84   Research commissioned by Ofcom looked at how demand from businesses, MNOs and telecoms service providers for leased lines services might change over the coming years[115]. Findings indicated that this was likely to be a period of increasing demand for high capacity lines driven by developments in the enterprise market (with the move to cloud-based computing), the mobile market (with increased demand for data and the rollout of 5G), and in the traffic generated by residential fixed broadband market (with the scale rollout of ultrafast broadband services).[116]

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[114] 2019 BCMR Statement, paragraph 3.51.
[115] Ofcom engaged Cartesian to research how UK large enterprises are using communication services, assess their level of satisfaction, and investigate how they see their future needs evolving over the next 5 years.
[116] Ofcom, 2018. *Cartesian Business Connectivity Market Assessment* (2018 Cartesian Report).

Volume forecasts

2.85   Generally, looking forward, information provided by network operators suggests that the demand for leased lines is expected to increase driven, amongst other things, by greater business use of cloud-based applications, increased demand by MNOs for higher bandwidth backhaul, and increased demand from fixed telecoms network operators for higher bandwidth backhaul and core leased lines.

2.86   Figure 2.16 below shows the results of a forward-looking analysis of total leased lines retailed connections by speeds (using information provided by leased lines operators)[117]. Based on evidence and our estimation, the number of 100Mbit/s connections is expected to decrease from around [✂]% today to [✂]% by the end of 2025. This decrease is driven by growing demand for 1Gbit/s and 10Gbit/s connections. Speeds of 1Gbit/s and over will amount, by the end of 2025, for [✂]% of all leased lines retailed connections.

Figure 2.16: Total leased lines retailed connections, by speed: 2019-2025
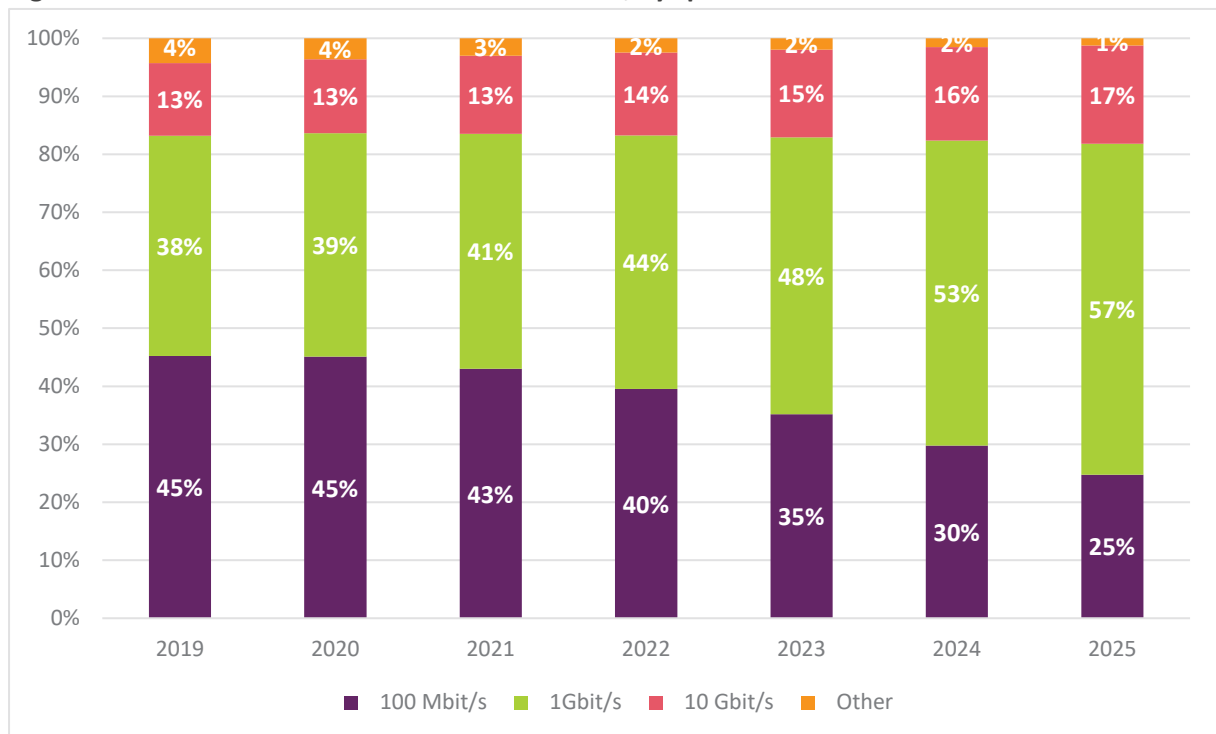
Source: Ofcom estimates based on information provided by relevant parties.

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[117] [✂] response dated [✂] to the s.135 notice dated [✂]; [✂] response dated [✂] to the s.135 notice dated [✂]; [✂] response dated [✂] to the s.135 notice dated [✂]; [✂] response dated [✂] to the s.135 notice dated [✂]; and [✂] response dated [✂] to the s.135 notice dated [✂].

Consultation question

36

> Question 2.1: Do you agree with our description of retail markets? Please set out your reasons and supporting evidence for your response.

3. Physical infrastructure – product market definition

3.1   In this section we consider the product market definition of the most upstream market – physical infrastructure.

3.2   In summary, we propose to define the product market as the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network.

Modified greenfield approach

3.3   When carrying out our market definition analysis, the regulatory framework sets out that we should follow a modified greenfield approach, as explained in Annex 5. In applying this approach, we need to consider whether retail markets would be competitive in the situation where there is no access regulation.

3.4   Without any access regulation we would expect competition at the retail level to be based on vertically integrated providers (i.e. retail providers that operate their own networks and physical infrastructure).

a)   For residential services, competition would predominantly be driven by BT and Virgin Media (though it is possible that some providers could build their own infrastructure and networks to provide residential services). However, given the cost of extensive network build, and noting the importance telecoms providers have placed on access to BT's ducts and poles in their own business plans (as explained in Section 1 above), we would not expect to see sufficient rival investment in new physical infrastructure to lead to the retail market becoming competitive.

b)   For leased lines, in most areas retail competition would again be largely based on the presence of Virgin Media's network. In some business districts, more competing networks are present. However, even in these areas in past reviews we have generally concluded retail markets would not be competitive absent wholesale regulation.[118] Based on information provided to us by leased lines network providers, there is unlikely to be significant new build (either to increase providers' coverage within business areas where they are already present, or to build into new areas), absent wholesale access to existing physical infrastructure.

3.5   Therefore, in our market definition and market power assessment, we focus on the extent of competition likely to arise from physical infrastructure which is self-provided by telecoms providers.

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[118] In the 2019 BCMR Statement we concluded that BT held SMP in leased lines everywhere except the CLA, taking the PIA remedy into account.

Product market definition

3.6   We use the term physical infrastructure to refer to all parts of a network which can be used to host elements of a telecoms network. It can include pipes, masts, ducts, inspection chambers, manholes, cabinets, buildings or entries to buildings, antenna installations, towers and poles.[119]

3.7   There are a number of physical infrastructures in the UK which could potentially support the deployment of telecoms networks by third party access seekers. These vary in their geographic coverage, the type of end-users they connect, and the way in which they connect to end-users. Some of these infrastructures were purpose built to deploy telecoms networks (such as those owned by BT and Virgin Media), whereas others were built to supply non-telecoms services such as electricity, gas, water and railways.

3.8   As set out in Annex 5, we use the hypothetical monopolist test framework to define the scope of the product market. To do this, we must first identify a focal product. The approach is to check whether a hypothetical monopolist of the focal product would find it profitable to set a price above a competitive level. If the price rise would not be profitable, the candidate market is expanded to include the closest substitutes for the focal product, and the price test is repeated.

Focal product

3.9   In our 2019 PIMR Statement, we defined a focal product of wholesale access to telecoms physical infrastructure for deploying a telecoms network. We propose the same focal product for the reasons set out below.

3.10   Our proposed focal product includes all physical infrastructure which is:

a) Deployed for the purposes of supporting a telecoms network (i.e. we exclude non-telecoms infrastructure), irrespective of the owner of that infrastructure; and

b) Deployed to host fixed (or 'wired' elements) of telecoms networks (e.g. ducts, poles and chambers). We exclude physical infrastructure which is deployed to host the radio transmission and reception equipment needed for wireless connections in a telecoms network (e.g. masts and antenna installations).[120]

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[119] This definition is based on the Broadband Cost Reduction Directive (*Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks*, 23 May 2014, OJEU L155/1) [accessed 2 December 2019]. In this document 'physical infrastructure' is defined as "any element of a network which is intended to host other elements of a network without becoming itself an active element of the network, such as pipes, masts, ducts, inspection chambers, manholes, cabinets, buildings or entries to buildings, antenna installations, towers and poles".

[120] We note that physical infrastructure intended to support wireless elements of telecoms networks is largely separate from physical infrastructure intended to support fixed elements of telecoms networks. For example, BT's physical infrastructure is not currently being used for radio equipment. We acknowledge that, in the longer term, innovation may lead to there being a higher degree of overlap in the use of these two infrastructures. However, we do not consider this will materialise in this review period.

3.11   We propose to include all operators' telecoms physical infrastructure within the focal product as the underlying product they would be making available to access seekers is broadly similar.

3.12   We recognise that there are differences between the telecoms physical infrastructures owned by different operators, most notably in terms of the geographic coverage of the network, the breadth and contiguity of that coverage, and the types of premises they connect to. These differences are likely to be an important determinant of the strength of the competitive constraint that different operators impose. Depending on the nature of the network a specific access seeker is deploying, some operators' telecoms physical infrastructure may be better suited than others. We take account of these differences in our analysis of geographic markets and assessment of market power.[121]

Demand-side substitution

3.13   Demand-side substitutability is used to measure the extent to which customers are prepared to substitute other services or products for the service or product in question. We consider both the direct and indirect constraints on telecoms physical infrastructure.

Non-telecoms physical infrastructure as a direct constraint

3.14   Access to non-telecoms physical infrastructure could be potentially useful in the deployment of telecoms networks. We, therefore, consider whether a telecoms network builder would view access to non-telecoms physical infrastructure as a good alternative to infrastructure built to support telecoms networks.

3.15   In our 2019 PIMR Statement, we concluded non-telecoms physical infrastructure was not a direct constraint. In summary, we found that:[122]

a)   Although non-telecoms infrastructure can be used as part of telecoms network deployments, its current use in the UK is relatively limited and represents a small fraction of the total telecoms network deployment;[123]

b)   Evidence suggested that there are various reasons why using non-telecoms physical infrastructure at scale is either not viable, or involves relatively higher cost and operational complexity;[124] and

c)   No telecoms provider in the UK has so far used non-telecoms physical infrastructure for scale network deployment, despite non-telecoms physical infrastructure being

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[121] From an economic perspective, market definition is a means to the end of identifying market power. Provided all relevant constraints are identified and taken into account at some stage in the market analysis, the order in which we consider those constraints will not alter the conclusion of our market power identification.
[122] For more detail, see 2019 PIMR Statement, paragraphs 3.56 to 3.61. We consider that this reasoning remains valid in the context of our current review.
[123] 2019 PIMR Statement, paragraph 3.57 and Annex 3.
[124] 2019 PIMR Statement, paragraph 3.60.

available through commercial deals arranged by the owners of such infrastructure or through use of the ATI Regulations.[125]

3.16 We concluded that non-telecoms physical infrastructure is a poor substitute for telecoms physical infrastructure for the purposes of deploying telecoms networks, and so we would not expect to see switching at sufficient scale in response to a small but significant and non-transitory increase in price (SSNIP) of telecoms physical infrastructure to warrant widening our product market to include it.

3.17 In the short time that has elapsed since publication of the 2019 PIMR Statement, we have not become aware of evidence, or received submissions, that the situation has changed. Also, the evidence that we have gathered, as part of this review via discussions with stakeholders, indicates that the barriers to using non-telecoms physical infrastructure, and the reasoning identified above, will not materially change during the market review period. We, therefore, have no reason to believe that, over the review period, use of non-telecoms physical infrastructure for deploying telecoms networks will become materially more viable. We, therefore, propose to conclude that non-telecoms infrastructure should not be included in the relevant physical infrastructure product market.

Wireless as a direct and indirect constraint

3.18 Some telecoms networks use wireless in place of fixed connections. This may be to enable mobile networks, or it may be to take advantage of lower deployment costs. The degree to which wireless can be used, in what form, and at what level in the network architecture, depends on what services are being provided. However, for those parts of delivery where a wireless connection is used, access to physical infrastructure to house cables is not required.

3.19 Wireless, therefore, represents, in principle, a potential constraint on a hypothetical monopolist of access to telecoms physical infrastructure.[126]

3.20 There are various forms of wireless connection, with different applications. We consider the following applications of wireless:

a) using microwave links for mobile backhaul;

b) using satellite to deliver broadband services; and

c) using fixed wireless access (FWA)[127] to deliver broadband services.

Microwave links

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[125] *The Communications (Access to Infrastructure) Regulations 2016* (the ATI Regulations) [accessed 2 December 2019] implement the Broadband Cost Reduction Directive. They are a set of measures intended to reduce the cost of deploying high-speed electronic communications networks, including sharing the physical infrastructure of telecoms network providers as well as infrastructure operators in other sectors (e.g. gas, electricity).
[126] The constraint from wireless could take the form of a direct constraint, or an indirect constraint. The hypothetical monopolist could be directly constrained by access seekers who might have deployed fixed connections switching to using wireless connections in response to a SSNIP, or it could still be indirectly constrained by customers switching downstream from products provided using fixed telecoms physical infrastructure to products provided using wireless connections.
[127] We explain what FWA is and how it might be used by telecoms providers in Annex 6.

3.21   Microwave links are widely used by mobile network operators for backhaul. We, therefore, consider whether the threat of mobile network operators switching from leased lines to microwave for backhaul is an indirect constraint on physical infrastructure.

3.22   In the 2019 PIMR Statement, we found microwave links to be a poor substitute for leased lines for mobile backhaul. In summary, this is because of their:

a) ability to support only lower capacity links compared to fibre-based backhaul, means access seekers are likely to need to rely on fixed connections in higher traffic areas;

b) requirement for line of sight (LoS) connectivity;

c) significantly lower transmission range than fibre-based backhaul links; and

d) higher risk of failure because microwave antennas are exposed.

3.23   Generally, microwave links are used for mobile backhaul where MNOs do not need the higher capacity offered by leased lines and use of leased lines would be costly (for example, rural areas). Looking forward, as demand for higher capacity mobile services increases (especially with the deployment of 5G), the effectiveness of microwave backhaul is, therefore, likely to reduce further, only being used to fill gaps where demand is lower and it is not cost-effective or practical to use fibre.

3.24   We, therefore, propose that microwave links are not included in the product market.

Satellite

3.25   Satellite technology can be used to provide broadband services, and services are available everywhere in the UK. We, therefore, consider whether the potential for retail customers to switch to satellite-based services is an indirect constraint on physical infrastructure.

3.26   In Section 2, we explain that currently satellite is not likely to be a good substitute for fixed broadband connections and, as such, does not provide a significant indirect constraint on physical infrastructure. In summary, this is because satellite services offer lower speeds and poorer latency, lack a voice service, and have higher prices.[128]

3.27   We recognise that there are some ongoing developments in satellite technologies, such as the development of LEO satellite systems. However, evidence on the time and cost required to deploy these systems suggests that, over this review period, satellite is unlikely will become a material constraint on fixed line services.

3.28   Therefore, we propose that satellite is not included in the relevant product market.

FWA

3.29   FWA technology can be used in network deployment for the provision of broadband services. We, therefore, consider whether the opportunity for network operators to use FWA is a direct constraint on fixed infrastructures.

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[128] A consumer survey we conducted for the 2018 WLA found that at most 2% of consumers said they would consider switching to satellite in response to a 10% SSNIP on fixed-lined broadband; this is lower than or equal to the proportion of consumers that said they would consider giving up internet access (see 2018 WLA Statement, paragraphs 3.90-3.94).

3.30   In Section 2 we discuss FWA. In summary, we find that use of FWA is currently limited, and is likely to remain limited, because:

- supported speeds may be lower;
- capacity may be constrained compared to fixed services; and
- coverage may be limited.

3.31   Also, FWA providers will still require access to physical infrastructure for fixed links to cell sites or nests of cell sites.[129] The opportunities for using FWA technologies are likely to be limited to certain elements of telecoms physical infrastructure (e.g. lead-ins). This limits the strength of any constraint faced by a hypothetical monopolist of telecoms physical infrastructure from FWA, even if FWA were to prove more successful than expected.

3.32   We, therefore, propose not to include FWA in the product market.

Supply-side substitution

3.33   Supply-side substitutability is used to measure the extent to which suppliers other than those offering the product or service in question would be able to switch, or increase, production to supply the relevant products or services.

3.34   In the 2019 PIMR Statement, we stated that we believed that potential entry to supply telecoms physical infrastructure access takes considerable time and involves incurring significant sunk costs.[130] We see no evidence to change our view, and, therefore, continue to believe this is true. Therefore, we propose that there are no supply-side substitutes for access to telecoms physical infrastructure.

Our provisional conclusion

3.35   In light of the above, we provisionally conclude that the product market is the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network.

Consultation question

Question 3.1: Do you agree with our provisional conclusion on physical infrastructure product market definition? Please set out your reasons and supporting evidence for your response.

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[129] There is currently uncertainty about what FWA deployments will look like, and the extent to which they will use fixed connections. Various network configurations are possible, with some still very reliant on access to telecoms physical infrastructure for fixed connections. For example, one possibility is that fibre is used for connections up to very distributed small cells, with 5G used to deliver only the 'lead-in' to the customers' premises. In this case, the backhaul required for these cells could have a very high degree of overlap with a full fibre broadband network. Conversely, FWA might be provided over a smaller number of less distributed cells, and/or cells could be connected to the network using wireless backhaul. In this case, there would be less reliance on access to physical infrastructure, although it would still be required in parts of the network.

[130] 2019 PIMR Statement, paragraphs 3.81-3.83.

4. Physical infrastructure – geographic market definition

4.1   In this section we consider the geographic dimension of the product market we proposed defining in Section 3. For the reasons set out below, we propose a national geographic market for wholesale access to telecoms physical infrastructure for deploying a telecoms network.[131]

4.2   We also set out why we consider our provisional findings on market definition satisfy the three-criteria test set out in the 2014 EC Recommendation[132] and are, therefore, susceptible to *ex ante* regulation.

Approach to geographic market definition

4.3   When considering the presence of telecoms physical infrastructure, we consider that geographic areas of the UK can be broadly categorised as those where:

- BT's infrastructure passes virtually every premises and there is limited alternative telecoms infrastructure ('**Category A**');
- alternative telecoms infrastructure has been deployed to support MSNs (at present, Virgin Media is the only significant operator with such infrastructure) ('**Category B**');
- a high presence of alternative telecoms infrastructure has been deployed to supply leased lines ('**Category C**'); and
- significantly more alternative telecoms infrastructure has been deployed to supply leased lines than in Category C above ('**Category D**').

4.4   We have based this categorisation on our understanding about the presence of broadband and leased lines operators in downstream markets as a proxy for presence upstream.[133]

4.5   Table 4.1 below shows the percentage of the UK (by postcode sectors and by number of premises) that fell within each category in 2018. It also shows the percentage of UK large business sites and mobile sites (taken together) that fell within each category.

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[131] Excluding the Hull Area.

[132] European Commission, *Commission Recommendation of 9 October 2014 on relevant product and service markets within the electronic communications sector susceptible to ex ante regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services (2014/710/EU)*, 11 October 2014, OJEU L 295/79, (2014 EC Recommendation) [accessed 3 December 2019], page 6.

[133] We note that in some cases downstream services are provided over the same network and therefore the same infrastructure; and that there is some sharing of physical infrastructure, but this is currently limited. We also recognise that, in some cases, downstream services are provided using direct buried cables and, as such, there is no physical infrastructure that is accessible to third parties. We have taken account of these factors in categorising areas of physical infrastructure presence.

Table 4.1: Postcode sectors, premises and large business and mobile sites falling within each category

	Category A	Category B	Category C	Category D	Total (UK excluding Hull Area)
Relevant postcode sectors	5,983	3,412	304	275	9,974
% of total postcode sectors in UK excluding Hull Area	60%	34%	3%	3%	100%
Premises in relevant postcode sectors	15.5m	13.0m	0.4m	0.2m	29.2m
% of total premises in UK excluding Hull Area	53%	45%	1%	1%	100%
Large business sites and mobile sites in relevant postcode sectors	89.0k	59.0k	5.4k	4.2k	157.7k
% of total business/mobile sites in UK excluding Hull Area	56%	37%	3%	3%	100%

Source: Ofcom.[134]

4.6   Using our statutory information gathering powers, we collected information from operators on more recent network deployment to update that set out above.[135] As at June 2019, there had been deployment of some new telecoms physical infrastructure particularly to support MSN roll-out e.g. the ongoing builds by CityFibre, FibreNation, and Virgin Media.

4.7   As this is a forward-looking review to 2026, we also asked operators about their future build plans over that period. Based on their responses, we expect continued deployment of some new infrastructure to support network roll-out.[136] However, we expect that:

- where infrastructure build is independent of the use of PIA, it is likely to be locally targeted / geographically limited in scale of roll-out;
- where the build is at scale it will be dependent on the use of PIA for part of the build; or

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[134] This table was used in the 2019 PIMR Statement (Table 3.2 on pages 34-35). We consider that the four geographic areas defined in the 2019 PIMR Statement map onto the four categories we have set out.

[135] We sent notices under section 135 of the Communications Act 2003 to a range of telecoms providers from July 2019 requesting information about, among other things, network investment plans and current and future use of physical infrastructure.

[136] Operator's build plans are discussed in Annex 7.

- it is a continuation of an existing approach such as Virgin Media's current network expansion investment.

4.8   In addition, much of the new network build is direct-buried or micro-trenched, so is not suitable for use by access seekers and, in general, we consider there to be high barriers to constructing new telecoms physical infrastructure, given the large sunk costs of entry.

4.9   So, whilst there is potential for significant deployment of new fibre networks over the review period, we consider that physical infrastructure access regulation is important to this investment being realised. This suggests that, absent *ex ante* regulation (consistent with the modified greenfield approach), these deployments are far less likely to be as viable or as extensive since in many cases they are expected to rely on PIA. Any deployment that relies on PIA will leave conditions in the physical infrastructure market unchanged. Furthermore, even where there is investment in new physical infrastructure, it may not be available or suitable for third parties' access.

4.10   Where there is some investment in new 'accessible' physical infrastructure, the impact could merely be some geographic localities moving between the categories of areas outlined above (for example an area identified as having no alternative presence could become an area with some presence if Virgin Media's Project Lightning extended build in an area where it had previously had relatively low coverage, or where CityFibre deploys into a new town where Virgin Media has limited presence).

4.11   In the following sub-sections, we assess whether:

- the conditions of competition are sufficiently homogenous across all these categories of areas to be defined as a national market; or
- that competitive conditions are likely to be significantly different and distinguishable between categories of areas such that we should consider defining sub-national markets.[137]

4.12   As explained in Annex 5, the regulatory framework allows for an aggregation of geographic areas into areas where "conditions of competition are similar or sufficiently homogenous".[138] There is no requirement for competitive conditions to be perfectly homogeneous across all geographic areas included within one market.

4.13   As there is no significant active market in the supply of wholesale access to telecoms physical infrastructure (it is largely used only for self-supply), we do not focus on market shares of infrastructure supply to evidence differences in competitive conditions between areas.[139] Instead, we carry out a qualitative assessment of conditions of competition based on the needs of telecoms physical infrastructure access seekers.[140]

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[137] If we were to consider defining sub-national markets, then we would need to carry out a more granular analysis of different areas of the UK in order to determine the boundaries of those sub-national markets.
[138] See EC SMP Guidelines paragraph 48.
[139] We consider BT's shares of current downstream services are the best available indicators of BT's position upstream.
[140] We acknowledge that access seekers wishing to deploy networks may view the constraint imposed by different types of physical infrastructure differently. We take this into account when conducting our assessment.

4.14   In the following sub-section, we, therefore, first consider what access seekers need and, with this in mind, we then go on to assess the conditions of competition in the four categories of areas we set out above.

Geographic assessment

Ubiquity is the key advantage for access seekers

Our proposal

4.15   We provisionally conclude that a ubiquitous infrastructure is likely to have material advantages over non-ubiquitous infrastructure for access seekers, wherever they seek to deploy.

4.16   As such, ubiquity of an infrastructure is a key characteristic we consider in assessing the competitive conditions in the different categories of areas we have described above.

Our reasoning

4.17   We consider that a ubiquitous telecoms physical infrastructure is likely to be preferred by access seekers to alternative telecoms physical infrastructure which is not ubiquitous. By ubiquitous, we mean an infrastructure which provides the ability to connect to any premises or site within a given geographic area, rather than an infrastructure which provides national coverage.[141]

4.18   We consider that this is important because:

- Most telecoms networks are built to connect to premises or sites in response to demand, and the precise location of this demand is not known at the point of network deployment. Irrespective of the business model adopted (e.g. whether targeting certain types of customers or all types of customers) the ability to provide any connection in response to future demand, quickly and without significant cost, is likely to be important.[142] This is more likely to be possible if using a ubiquitous infrastructure, than one that is not ubiquitous.[143]

- The ability to connect any premise or site using a ubiquitous infrastructure allows an access seeker the flexibility to expand the scale and scope of its deployment beyond its initial plans without significant additional connection cost and time lags. This provides an option value to access seekers, reducing the need to pre-specify roll-out plans *ex*

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[141] For the avoidance of doubt, the advantages we outline below mainly derive from the ability to connect to any premises or site within a given geographic area. However, there are further advantages which derive from national coverage.
[142] This is also likely to reduce lead times and increase certainty of delivery dates, which end users of leased lines consider important factors when choosing supplier. See 2019 BCMR Statement, Section 6, paragraph 6.53 and Annex 11.
[143] A ubiquitous infrastructure will also enable multiple routes between two given connection points, offering greater resilience for certain customers.

ante. This flexibility is likely to be important for risky investments where demand may evolve over time.[144]

4.19 Therefore, access seekers are likely to value a more ubiquitous physical infrastructure wherever they are seeking to deploy. Even if it is theoretically possible for an access seeker to deploy to a commercially attractive number of premises using a non-ubiquitous infrastructure, using a ubiquitous infrastructure is likely to offer material advantages, for the reasons above.[145]

4.20 We acknowledge that in some circumstances it may be possible to combine multiple non-ubiquitous infrastructures, or supplement use of non-ubiquitous infrastructure with partial self-build. However, we consider that access seekers will seek to minimise the number of alternative infrastructures used to deploy their network, due to the costs and uncertainty associated with combining multiple infrastructures.[146]

4.21 We recognise that an access seeker might not deploy a network exclusively using a single infrastructure and as such access seekers will mix-and-match on occasion. For example:

a) Access seekers may desire a different network architecture to that offered by any single existing infrastructure.[147]

b) Capacity constraints in the existing network (including directly buried lead-ins which cannot be used by access seekers) may compel an access seeker to utilise alternatives to provide those connections.

c) Local authorities may have expressed a strong preference for making use of their assets, in order to avoid disruption.[148]

4.22 However, in general, such usage of self-build and mix-and-match is based on necessity, rather than preference, and so would not constrain the behaviour of owners of ubiquitous infrastructure.

4.23 We, therefore, provisionally consider that a ubiquitous infrastructure is likely to provide material advantages for most access seekers, regardless of scale and scope. This is the key

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[144] The telecoms sector is fast-moving and dynamic, with continually evolving demand and supply, driven by innovation in technology and customer services and changes in consumer preferences. By their nature these changes cannot be predicted with certainty.

[145] We note that as there is only one ubiquitous infrastructure in the UK, using it enables an access seeker to reach the areas where there is less existing downstream competition from retail services provided over alternative, non-ubiquitous infrastructures. On the other hand, using a non-ubiquitous infrastructure confines an access seeker to areas where there already exist at least two competing infrastructures. The level of existing competition is a relevant factor for access seekers, as it affects the expected take-up and revenue – for example [✂]. This is a distinction from when Virgin Media's network was built – it did not face different levels of competitions from alternative infrastructures (there was only BT). Virgin Media's (and other alternative infrastructures') presence now means prospective access seekers face areas of differing degrees of competition.

[146] In the 2019 PIMR Statement (pages 45-46, paragraph 3.169) we identified various costs of combining multiple infrastructures, based on our discussions with stakeholders. These included the cost and time of undertaking civils work to break in and out of different infrastructures; the duplication of maintenance costs associated with multiple infrastructures; and the time, cost and complexity of developing and maintaining multiple stakeholder relationships.

[147] See for example [✂].

[148] [✂].

characteristic we test below in assessing the conditions of competition in the different categories of areas we outlined above.

Conditions of competition in areas where there is limited alternative infrastructure (Category A)

4.24   In areas where there is limited alternative infrastructure and where BT's infrastructure passes virtually every premises, BT is unlikely to face any competitive constraint.

Conditions of competition in areas where alternative infrastructure has been deployed to support MSNs (Category B)

4.25   We consider that conditions of competition are sufficiently homogeneous between Category A areas and Category B areas such that they can be aggregated for the purpose of geographic market definition. This is because we consider BT does not face an effective constraint in Category B areas, for the following reasons:

- As explained above, access seekers are likely to prefer a ubiquitous infrastructure wherever they are seeking to deploy. At present there is one significant alternative infrastructure deployed to support MSNs – that owned by Virgin Media. In the areas where Virgin Media has a material presence, its coverage of premises remains below that of BT.[149] In some postcode sectors within its footprint, Virgin Media covers over [✂]% of premises. However, these postcode sectors are distributed across the Virgin Media footprint generally so that there are not large areas with contiguous coverage of over [✂]%.[150] Virgin Media's average coverage of large business sites and mobile cell sites is also lower than its coverage of all premises.[151]

- Even where Virgin Media and BT cover the same individual premises, BT's lead-in infrastructure is likely to offer cost and capacity advantages in terms of connecting premises. BT's infrastructure delivers around 50% of lead-ins overhead[152] whereas Virgin Media's are all underground.[153] This difference in mix of lead-ins means that connecting customers using BT's infrastructure is likely to be quicker and cheaper as using poles is likely to be quicker and cheaper than underground lead-ins. In addition, poles offer greater certainty over whether the existing infrastructure is useable as access seekers can more easily assess the state and capacity of a pole than they can an underground duct. We also understand Virgin Media's infrastructure (such as its Toby

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[149] The Virgin Media network may not cover some specific premises in areas where its network is otherwise present, or may miss areas of coverage within its wider footprint.

[150] See Annex 4 (Evidence of telecoms physical infrastructure coverage) of the 2019 PIMR Statement which used, among other sources, Connected Nations December 2018 data to estimate contiguous coverage of Virgin Media's network.

[151] Using 2017 data, we estimated that [✂]% of large business and mobile sites to be, on average, within 50m of Virgin Media's network in those postcode sectors which we considered Virgin Media to be present.

[152] i.e. dropwires attached to premises from nearby poles.

[153] Either ducted or directly buried.

boxes[154]) will not have spare capacity to accommodate further cables and cannot readily be used by an access seeker.

4.26 Virgin Media is expanding its network (as part of its Project Lightning). This is likely to mean coverage in some areas increases. This may mean there are larger contiguous areas of high penetration. However, the extent to which this addresses the issues above is uncertain and, regarding the advantages of BT's lead-in infrastructure to access seekers over Virgin Media's, unlikely to lead to any material difference.

4.27 We propose this also holds for areas with other infrastructure supporting MSNs since:

- These areas tend to be much smaller than the Virgin Media footprint;
- The ubiquity of alternative infrastructure within these smaller areas is likely to be less than Virgin Media;[155] and
- Is also unlikely to alter the advantage of BT's lead-in infrastructure.

4.28 We, therefore, provisionally consider that other infrastructure is likely to be less attractive to access seekers.

Conditions of competition in areas which have a high presence of alternative infrastructure deployed to supply leased lines (Category C)

4.29 Certain geographic areas have a high presence of alternative infrastructure deployed to supply leased lines. Given the nature of the deployment, this infrastructure is typically deployed to provide connections to large business and mobile sites (rather than to maximise coverage to residential premises). As we set out in Section 7, we consider a high presence of leased lines to mean at least two alternative networks that can reach within 50m of more than 65% of large business and mobile sites within a given area. Although we adopt this as the basis for our provisional assessment below, we do not consider that slight changes in those parameters would materially alter our assessment.

4.30 While there may be greater competition for providing connections to large business and mobile sites, we consider that BT will still not face an effective competitive constraint from alternative infrastructure in these areas. We consider that conditions of competition are, therefore, sufficiently homogeneous between these areas and Category A and Category B areas such that they can be aggregated for the purpose of geographic market definition.

4.31 We consider that BT will not face an effective constraint in these areas for the following reasons:

a) Infrastructure targeted at supplying leased lines has a much lower coverage of all premises within the geographic area than its coverage of mobile and business sites. As

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[154] A small underground access chamber for housing subscriber terminations typically positioned just outside the curtilage of each customer premises passed by the network.
[155] Because of their greater use of existing infrastructure and/or micro-trenching to support their network build rather than constructing new infrastructure which could potentially be used by an access seeker.

such it is much less attractive to providers looking to deploy an MSN (or a broadband only network) than BT's ubiquitous infrastructure.

b) In the majority of cases, when alternative infrastructure is deployed to supply leased lines in a given area, it will not be close to every large business or mobile site in that area.[156] By contrast, BT's infrastructure is typically ubiquitous. In order to deploy throughout an area, or to any given set of sites within that area, an access seeker would, therefore, face significantly higher costs if it needs to combine multiple infrastructures, relative to using BT's ubiquitous infrastructure.

c) Even where alternative infrastructure is close to a large business or mobile site in these areas, on average it is further from the end customer than BT's network.[157] This is likely to give rise to a significant cost advantage of using BT's network.[158] Moreover, where BT's duct is already connected, the convenience from being able to readily connect to a customer is likely to be a significant advantage when seeking to attract downstream leased lines customers.[159]

d) Areas with a high presence of alternative infrastructure used to supply leased lines to larger business and mobile sites are generally smaller than that of a typical MSN deployment.[160] As such, the limited availability of alternative infrastructures in the surrounding areas means that access seekers will need to combine access to multiple infrastructures, adding time, cost and operational complexity.

Conditions of competition in areas with significantly more alternative infrastructure deployed to supply leased lines (Category D)

4.32 In our previous market reviews, we have found that an area within London has a uniquely high presence of leased lines networks compared to other areas of the UK.[161] Consequently, we consider this category of area, which we provisionally define in our downstream market assessment as the CLA, to have significantly more alternative infrastructure than Category C areas.[162] We recognise that in the 2019 BCMR Statement we

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[156] By way of illustration, in 2019 PIMR Statement we found that in 50% of postcode sectors in the HNR areas where at least one large business or mobile site is located, there was no single alternative infrastructure that was within 50m of every large business or mobile site in the postcode sector. See 2019 PIMR Statement, page 50, paragraph 3.191.

[157] We refer to our assessment of the presence of rival infrastructure using a range of infrastructure indicators in 2019 BCMR Statement, Section 6, paragraphs 6.125 to 6.126 and Table 6.6.

[158] In our 2019 PIMR Statement, page 51, footnote 189 we calculated that using BT's infrastructure would have a cost advantage of around £2,600.

[159] In our 2019 BCMR Statement, page 98, paragraphs 6.52 to 6.53 we explained that BT will more often have a physical infrastructure connection to customer sites. Our analysis showed that BT had existing duct connections to 81-90% of its 2017 new customer ends in the UK excluding the Hull Area, compared to 46% across all rivals, collectively.

[160] See Section 7.

[161] The boundaries of this area have changed as we have periodically reviewed the wholesale services markets for leased lines. Our current review of downstream services is set in Section 7 where we propose to define a CLA. However, the precise delineation of the area is not important to our assessment. We are assessing a generic area of very high presence of telecoms physical infrastructure used to supply leased lines.

[162] As noted above, we take the presence of alternative networks as a proxy for the presence of alternative telecoms physical infrastructure.

found that BT did not have SMP in downstream LL Access markets related to the upstream market for telecoms physical infrastructure in the CLA.[163]

4.33   We consider that BT is unlikely to face an effective direct competitive constraint from alternative telecoms infrastructure in this area, and we, therefore, consider the conditions of competition to be sufficiently homogeneous to aggregate it with the other categories of areas described above.

4.34   We recognise that there is significantly more alternative infrastructure present in the CLA, both in aggregate, and in terms of the proportion of the large business and mobile sites that any individual infrastructure covers, than in the other categories of areas we describe above. Whilst this means that it is more likely that an access seeker could provide coverage to the majority of business sites using a single infrastructure which is not BT, we nonetheless consider that BT maintains advantages arising from its control of access to a ubiquitous telecoms physical infrastructure, which grants it cost and time advantages in the installation of new lines:

4.35   The evidence found in the 2019 BCMR shows that:

a)   The single infrastructure with the closest average proximity to customer sites is on average [✂]m away.[164] Using BT's infrastructure is likely to have a significant cost advantage (around £[✂] per dig) compared to using this infrastructure.[165]

b)   BT has a higher proportion of on-duct connected new provisions [✂]% [91%-100%] than alternative infrastructures (76%).[166]

c)   Alternative operators only built for 11% of the connections where they were not duct connected, preferring instead to purchase off-net i.e. lease a connection from someone else such as Openreach.[167]

4.36   Furthermore, in respect of connecting residential premises, coverage of alternative infrastructures is low: no single alternative infrastructure passes more than 30% of premises in the CLA. This can be compared with BT's infrastructure, which passes nearly all premises. For access seekers wishing to deploy to residential premises, alternative telecoms infrastructure is unlikely to provide an effective constraint on BT given the importance of ubiquity to access seekers (outlined above). As noted in Section 1, over the time period of this review, we expect access seekers to increasingly deploy MSNs (rather than leased lines only networks), such that this factor is likely to become increasingly relevant.

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[163] This was the finding in our 2019 BCMR Statement for the Contemporary Interface Access market. We note that the imposition of an unrestricted physical infrastructure access remedy was a factor in this assessment.
[164] This is greater than the average closest alternative network (16m – see the 2019 BCMR Statement, Section 6, pages 121-122, Table 6.9) because the closest alternative network will not be the same for each site. We note that access seekers are likely to prefer to minimise the number of alternative infrastructures used to deploy a network. If instead an access seeker was to seek to deploy its network by using the closest alternative network to each business site, it would save some dig costs, but would instead need to incur the costs of breaking in and out of multiple networks.
[165] Calculations of infrastructure costs for different proximity scenarios are summarised in the 2019 BCMR Statement, page 99, Section 6, Figure 6.1 and set out in Annex 10.
[166] 2019 PIMR Statement, page, 52, paragraph 3.196.
[167] 2019 PIMR Statement, page, 52, paragraph 3.196.

Importance of infrastructure crossing areas with different levels of build

4.37   We also note that access seekers' deployment plans may span across these different categories of areas. Access seekers are likely to consider the availability of alternative infrastructures across their target deployment area. Given the costs of using different infrastructures in different geographic areas, this may reduce the attractiveness of using alternative infrastructures if they only exist in certain areas. This means, for example, that alternative infrastructure in the CLA may be less attractive if that infrastructure is not also available outside the CLA.

Provisional conclusions on our geographic assessment

4.38   Whilst we consider there is potential for significant deployment of new fibre networks over the review period, we expect that in many cases these investments rely on PIA. Even where there is investment in new physical infrastructure, much of it may not be available or suitable for third parties' access.

4.39   Overall our view is that, absent *ex ante* regulation, we can consider all areas of the UK to have sufficiently similar conditions of competition at this moment even considering the presence of differing infrastructures, and that the impact of new build is uncertain but may further blur any boundaries between areas. Even if the presence of alternative infrastructure did develop beyond the categories of areas we have described in our assessment, we believe that the advantage of BT's ubiquitous telecoms physical infrastructure would still result in the conditions of competition being similar across all areas.

4.40   For these reasons, we propose to define a single national geographic market.

Comparison with finding in the 2019 PIMR

4.41   We recognise that this proposal differs from the view we reached on geographic market definition in the 2019 PIMR Statement (in relation to the review period 2019 – 2021). The 2019 PIMR was our first review of the physical infrastructure market and we undertook a very granular assessment of the presence of alternative infrastructure across the UK. We defined four sub-national markets on the basis of network presence.[168] However, we found BT to have SMP in each of those four markets. Even in areas with a high presence of alternative infrastructure such as Central London, we found that this infrastructure would be unlikely to be a sufficient constraint on BT. This was primarily because of the advantage

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[168] We measured the presence of this infrastructure in each of around 10,000 postcode sectors, and then aggregated these into areas where we considered there to be a similar presence of alternative telecoms infrastructure. These areas formed the basis of the four geographic markets we defined: (1) areas where there is no or limited alternative telecoms physical infrastructure to BT; (2) areas with alternative telecoms physical infrastructure that has been deployed to support MSNs; (3) areas outside of the CLA with a high presence of rival telecoms physical infrastructure deployed to support leased lines networks; and (4) the CLA – an area with uniquely high presence of rival telecoms physical infrastructure deployed to support leased lines networks.

offered by the ubiquitous presence of BT's infrastructure and the more attractive features of BT's lead in infrastructure.

4.42   In its comments on our *draft* 2019 PIMR Statement, the European Commission 'invited Ofcom to revisit' this approach on the grounds that larger geographical units, or even a single national market, would not change the SMP finding or the selected remedies and hence the regulatory outcome would be the same. We decided on that occasion that it was appropriate to retain our approach of four separate geographic markets in our *final* 2019 PIMR Statement primarily because this was the first assessment of the relevant market and that our approach mitigated the risk that we would fail adequately to identify differences in the constraints imposed by the alternative telecoms infrastructures which are observed in each different market in the UK.

4.43   Since the 2019 PIMR Statement, we have met and held discussions with a range of stakeholders and requested further information from operators on more recent deployments and their future plans over the period to 2026. On the basis of the very granular assessment we carried out for the 2019 PIMR and our more recent knowledge, we have greater confidence in our understanding of competitive constraints in different areas across the UK and how these are likely to develop over the period of this review. Rather than defining geographic markets on the basis of a count of network presence, we are, therefore, proposing to take a broader view of whether conditions of competition are sufficiently homogeneous across different categories of areas. In this respect, we note that market definition is not an end in itself, but a means of assessing market power.[169]

Provisional conclusion on geographic market definition

4.44   We provisionally conclude that the geographic market for wholesale access to telecoms physical infrastructure for deploying a telecoms network is the UK excluding the Hull Area.

Application of the three criteria test

4.45   Under the regulatory framework, in considering whether it is appropriate to impose regulation in electronic communications markets, NRAs must begin by defining relevant markets appropriate to national circumstances in accordance with the principles of competition law and taking utmost account of the 2014 EC Recommendation. This Recommendation lists a number of markets in which it is presumed that *ex ante* regulatory obligations may be warranted, taking into account the particular features of those

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[169] This is explained in the regulatory framework. "It should be recognised that the objective of market definition is not an end in itself, but part of a process, namely assessing the degree of an undertaking's market power." (EC SMP Guidelines, footnote 19). "In this regard, it is important for NRAs to bear in mind the purpose of market definition, which is not an end in itself but a means to undertaking an analysis of competitive conditions, for the purposes of determining whether ex ante regulation is required or not." (EC Staff Working Document on the EC SMP Guidelines, page 21).

markets.[170] However, the 2014 EC Recommendation also sets out the following three criteria which must be applied if NRAs wish to identify markets other than those listed:[171]

- the presence of high and non-transitory barriers to entry. These may be of a structural, legal or regulatory nature;
- a market structure which does not tend towards effective competition within the relevant time horizon. The application of this criterion involves examining the state of competition behind the barriers to entry; and
- the insufficiency of competition law alone to adequately address the market failure(s) concerned.

4.46   The market we propose to define for the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network is not on the list of recommended markets. Therefore, it is necessary to apply these three criteria.[172]

High and non-transitory barriers to entry

4.47   The market we are considering exhibits high and non-transitory barriers to entry. In particular, there are significant structural barriers to entry as entry would require very high levels of investment to install new physical infrastructure and would take considerable time. Moreover, the costs associated with such investment are, to a large degree, likely to be sunk.

4.48   We have previously acknowledged these barriers to entry and we see no clear evidence that underlying conditions are likely to change over this review period. Whilst there is potential for telecoms providers to build and this may include deployment of their own physical infrastructure, these network deployments in many cases may rely on access to BT's infrastructure in some areas or parts of the network, and are unlikely to be of a significant scale to impose a significant competitive constraint on BT.

A market structure which does not tend towards effective competition

4.49   We consider that the market we have proposed will not, in the absence of regulation, tend towards effective competition in the foreseeable future.

4.50   BT's market power is significant and entrenched. The extent of BT's market power has not materially changed over time. In the forthcoming market review period, we do not consider that deployment of alternative physical infrastructure will occur to a sufficient extent to provide effective competition (as explained in the next section).

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[170] We anticipate that a new Recommendation on relevant markets will be issued by the European Commission before the end of 2020. We expect to reach our final decisions on this market review in Q4 2020/21 and, in doing so, will, therefore, take any appropriate account of any such new Recommendation.

[171] The three criteria test is used to assess whether markets are susceptible to *ex ante* regulation.

[172] We note more generally that there appears to be growing momentum within the EU behind the inclusion of this market on the list of wholesale markets susceptible to *ex ante* regulation. For example, BEREC is currently preparing a report on access to physical infrastructure in the context of market analyses. [Accessed 17 December 2019.] The report will analyse the potential to isolate this market in order to conduct market analyses that would be methodologically robust and consistent with the regulatory framework.

4.51   We are also not aware of factors that may materially reduce the barriers to entry we have identified. For instance, we have not identified any technological developments that will change competitive conditions in this market in the foreseeable future.

Insufficiency of competition law

4.52   We set out in the next section our provisional conclusion that BT has SMP in the market we have identified, and our main competition concerns arising from this. Specifically:

- BT could refuse to supply access to its physical infrastructure, and thus continue to restrict competition in the provision of products and services in downstream markets;
- BT could provide access on less favourable terms compared to those obtained by its own downstream businesses; and
- BT could set excessive wholesale charges for access to its physical infrastructure or engage in price squeeze behaviour.

4.53   Competition law, in particular the rules prohibiting the abuse of a dominant position, is an important part of the legal framework that BT needs to comply with. Given its position of SMP (which equates to the competition law concept of dominance) BT has a special responsibility not to allow its actions on the market (where conditions of competition are weak) to distort or impair competition.

4.54   However, we consider that national and EU competition law remedies would be insufficient to address the identified competition concerns on their own in this context.

- First, competition law would focus on tackling the abuse of a dominant position and would not be as effective as *ex ante* regulation in promoting downstream competition.
- Second, regulation must remain effective for the review period, and *ex ante* regulation better enables us to do this as it can be tailored to the particular circumstances in the market and services provided.
- Third, competition law does not provide enough regulatory certainty, which itself can undermine downstream competition where there is upstream SMP – and regulatory certainty is important in encouraging long-term investment in competing networks. In contrast, a benefit of *ex ante* regulation is that all industry stakeholders are clear in advance on the regulation that will apply.
- Fourth, *ex ante* regulation can facilitate more timely enforcement due to the greater certainty and specificity provided.

4.55   On that basis, while competition law enforcement may be used in appropriate circumstances, we do not consider that it would be sufficient to rely on it alone and that *ex ante* regulation is required.

Provisional conclusion on application of the three criteria test

4.56   We consider that the physical infrastructure market which we are proposing meets the three criteria test and, therefore, is susceptible to *ex ante* regulation.

Consultation questions

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> Question 4.1: Do you agree with our provisional conclusion on physical infrastructure geographic market definition? Please set out your reasons and supporting evidence for your response.
>
> Question 4.2: Do you agree with our provisional conclusion on the application of the three criteria test to the physical infrastructure market? Please set out your reasons and supporting evidence for your response.

5. Physical infrastructure – SMP analysis

5.1   Having proposed in Section 4 that the market we define is susceptible to *ex ante* regulation, we now carry out our SMP analysis for this market.

5.2   In doing so, we focus on whether BT has SMP in respect of the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network. This is because BT is the owner of the only ubiquitous telecoms physical infrastructure in the UK.

5.3   To evaluate the extent to which BT would face a competitive constraint in the physical infrastructure market, we propose to adopt the same approach as taken in the 2019 PIMR Statement where we assessed the following:

     a)   **Strength of competition from existing competitors:** we consider whether BT would be constrained by telecoms providers switching to alternative telecoms physical infrastructure already in the market.

     b)   We consider the **scope for entry and expansion** by new or existing operators deploying new telecoms physical infrastructure, including whether access seekers can enter the market themselves by self-supplying infrastructure.

     c)   We also consider whether telecoms providers have **buyer power** which weakens BT's market power.

5.4   Our starting point is the 2019 PIMR Statement, where we found BT to have SMP everywhere. We consider whether there have been developments in the short time that has elapsed since these findings were published and we look forward to consider the impact of likely developments over the period of this review to 2026.

Our proposal

5.5   In summary, we propose that, absent *ex ante* regulation, BT would have SMP in our proposed national geographic market for the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network.

Our analysis and reasoning

Strength of competition from other owners of telecoms infrastructure

5.6   In the 2019 PIMR Statement, we found there to be some commercial supply of access to infrastructure between telecoms providers but that this is very limited.[173] In this review, we have asked network operators, looking forward to 2026, about their expectations regarding the use of third-party physical infrastructure. The responses indicated that the only material change would likely be the opportunities for greater access to BT's

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[173] 2019 PIMR Statement, Annex 3, paragraphs A3.2 to A3.7.

infrastructure provided by the regulation imposed in the recent 2019 PIMR Statement.[174] This suggests to us that, absent *ex ante* regulation, the commercial market for the supply of wholesale access to telecoms physical infrastructure would be likely to remain small over the period of this review.

5.7   Generally, in an SMP analysis we would consider market shares within the market being considered. However, trying to calculate market shares in the supply of access to infrastructure is difficult and not very enlightening, because of the significant use of it for own infrastructure which means that like-for-like comparisons of usage of the infrastructure, or revenues from it, cannot easily be assessed. In the 2019 PIMR Statement we, therefore, focussed on assessing the strength of competition to BT from existing competitors based on information from access seekers about what matters to them, including in relation to the characteristics of those networks. In doing so, we acknowledged that there are likely to be multiple potential types of access seeker wishing to deploy telecoms networks, which may view the constraint imposed by different types of physical infrastructure differently.

5.8   As set out in Section 4, a ubiquitous telecoms physical infrastructure is likely to be preferred by access seekers to alternative telecoms physical infrastructure which is not ubiquitous.

5.9   Existing alternative physical infrastructure is largely that owned by Virgin Media and leased lines only networks.

5.10   In relation to Virgin Media infrastructure, as explained in Section 4:

- it does not provide the same level of coverage as BT infrastructure;
- BT's lead-in infrastructure may offer it advantages; and
- Whilst Virgin Media's Project Lightning is extending its coverage, the extent to which this makes its coverage ubiquitous in any area (i.e. comparable to BT), and whether it would be useable by access seekers, is uncertain.

5.11   This means that using BT infrastructure is likely to be cheaper and quicker than using Virgin Media's.

5.12   In relation to leased lines networks, as explained in Section 4, even in areas with greater presence of alternative infrastructure (the areas we identified as Category C and D areas)[175], BT's infrastructure has advantages as it is generally closer to end customers than rival infrastructure, and rival infrastructure has insufficient coverage to be used by access seekers looking to deploy broadband services.

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[174] We sent notices under s.135 to a number of network operators from July 2019 asking, among other things, about the proportion of their network hosted in their own or third-party physical infrastructure as at June 2019 and their forecast out to 2026. We set out the responses we received in Annex 7.
[175] Areas where there is a high or very high presence of alternative telecoms infrastructure that has been deployed to supply leased lines.

5.13 For these reasons, we propose that existing alternative infrastructure is unlikely to exert a material constraint on BT, and that this situation is unlikely to change over the period of this review.

Scope for entry and expansion

5.14 In Section 1 and Annex 7 we describe the significant activity in deploying new networks, or expanding existing networks, currently underway in the UK. We anticipate these and potentially other builds to be rolled out during the period of this review.

5.15 However, we do not expect this significant network build activity to translate into the extensive construction of new telecoms physical infrastructure suitable for use by other access seekers.

5.16 Entry into the market for constructing this kind of physical infrastructure to support large-scale roll-out would require very high levels of investment, a large proportion of which are likely to be sunk costs, and which would take a considerable period of time to deploy. We, therefore, consider that, in general, there are high entry barriers to constructing new physical infrastructure.

5.17 We understand from network operators that their build plans are dependent on:

- wholesale access to BT's existing physical infrastructure via the existing PIA remedy (and so is not relevant under a modified greenfield approach); and/or
- where practical, the use of faster and more efficient construction techniques, such as micro-trenching, which may not be suitable for use by access seekers (so this entry could, therefore, only exert an indirect constraint on BT).

5.18 We consider the dependence on these alternatives to be a reflection of the high barriers facing potential entrants to the infrastructure market.

5.19 Deployment of some new infrastructure is nevertheless expected. There will be parts of network builds where this is either necessary or the above alternatives are not available. But we expect such entry to be geographically limited in scale (and so is unlikely to place a sufficient constraint upon BT).

5.20 For these reasons, we propose that the threat of entry or expansion by new or existing operators would not effectively constrain BT.

Countervailing buyer power

5.21 In general, purchasers may have a degree of buyer power where: a) they purchase a significant and material proportion of a supplier's total volumes; and b) they have a credible threat of switching to an alternative supplier, or to self-supply, to an extent that would materially impact the supplier's profitability.

5.22 Currently, the largest user of BT's physical infrastructure is BT itself, and other providers do not purchase a significant amount of access. Furthermore, BT's involvement downstream weakens its incentive to offer supply of its infrastructure at scale, absent regulation. Even if it did, should an access seeker purchase significant volumes of access to infrastructure, it is

unlikely that there would be a credible threat of it switching sufficient volumes away quickly, given the large switching costs and service disruption that would be involved in removing and re-deploying its network in alternative physical infrastructure. It is also unclear that an alternative provider would be willing to supply access to its infrastructure in such volumes.

Provisional finding on SMP

5.23   For the reasons given above we propose to find that BT has SMP in a national market for the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network.

Competition concerns arising from BT SMP in access to telecoms physical infrastructure

5.24   Having proposed finding that BT has SMP in the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network, we now consider the consequences of this SMP.

5.25   Physical infrastructure is a key enabler of the provision of telecoms services – both in terms of the deployment of new telecoms networks as well as innovation in existing networks. This is because the civil engineering works associated with the deployment of physical infrastructure represent a sizeable proportion of the cost and time to deploy, and, therefore, a barrier to new network investment on a large scale.

5.26   As a vertically integrated provider, BT's access to its physical infrastructure provides it with a significant commercial advantage in the provision of all telecoms services in the UK. This advantage can be seen in the enduring SMP BT continues to maintain in key downstream wholesale services (and would enjoy in the retail services absent regulation).

5.27   Access to ubiquitous telecoms physical infrastructure appears to offer BT the advantage of the lowest cost delivery path for new network installation and network upgrade, such that it can sustain and, in some cases, reinforce its SMP in downstream services. Specifically, it vests BT with the following advantages in the construction of, and innovation in, telecoms physical infrastructure and the provision of downstream telecoms services:

- **cost:** BT can deploy new fibre networks with a significant advantage in upfront costs;
- **coverage and speed of provision:** BT can provide new network links more rapidly than competitors as the ubiquity of its network significantly reduces the need for the construction of new physical infrastructure; and
- **innovation:** BT's flexible physical network provides capacity to construct new network or reconfigure networks more rapidly and at lower costs and with less risk than competitors.

5.28   In the absence of regulation there are behaviours that BT could engage in that could distort downstream competition:

- it could refuse to supply access to its physical infrastructure, and thus continue to restrict competition in the provision of products and services in downstream markets;
- it could provide access on less favourable terms compared to those obtained by its own downstream businesses; and
- it could set excessive wholesale charges for access to its physical infrastructure or engage in price squeeze behaviour.

5.29   While competition law enforcement may be used in appropriate circumstances, we do not consider that it would be sufficient to rely on it alone and that *ex ante* regulation is required.

5.30   We consider how to address these competition concerns in Volumes 3 and 4.

Consultation question

Question 5.1: Do you agree with our provisional finding on SMP and resultant competition concerns in the physical infrastructure market? Please set out your reasons and supporting evidence for your response.

6. Wholesale networks – product market definition

6.1   Having considered the telecoms physical infrastructure market in the previous sections, we now review the markets for wholesale network services directly downstream of this market. These are the markets for the supply of WLA and LL Access services, and IEC services.

6.2   Consistent with the regulatory framework (see Annex 5), the exercise is forward looking, taking into account developments in the market over the period of the review. This includes developments in technology, regulation and demand. In this review we are looking forward to March 2026.

6.3   In reviewing these downstream markets, we take into account the remedies we are proposing in the telecoms physical infrastructure market in Volumes 3 and 4, based on the proposed SMP findings set out in Section 5. This modified greenfield approach means that the downstream market would only be subject to *ex ante* regulation if competition issues remain, despite the presence of regulation on the upstream market.

6.4   In this section we explain our proposed product market definition for these downstream markets. The structure is as follows:

a)   our evaluation of whether it would be right to define a single market for wholesale access services, and our provisional view that it would be premature to do so in this review; and

b)   our proposed definition of each of the proposed product markets.

6.5   In summary, we propose to define three products markets:

a)   a product market for the supply of WLA at a fixed location;

b)   a product market for the supply of LL Access; and

c)   a product market for the supply of IEC.

Future market convergence and product market definition for this review

6.6   Historically, as set out in Section 1, network competition to BT has largely come from Virgin Media, both of which operate MSNs. The exceptions are a geographically limited number of areas in city centres where there are networks focussed on providing leased lines, and a few networks that provide broadband only services to targeted customer groups (typically those in rural areas and MDUs).

6.7   Looking forward to 2026 we expect that the extent of competition in the supply of wholesale network services will be driven primarily by the presence of MSNs. There have been many announcements of network deployments and investment and new network

build. Whilst some of these appear to focus largely on broadband deployment to specific geographic areas or customer segments, there are plans for large deployments (in terms of geographic footprint and number of premises passed) by MSNs.

6.8   Therefore, whilst we are anticipating this investment in new networks, we note the following:

a) First, the actual extent, location and competitive impact of new networks is subject to uncertainty.

b) Second, the emergence of new competing networks is to some extent dependent on continued regulation of BT's wholesale access products while the new networks roll out. The reason is that some rival network builders have indicated that the presence of retailers with large customer bases that they could move onto a new network is important to their business case (though others did not highlight this factor). Currently, these retailers rely on regulation in these markets (i.e. WLA regulation). Without this regulation the extent to which retailers would have an important role in the market is less certain. This could in turn mean network rollout for some telecoms providers is more challenging.

c) In addition, the rollout of new networks will take time, so even if competition does emerge in the future there is unlikely to be effective competition for an extended period before that.

6.9   Conditions of competition between MSNs tend to be broadly similar across a range of services. For example, historically Virgin Media has been the main competitor to BT in most geographic areas in both WLA and leased lines. We expect additional competition from new MSNs to similarly apply across the range of services.

6.10   There are other market interactions between WLA services and leased lines.

a) One dimension of competition is extending and upgrading networks, to anticipate, test and deliver new services, and to try out new business models and means of delivery. Dynamic competition of this type is likely to play out across the various services, with interactions between them in various ways. For example, the business case for a new entrant will often rely on the new network being able to successfully compete across a broad range of services, or at least have the potential to do so.

b) Broadband provided over fibre networks will be a significant improvement over services based on copper, with improved speeds and reliability. While not offering all of the attributes of a leased line (e.g. leased lines are dedicated to the customer) business grade ultrafast broadband will be an alternative for some potential leased line customers. For example, ISPs could offer high speed broadband products to SMEs with enhanced 'service' features[176], potentially prompting some leased line services switching to broadband-based business products.

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[176] For example, improved repair/customer service terms, symmetric speeds, features such as online storage, and Static IP addresses.

    c) Some leased lines – or connections with the characteristics of leased lines - are an input into provision of WLA services. For example, fixed network operators use leased lines for connections from their access nodes within BT local exchanges to their backhaul and core network nodes.[177] This means there may be a constraint from the WLA market on leased lines providers competing to provide the leased line part of the value chain.

6.11   These are important considerations for a period where telecoms services are in the process of a dynamic phase of new network build, and in this review we will take account of these interactions in our remedy design.

6.12   In our view there is some argument for anticipating a phase of competitive activity that will occur across a range of traditionally separated markets by dispensing with traditional delineations and defining a single product market for all wholesale access services. Market definition is a means to an end; the end being to identify market power.[178] A single product market definition would recognise the importance of competition between MSNs in driving the transition to fibre, exploiting strong economies of scope in the provision of mass-market broadband and dedicated high capacity services to residential and business customers, and a likely blurring of the boundaries between the demand for leased lines and broadband services.[179]

6.13   However, we recognise that the emergence of competition will take time and where it will end up is uncertain. We also recognise that some of the competitive dynamics that we anticipate do not fit neatly into the standard market definition concepts. Typically, for different products to be in the same market we would need to establish that they are demand-side and/or supply-side substitutes.[180] Over time it may be increasingly difficult to distinguish between these services on supply-side and demand-side (but particularly the supply-side). However, as set out below we find there to be differences between broadband and leased lines retail services which mean that, currently and over the period of the review, they are unlikely to be substitutes.

6.14   In addition, we have previously found material differences in competitive market conditions between the supply of leased lines and broadband products in Central London and some other business districts.

6.15   To summarise, in this review we propose to start from a position of considering WLA and LL Access separately, given that:

    a) networks that provide a single service (leased lines or broadband) also exist;

    b) investment and innovation in network rollout is at a relatively early stage; and

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[177] See Annex 6.
[178] See https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018XC0507(01)&rid=7, footnote 19.
[179] https://www.ofcom.org.uk/__data/assets/pdf_file/0005/130001/Consultation-Promoting-investment-and-competition-in-fibre-networks.pdf, paragraph 1.7.
[180] Guidance notes that supply-side substitution is particularly relevant in network industries, such as electronic communications, as the same network may be used to provide different types of service. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52018XC0507(01), paragraph 28.

c) this investment could be in single service networks that could develop to provide a material impact in competition.

6.16 In this review, the competitive interactions between services will be an important consideration in remedies. In future reviews we will revisit whether a combined network market is appropriate.

IEC

6.17 In addition to separate access markets for WLA and leased lines as discussed above, we have also considered trunk segments.

6.18 We define trunk segments as circuits carrying aggregated traffic between points of aggregation. [181] These are typically made up of backhaul and core connections between network nodes, BT exchanges and data centres (excluding data centres not used as points of aggregation such as a "corporate hub").[182, 183] Annex 6 provides further background on the different types of trunk routes and IEC.

6.19 Under the 2014 EC Recommendation, there is a presumption that such links are effectively competitive. However, NRAs might find that certain trunk routes warrant *ex ante* regulation if they fulfil the three criteria test.

6.20 Against this backdrop, in the 2019 BCMR we looked at each type of trunk connection and concluded that all circuits in the trunk segment should be presumed to be competitive, with the exception of circuits between BT exchanges. In particular, we considered that:[184]

a) It is appropriate to presume that all trunk connections to telecoms provider network nodes and connections to data centres (excluding data centres that are not used as points of aggregations) are competitive;[185,]

b) Unlike data centres and network nodes, the presumption of competitiveness may not be appropriate for some routes between BT exchanges and so they may warrant *ex ante* regulation. [186, 187] Telecoms providers require circuits from BT exchanges in order to make use of access regulation provided at those exchanges (for example, access to WLA and LL Access remedies where we find BT holds SMP in those markets). There will be some BT exchanges to which telecoms providers can provide their own connectivity,

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[181] Annex 6 explains that connections between exchanges may be part of an access circuit, in which cases they are excluded from the trunk market.

[182] These corporate data centres are used primarily for processing, storing and providing appropriate access to company data. They are treated as access customer sites and we consider them to be part of the LL Access segment. We note that in terms of materiality, the number of these links appear to be declining.

[183] In our view, it will be practical for Openreach to work with its customers to confirm whether or not a data centre is used as a point of aggregation/for on-ward routing.

[184] For more details on the reasoning see 2019 BCMR Statement, paragraphs 7.30-7.45.

[185] The reasoning underlying our conclusion for network nodes and data centres is set out in 2019 BCMR Statement paragraphs 7.35-7.37 and 7.38-7.40, respectively.

[186] 2019 BCMR Statement, paragraphs 7.41-7.45.

[187] In the 2019 BCMR we considered routes carrying aggregated traffic between BT exchanges (such as routes carrying LLU backhaul) as part of the trunk market (whereas in BCMRs prior to that we considered the split between access to trunk to be based on an analysis of Openreach Handover Points (OHPs)).

and others where they can purchase connectivity from other non-BT telecoms providers. However, given the number of BT exchanges, there may be some where only BT can provide connectivity. Access to some routes between BT exchanges may be necessary to enable our access regulation to work. We considered it necessary to undertake a competitive assessment to consider whether some of the routes between BT exchanges are uncompetitive and warrant *ex ante* regulation. We referred to connections between BT exchanges as IEC.

6.21   Taking account of the regulatory framework, we do not propose to revisit our analysis of those trunk segments that we presumed in the 2019 BCMR to be effectively competitive.[188] In relation to IEC, given we found SMP for some routes in 2019 BCMR, it is appropriate to undertake a new competitive assessment for these services in this review. We go on below to propose a product market definition for these purposes.

Product market definition for WLA

6.22   In this section we set out our proposals in relation to product market definition in WLA services.

6.23   We have previously defined WLA to comprise access to network assets used by a retail telecoms provider to deliver a range of differentiated services and bundles to residential and business customers at a fixed point close to the end user. The services include:

a) broadband;

b) the ability to receive TV content; and

c) the ability to make and receive voice calls.

6.24   As in previous reviews, although multiple services can be provided over a local access connection, the key supply requirement is the local access connection itself. Once a connection is in place, a range of services can be supplied. Of the retail services listed, the most important is broadband.

Choice of focal product

6.25   We propose to define a focal product to be the supply of WLA services by fixed networks to support the delivery of broadband services to residential and business customers. This follows our approach in previous reviews in recognising the economies of scope inherent in supplying multiple downstream broadband services from a single access connection. These economies of scope are reflected in both:

a) how local access networks are built; and

b) how retail fixed line services supported by WLA are marketed and sold (which is that typically, ISPs offer a range of differentiated broadband packages (see Section 2)).[189]

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[188] Explanatory Note to the 2014 EC Recommendation, pages 49 – 50.
[189] Also see 2018 WLA Statement, paragraphs 3.50 -3.51.

6.26   Looking forward, fibre networks will exhibit the same economies of scope as legacy networks. In particular, fibre networks have the capability to support a range of products for businesses and homes. Having built fibre networks, operators have a strong incentive to serve the whole of the market including demand for lower and higher bandwidth services.

6.27   In the 2018 WLA Statement, we defined the focal product to be local access at a fixed location using copper/fibre connections (which did not include cable). We then found cable networks to be in the same market on the grounds that the retail services supplied by cable networks were similar and likely to be close demand-side substitutes for retail services supplied using BT's WLA products.[190] We continue to find that BT and Virgin Media offer similar packages that compete directly with each other (see Section 2).

6.28   In this review we take a different approach and propose to define the focal product to include all fixed networks. Looking forward, retail services will be delivered over a mix of fixed networks using fibre, FTTC, or existing copper and cable connections. However, the range of retail services and packages delivered over these different types of networks will have similar features, with the new networks able to offer improved quality.

6.29   For this reason (just as we have previously found retail services offered by BT and Virgin Media to be close substitutes), we consider that retail services delivered over the new networks should be good substitutes for those delivered over the existing networks. While the new networks can offer better quality services, we consider that differentiation between networks, and the retail services that they support, can be addressed in later stages of the analysis. We address below whether higher speed services are sufficiently differentiated that they should form a different market. In addition, differentiation between different networks within the relevant product and geographic markets should be a factor in the SMP assessment.

6.30   Therefore, consistent with market definition being forward looking, we consider that the definition of focal product should include all fixed networks.

6.31   In the 2018 WLA Statement, the relevant product market included WLA connections to both homes and businesses. We noted that the differentiation between residential and business broadband products comes from activities downstream from the wholesale network access layer.

6.32   While business-grade broadband services are widely available (including from the larger ISPs and a number of smaller ISP focussed on the SME segment), around 30% of SMEs subscribe to residential broadband services.[191] This suggests that for a substantial number of businesses, basic broadband services are adequate for their needs. Business broadband packages offer additional services and features, compared with residential services, and this means that these packages have a higher price. However, these additional features are

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[190] For example, we found, that whilst BT and Virgin Media offered retail packages comprising different speeds of broadband, their offers had several similar characteristics and were targeted at similar customers and at comparable prices. See 2018 WLA Statement, paragraph 3.73.
[191] See Section 2 for some examples of how features of business and residential products compare.

generally not a feature of WLA services, but rather are provided as part of the downstream activity. Looking forward, we have not seen any evidence to suggest that ISPs will not continue to offer products to both residential and business customers over the course of the period covered by this review.

6.33   Accordingly, we do not propose to distinguish between different fixed access networks and types of customer, in the definition of the focal product. We now check whether the different bandwidth speeds are good enough substitutes over the review period, to confirm that the focal product should include all speeds.

Different broadband speeds

6.34   Looking forward to the period covered by this review, we consider that supply-side considerations point to a single WLA market that is not differentiated by speed. This is because local access networks are built with properties that make them amenable to delivering a range of broadband speeds. As set out in Annex 7, the Virgin Media and new entrant networks all have the capability to provide a full range of broadband speeds. Openreach's FTTC network currently covers around 95% of the UK. On this network, it offers a range of speeds from 40/10 to 80/20. There is no difference in the network equipment between these – different speeds are provided simply by applying different configurations to each line. Where Openreach has deployed FTTP it has the capability to offer the full range of fibre broadband speeds.

6.35   We also consider, for the reasons set out below, that demand-side considerations support a single market definition. We draw on evidence set out in Section 2 on the features of different broadband products, consumer behaviour and preferences, and recent trends in wholesale access pricing.

Our assessment in the 2018 WLA Statement

6.36   As noted above, in the 2018 WLA Statement, our starting point was to recognise the economies of scope inherent in access from providing multiple downstream services. We also considered demand-side substitutability between different speeds.

6.37   In respect of demand side substitutability we found that retail prices of SBB services were likely to be a constraint on retail prices for SFBB service, and vice versa.[192] However, we also said that these constraints appeared to be asymmetric in that demand-side substitution from SBB to SFBB appeared stronger than from SFBB to SBB (because of evidence on the reluctance to downgrade). We expected this asymmetry to get stronger over time.[193] We also found that the 40/10 product was a good demand side substitute for and effective constraint on higher bandwidth products.[194, 195]

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[192] See 2018 WLA Statement, Appendix 5, Supporting evidence for market analysis, paragraphs 5.132- 5.141.
[193] See 2018 WLA Statement, Volume 1, Section 3, paragraph 3.35 and Appendix 5 paragraphs A5.133-A5.134.
[194] See 2018 WLA Statement, Appendix 5, paragraphs 5. 137 and 5.138
[195] We also recognised that retail competition is between bundles with several dimensions of differentiation. While broadband speed is one aspect when choosing a bundle of fixed-line services, in practice there is a multitude of factors and

6.38   In respect of supply side substitutability, we said that local access networks are built with properties that make them amenable to delivering a range of broadband speeds.[196] With the exception of a small proportion of premises in the UK, we found that a hypothetical network operator would be able to provide a range of services to both businesses and homes and that this pointed to a single market for different speeds, whether or not they were demand-side substitutes.

6.39   Therefore, we considered different broadband speeds to be both demand-side substitutes and supply-side substitutes.[197]

Evidence on demand-side substitutability of different broadband speeds

6.40   As set out in Section 2, typically broadband services are sold to end users as a part of a bundle or package of services. End-customers will take account of the range of features when deciding whether a retail tariff is value for money. The headline speed of broadband services will be just one element of these packages. We observe that there is considerable overlap in the retail advertised prices of packages such that end customers may have the option of switching to packages offering higher headline speeds at lower prices (although we note that retail pricing is complex, with many consumers not paying advertised prices e.g. ISPs have been up-grading existing SBB customers to SFBB products at no or small incremental charge). We consider these findings to be consistent with a range of broadband speeds being in the same market.

6.41   Going forward there are three questions: a) whether SBB and SFBB services are in the same market; b) whether different SFBB speeds are in the same markets and c) whether SFBB and higher UFBB services are in the same market.

6.42   The main sources of evidence are: survey and other research carried out by ISPs; our discussions with ISPs; and our analysis of wholesale market pricing (which we set out in detail in the Section 2).

Are different SBB and SFBB speeds in the same market?

6.43   Currently around a third of people are subscribing to SBB services and the remainder to SFBB (currently fewer than 1% of people are subscribing to UFBB services). Looking forward, indicative forecasts suggest that the number of people subscribing to SBB services will fall to around one million by the end of review (see Section 2). We have been told that BT has stopped offering SBB to new customers and note that neither Virgin Media nor Hyperoptic are advertising SBB products. More importantly, as explained in Section 2, Virgin Media automatically upgraded its SBB customers to SFBB, and [✂] and [✂] are offering free of charge upgrades motivated by both Openreach pricing and the opportunity to reduce churn.

6.44   As set out above, we previously found SBB and SFBB services to be in the same product markets, and in particular that SFBB services exert a significant constraint on SBB. Looking

service characteristics that end-customers will take into account simultaneously when deciding whether a retail tariff is value for money. (See 2018 WLA Statement, Volume 1 paragraph 3.51 and Appendix 5, paragraph 5.139.
[196] See 2018 WLA Statement, Volume 1, paragraphs 3.50 and 3.51.
[197] See 2018 WLA Statement, Volume 1, paragraph 3.57.

forward, we recognise that the competitive constraint exerted by the availability of cheaper SBB services on SFBB services is likely to become increasingly weak. However, we note that TalkTalk and Sky are still offering SBB services. We think that, during a period when networks are seeking to migrate SBB customers to SFBB services, the availability of cheaper SBB services will continue to exert some constraint on SFBB prices and vice versa. We, therefore, propose to consider SBB services are in the same market as SFBB services within our WLA market definition.

Are different SFBB speeds in the same market?

6.45   ISPs told us that people have a low willingness to pay for higher broadband speeds. This was based on results of surveys and research they had commissioned, as well as their experience in the market. They said there are several factors contributing to this result. Most importantly, for most people, SFBB speeds are currently more than adequate to meet their need. They pointed, as evidence of this, to reported levels of consumer satisfaction with their current broadband speeds. They also noted that their experience is that most people do not know what their current broadband speeds are or understand the benefits of fibre. All of these factors were said to contribute to most people not being prepared to pay more to get higher speeds. We were also told that while dissatisfaction with quality of the broadband services can be a trigger for churn, price will be key in the choice between products in the market.

6.46   In Section 2 we have set out details of Openreach's wholesale access charges for its 40/10 and 80/20 products. We consider this pattern of pricing, which sets low incremental wholesale charges to encourage 80/20 take up, is consistent with customers being unprepared to pay a large premium for higher speed services than 40/10.

6.47   We found that, at the retail level, BT is no longer offering SBB to new customers where FTTC/FTTP services are available and is in the process of migrating their 'copper' customers to FTTC services at their current prices indexed to CPI. We consider this to be evidence of a lack of willingness amongst SBB customers to pay higher prices. In addition, we note that [✂]. We think this is further evidence that these customers would not be prepared to pay a large premium for the higher speeds offered by these services as compared with 40/10 based services.

6.48   We also note that higher speed broadband services are often bundled with other premium services (an example is Virgin Media's 'Ultimate Oomph' package[198]). The strategic advantage for ISPs of bundling services in this way is that the same bundle could be attractive to people with different willingness to pay for different components of the package. In choosing between bundles, end-customers will take into account the range of features when deciding whether a retail tariff is value for money. In these circumstances, packages offering lower broadband speeds may be a closer substitute for premium products for some customers than may be indicated by retail price differentials. As previously noted, we observe there is significant overlap in the features and prices of

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[198] See https://www.virginmedia.com/shop/bundles/ultimate-oomph-bundle [accessed 2 December 2019].

packages available in the market. ISPs have considerable flexibility in the design of packages and positioning of packages in the market.

6.49   We, therefore, propose to consider all SFBB services are in the same product market.

Are SFBB and UFBB services in the same market?

6.50   We have been told that the main drivers of residential demand for higher speeds have been an increase in the use of video-on-demand and gaming, and the simultaneous use in a home of multiple devices. The result of surveys and other research carried out by [✂] and other stakeholders provide some evidence that there may be a minority of users who would be prepared to pay a substantial premium for 1Gbit/s broadband services. Research conducted for Sky found that these people are likely to be those who are already subscribing to [✂]Mbit/s speeds.

6.51   It is, however, early days. It is clear from internal documents that ISPs are experimenting with different approaches to the design, marketing and pricing of their retail products. There are 1Gbit/s products in the market priced at a premium to SFBB, but the broader evidence suggests it is unlikely that this will be attractive to many customers. Looking forward, indicative forecasts provided by networks and ISPs on the take-up of SFBB and UFBB products, taken together, suggest that, by 2026 the majority of people will still be subscribing to SFBB packages with 20% subscribing to UFBB. However, in order to achieve this level of penetration, it may well be that the prices charged will need to be more attractive.

6.52   Accordingly, while there may be some early adopters with a relatively high demand for UFBB, our expectation is that to achieve high volumes of sales attractive prices will need to be offered. While demand for UFBB will certainly grow over time, in this review period we expect lower bandwidths to continue to be good substitutes. Therefore, we propose to define a single focal product including all broadband speeds.

Leased lines

6.53   As noted above, we have started from the point of considering separate markets. We nonetheless need to consider the potential for substitution between broadband and leased lines services.

6.54   On the demand-side, we recognise that business grade ultrafast broadband services could be an alternative for some users to leased line services. It remains, however, that over the period of this review, broadband and leased line products will continue to have distinct features. Leased line services provide end-users with a higher quality service at higher prices. We, therefore, consider it most unlikely that a business would, in response to a 10% increase in prices of broadband services switch to a leased line product.

6.55   On the supply side, the network architecture required to support leased lines and broadband access services are different. WLA services provide the local connectivity to deliver mass-market broadband and other electronic communication services to homes and businesses. The network architecture of an access network for the supply of leased lines does not have this capability. Rather than pre-building a network with access points

at most premises across an area such as a town, a leased lines network locates access points near a business district and extends the network to the customer in response to a retail order. Also, the operational requirements for the provision of leased lines and broadband wholesale services are different.[199]

6.56   For these reasons, we propose to conclude that leased lines should not be included in the WLA market.

Wireless technologies

6.57   In previous reviews we have concluded that wireless technologies (specifically, fixed wireless, mobile and satellite services) are not substitutes for fixed access services, but said that, if such services were to become more widely available to consumers, we would review our position. Since then we have seen the launch of 5G mobile, including in-home broadband services.

6.58   As we discuss in the sub-sections below, the expectation continues to be that wireless services may offer broadband alternatives for some customers but is not likely to emerge as mass-market substitute. To the extent necessary we treat them as "out-of-market" sources of competition in our market power assessment.

Fixed wireless

6.59   In Section 2 we discuss FWA. In summary, we find that use of FWA is currently limited, and may continue to be limited, for the provision of services at a fixed location because:

- Supported speeds may be lower than available on fixed networks, particularly fibre networks;
- Capacity may be constrained compared to fixed services; and
- Coverage may be limited.

6.60   Overall, our view is that the evidence does not suggests that 5G FWA services would exert a material competitive constraint on fixed access services, but we recognise that this is an area that could develop during this market review.

Mobile

6.61   Mobile can be 4G or 5G. So far, the long established 4G services have not been popular with customers as an alternative to fixed broadband, due to low speeds and restrictive data use policies. Take up of fixed broadband has remained high and customers tend to have both fixed and mobile.[200] This suggests to us that 4G broadband is a complementary service rather than a substitute for fixed broadband services.

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[199] For example, different operational field forces may be needed to provide mass market broadband as opposed to leased lines, where there are fewer customers but provisioning and fault repair may be more complex.
[200] See Communications Market Report 2019, summary of key findings.

6.62   5G promises to offer much higher speeds and fewer restrictions on data usage, but we do not know how the quality of 5G services will compare with fixed broadband or what the packages will look like, as the network is rolled out and services mature.

6.63   Based on this evidence, we do not propose to include 4G or 5G mobile services in the relevant market. The evidence is that mobile retail services have not been a material source of competition to fixed access services, and we do not expect such a development during the course of this review period.

Satellite

6.64   In the 2018 WLA Statement we found that satellite services are not a close substitute for fixed broadband due to the high prices, limited download allowance and longer latency. We have considered whether this is likely to remain the case over the period of this review. A new generation of satellites – LEO satellites may address some of these service issues. However, as set out in Annex 6, LEO satellites are only now beginning to be deployed and so services are not yet available, and their commercial impact is untested. We, therefore, do not expect LEO satellites to emerge as a major source of competition during this review period.

Summary of wireless technologies

6.65   Based on current evidence, we do not propose to extend the product market to include wireless technologies.

Conclusion on product market definition for WLA

6.66   Based on the analysis set out above, we propose that:

   a) All fixed network technologies are in the same market;

   b) All speeds are in the same market;

   c) Residential and business are in the same market;

   d) Leased lines are outside the WLA market; and

   e) Wireless services are outside the market.

Product market definition for LL Access

6.67   Leased lines provide high quality point-to-point business connectivity services between two or more locations. These services tend to be symmetric (the capacity is the same in both directions), uncontended (the capacity is guaranteed and not subject to reduction by the presence of other telecoms services), and typically, dedicated. These are different from other services such as consumer and business broadband connections which tend to be contended.

6.68   We define LL Access services as circuits between end-user sites and the first point of aggregation,[201] or in some cases, between customer sites.[202] See Annex 6 for more details.

6.69   Ofcom concluded on product market definition recently in the 2019 BCMR Statement in relation to the period 2019 to 2021. We assessed demand-side and supply-side substitution. Our findings were primarily underpinned by our analysis of supply-side substitution. Our conclusions can be summarised as follows:

- we defined a single market for LL Access services at all bandwidths, which includes all wholesale fibre-based Ethernet and WDM services;
- we included dark fibre used to supply or self-supply LL Access services in the product market; and
- we excluded business-grade connectivity services provided over EFM, as well as broadband (symmetric and asymmetric), from the product market.

6.70   In the six months since the 2019 BCMR Statement, we have not seen any evidence to suggest a different product market definition would be appropriate for the period covered by this review (2021 to 2026). Therefore, in this section we summarise the main evidence and findings underlying our decision in the 2019 BCMR Statement and explain why we think the product market as we found it then remains appropriate for the period of this review.

6.71   In summary, our findings on the key issues in defining the relevant product market are:

a)   Different bandwidths of LL Access services are sufficiently close substitutes to one another such that they should be considered in the same product market. Dark fibre is also a substitute.

b)   Other access services, such as broadband and EFM, should not be considered in the same product market as LL Access services.[203]

c)   There is a single market for all access customers, and in particular we consider that mobile backhaul services form part of the leased lines access market.

d)   LL Access and IEC services are in different markets.

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[201] We note that there are instances where access circuits can pass through nodes where they are not aggregated.
[202] Some networks have small access aggregation nodes between the end-user site and the access aggregation site (such as cabinets with FTTC DSLAMs or a mobile base station with a fixed connection with then uses microwave to connect to additional base stations) or as part of a 'daisy chain' (such as cabinets as part of a ring within the cable access network). We have treated these examples as a part of the access network and not inter-exchange backhaul connections.
[203] Note that in the 2019 BCMR we excluded leased lines used for specialist applications such as CCTV, Broadcast and Street Access from the LL Access market. We remain of the view that these circuits are not viable substitutes for fibre leased lines, as they either use a different interface to LL Access services or are priced at a significant premium. We have thus excluded these services from the proposed product market. Based on 2017 access connections, these services combined account for only a small number of circuits, so excluding them has no influence on our SMP findings. While we are aware that the deployment of 5G may see a rise in the use of street access services, we do not expect there to be a significant increase during this review period. In response to a statutory information request (BCMR s.135-23), MNOs have indicated they will mainly use [✂] for their access connections.

e) Accordingly, we propose that the product market defined for the period of this review is LL Access services at all bandwidths and including dark fibre.

Speeds

6.72 In the 2019 BCMR, we concluded that different bandwidths are part of the same product market, based on supply-side substitution. [204]

6.73 We considered whether, for any given bandwidth, a telecoms provider supplying other bandwidths would respond to an increase in the price of the focal product bandwidth. We considered suppliers are equally able to supply all bandwidths and, therefore, are able to switch between them at low cost and quickly. This is because:

a) where a telecoms provider has an existing connection to the customer site it can be used to provide the full range of leased line services. The only difference between different services is the electronic equipment installed at the circuit ends, and in some cases, the same equipment can be used to provide different leased line bandwidths.[205]

b) Where telecoms providers do not have an existing connection, the evidence indicates that their ability to supply a customer in response to a SSNIP does not differ by bandwidth, therefore, pointing at similar competitive conditions across all bandwidths.[206]

6.74 We recognised that if some leased lines have particularly higher prices and margins (e.g. Very High Bandwidth (VHB) services), it may be more profitable for a provider to extend its network to supply those lines than to extend its network to supply lines with lower margins. However, the evidence suggests that BT's rivals rarely dig to connect customers even where these higher margins apply and tend not to dig further for these higher margin services than for other services. [207] Also, these higher prices could be themselves a reflection of BT's market power and the difference in margins merely reflect the fact that VHB services have not been subject to as stringent price controls as have other leased lines. Accordingly, even if there was a higher propensity to dig to connect customers with VHB, it may not necessarily be a reflection of any fundamental difference in supply-side conditions. This is consistent with competitive conditions being similar across all bandwidths.

6.75 We consider that the above remains the case at the time of this consultation and we do not anticipate any market changes over the review period that would lead us to a different

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[204] We considered that evidence on demand-side substitution was ambiguous. See 2019 BCMR Statement, paragraphs 4.43-4.61.

[205] This was supported by Openreach's internal documents submitted to Ofcom in response to the 2019 BCMR 8th s.135 and views expressed by stakeholders in meetings and in response to the BCMR consultation. See 2019 BCMR Statement paragraphs 4.68-4.78.

[206] While our bottom-up cost model suggests that it is profitable to dig for longer distance for higher bandwidths services, evidence on operators' actual digging behaviour (in response to 2019 BCMR 1st s.135) shows that digging is infrequent and for short distances for all bandwidths (2019 BCMR Statement paragraphs 4.79-4.100).

[207] Evidence on actual digging primarily shows that digging occurs very rarely and that when it does, distances are low for all bandwidths. See 2019 BCMR Statement paragraph 4.102.

conclusion. We have considered the possibility that PIA will lead to more competition for higher bandwidth services by encouraging more customer-specific network build to them. However, our current view is that PIA is less likely to be used on a material scale for customer specific extensions than for infill of existing networks[208] or building networks in new areas, in both cases an exercise that would typically supply all bandwidths and not specifically VHB (for more details see Annex 7). Further, expansion of this type may simply reflect the different price control arrangements for VHB services that we discussed above. Accordingly, we propose that all bandwidths be included in the same product market.

Dark fibre

6.76   Dark fibre is a fibre connection provided between two sites which does not include any powered equipment supplied by the network provider, allowing the customer, or another supplier, to provide the equipment. Provision of the equipment is the only difference compared to active products (Ethernet and WDM services). While BT, absent regulation, does not supply dark fibre, some other CPs sell dark fibre and in some cases this will substitute for a leased line.

6.77   In the 2019 BCMR, we assessed the supply-side constraints imposed by dark fibre on LL Access services, by applying a similar approach to our analysis above for bandwidths.

6.78   We concluded that dark fibre, when used to supply or self-supply LL Access services, is in the same product market as LL Access services based on supply-side analysis: [209],[210]

   a)   When networks are already fibre connected, they would be able to switch between supplying dark fibre and LL Access services sufficiently quickly and at minimal cost in the event of a SSNIP. In fact, the main dark fibre providers (e.g. CityFibre, Zayo, euNetworks and Colt) all supply both dark fibre and LL Access services.

   b)   Where suppliers are not already connected, dark fibre providers are equally able to supply LL Access services as any other supplier of LL Access services as the incentives to extend their networks will be broadly similar for both services.

6.79   We propose to continue to include dark fibre in the same market as LL Access services. We consider that the above remains the case at the time of this consultation and we do not expect any developments over the market review period that would lead us to a different view.

Broadband

6.80   As noted above, we have started from the point of considering separate product markets for WLA and LL Access. We nonetheless need to consider the potential for substitution between broadband and leased lines services.

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[208] By infill we mean deploying new network within a telecom providers' existing footprint to 'densify' the network.
[209] This is supported by evidence showing that CityFibre's dark fibre service competes for LL Access services of all bandwidth and the price data submitted by telecom's providers indicate that dark fibre prices are competitive against the range of leased line access services. (See 2019 BCMR Statement, paragraphs 4.106-4.110.)
[210] Evidence on the demand side was ambiguous (2019 BCMR Statement, paragraphs 4.59-4.50).

6.81   On the demand-side, we recognise that business grade ultrafast broadband services could be an alternative to leased line services for some users. It remains, however, that over the period of this review, broadband and leased line products will continue to have distinct features. Leased line services provide end-users with a higher quality service at higher prices. Specifically, leased line services tend to be uncontended, and typically, dedicated (providing security). Looking forward, the expectation is that, whilst the vast majority of installed leased lines provide speeds of 1Gbit/s or lower, the demand for higher speed leased line services is expected to increase.

6.82   On the supply side, as discussed in Annexes 6 and 7, the network architecture required to support leased lines and broadband access services are different. WLA services provide the local connectivity to deliver mass-market broadband and other electronic communication services to homes and businesses. The network architecture of an access network for the supply of leased lines does not have this capability. Rather than pre-building a network with access points at most premises across an area such as a town, a leased lines network locates access points near a business district and extends the network to the customer in response to a retail order. Also, the operational requirements for the provision of leased lines and broadband wholesale services are different.[211]

6.83   For these reasons, we propose to conclude that broadband access services are not substitutes for LL Access services. This is consistent with the approach taken in the 2019 BCMR.

Ethernet in the first mile (EFM)

6.84   EFM uses copper connections from the BT exchange to connect to the customer. The speed of the service provided is impacted by the use of copper. The highest achievable speeds are significantly lower than for fibre, and the speed diminishes the further the customer is from the exchange. As demand moves towards higher speeds, this means EFM becomes less attractive as an alternative. In addition, using copper means that reliability is likely to be less than that of leased lines provided using fibre.

6.85   In 2019 BCMR, we considered whether EFM and leased line access services are in the same market based on demand side substitution. Our analysis indicates that EFM[212] is unlikely to sufficiently constrain LL Access services to consider them in the same product market, even when considering substitution from lower speed leased lines such as 100Mbit/s, which is closer to the maximum speeds that could be offered by EFM. This is because they are less reliable and are considered to be a legacy product.[213]

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[211] For example, different operational field forces may be needed to provide mass market broadband as opposed to leased lines, where there are fewer customers but provisioning and fault repair may be more complex.

[212] Our analysis of EFM substitution also applies to substitution to business grade connectivity provided over symmetric broadband services using SDSL technologies, which is the legacy version of EFM. We have not referred to these technologies explicitly in our analysis as these have been largely superseded by EFM.

[213] 2019 BCMR Statement paragraph 4.56. For example, results from the 2018 Cartesian report indicate that businesses perceive "copper-based circuits (EFM) [...] to be less reliable" than fibre leased lines. Ofcom, 2018. *Cartesian Business Connectivity Market Assessment*.

6.86   We propose that EFM is not in the market. We do not consider that this has changed or that EFM will become a more attractive option over the forthcoming review period, given the limitations of a copper-based service.

Mobile backhaul and microwave links

6.87   In the 2019 BCMR we considered whether leased lines purchased by MNOs (for the purposes of providing mobile backhaul) should be included in the same market as enterprise access circuits. The key question is whether there are significant differences in competitive conditions in the supply of mobile backhaul compared to other LL Access services.

6.88   We decided to include mobile backhaul within the same market with other LL Access customers rather than define a separate market for this customer group.[214] The main reasoning was:

a)   although there are some differences between purchasers of mobile backhaul and enterprise customers, in both cases, competition is determined by the presence of rival networks to the customer site. On that basis, competitive conditions at particular locations are largely the same whether the end customer is a mobile network operator or an enterprise customer.[215]

b)   MNOs and enterprise access customers have broadly the same geographic distribution, generally rely on the same set of suppliers for their connectivity needs, and the density of rival infrastructure is broadly the same for both customer groups in each geographic market defined.[216]

c)   We recognised that if MNOs needed a single supplier to achieve wide coverage this could mean national based competition and, therefore, a separate product market. However, our analysis of service shares showed that MNOs can and do use multiple telecoms providers for their mobile backhaul needs, albeit BT's share for MNO customers compared to enterprise customers is much higher in some of the geographic markets defined. While this suggests that historically, MNOs relied more on BT compared to other customers, evidence supports that this may change in the future as BT's share of supply to MNOs has fallen from [✂]% in 2014 to [✂]% in 2017 and evidence from MNOs shows that they are more likely to consider using multiple providers with the rollout of 5G.[217]

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[214] 2019 BCMR Statement, Annex 9, paragraphs A9.102-A9.111.
[215] 2019 BCMR Statement, Annex 9, paragraphs A9.30-A9.32.
[216] 2019 BCMR Statement, Annex 9, paragraphs A9.33-A9.36. Our analysis was based on 2017 new connections data gathered from telecoms providers (2019 BCMR 1st s.135) and MNO inventory data (2019 BCMR 5th s.135).
[217] 2019 BCMR Statement, Annex 9, paragraphs A9.43 and A.94.

d) We acknowledged that there are other differences in the demand requirements of MNOs and enterprise customers. However, we do not consider they lead to significant variations in competitive conditions to justify a separate market for mobile backhaul.[218]

e) We found that microwave links – which can be used for mobile backhaul in some circumstances – do not constrain the provision of leased line access circuits to MNO customers as they are a poor substitute.[219]

6.89 We propose not to define a separate market for mobile backhaul as we consider that the above remains the case at the time of this consultation and we do not expect any major developments over this review period that would lead us to a different finding. We recognise that unrestricted PIA may be used more intensively by MNOs compared to other customers to facilitate network expansion to serve MNO sites. However, as set out in Annex 7, there are uncertainties around the extent of PIA usage by different customers at this stage and there is insufficient evidence to conclude that competitive conditions will be materially different for MNOs compared to other customers over this review period.

IEC

6.90 In the 2019 BCMR, we concluded that IEC services and LL Access services are in separate markets. LL Access services provide a dedicated single link service from an end user site to a point of aggregation, whereas IEC services provide a service to carry aggregated end user traffic between BT exchanges (which include connections between access areas).

6.91 The main reasons underlying our view were:[220]

a) We considered that the different purpose of IEC leads to a difference in competitive conditions compared to access circuits. Specifically, LL Access services provide a dedicated single link service to a point of aggregation, whereas IEC services provide a service between points of aggregation (BT exchanges), which includes providing connections between different access areas. In addition, demand for IECs tends to be for higher bandwidths, reflecting that they carry traffic aggregated from multiple end customers. Higher bandwidths may make IEC services more contestable than LL Access, but any competitors would need a network that connects between different access areas.

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[218] 2019 BCMR Statement, Annex 9, paragraphs A9.52-A9.72. Overall, we find the evidence for each demand-side characteristic to be mixed, for example, MNOs' large volume requirements may give them the ability to negotiate bespoke deals and their importance in sponsoring entry may mean there is more competition for their contracts. However, the volumes MNOs require may also limit their choice of supplier and as a result of the size of BT's network and the economies of scale it can achieve, BT may have an advantage in winning mobile backhaul contracts. We have also considered that the products consumed by MNOs are not different to enterprise customer.

[219] 2019 BCMR Statement, Annex 9, paragraphs A9.73-A9.79. We considered microwave links to be a poor substitute for leased lines because of their: a) ability to support only lower capacity links compared to fibre based backhaul; b) requirement for line of sight connectivity; c) significantly lower transmission range than fibre-based backhaul links; and d) higher risk of failure because microwave antennas are exposed.

[220] 2019 BCMR Statement paragraphs 7.50-7.60.

b) We noted that separate markets for access and IEC is consistent with the EC approach which considers there to be a clear difference between terminating (i.e. access) and trunk segments and which NRAs should distinguish between.[221]

6.92 We consider the approach taken in the 2019 BCMR, described above, remains the case at the time of this consultation and is appropriate for the period of this review and so we propose to continue to define separate markets for IEC and LL Access services.

Summary of proposed product market definition for LL Access

6.93 We propose to define a single product market for LL Access services, which:

a) includes all wholesale fibre-based Ethernet and WDM services, and dark fibre used to supply or self-supply leased line services;

b) excludes business-grade connectivity services provided over EFM, broadband and microwave links used to provide mobile backhaul; and

c) excludes IEC services between BT exchanges.

IEC

6.94 As set out above, we consider we need to review IEC, but not other trunk routes as these were found competitive last time, and we propose to define separate product markets for IEC services and LL Access services. We now consider whether there are separate IEC markets for different bandwidths and for dark fibre services.

Speed and dark fibre

6.95 In the 2019 BCMR, Ofcom defined a separate product market for IEC services consisting of all IEC services including all bandwidths and dark fibre. Similar to our analysis for LL Access, we applied a hypothetical monopolist test and our findings were primarily underpinned by supply-side substitution.

6.96 In particular, we considered that:

a) Different bandwidths of IEC services are sufficiently close substitutes to one another such that they should be considered in the same product market. As for LL Access services, evidence on the demand side was ambiguous[222] but on the supply-side we found that where a telecoms provider is already connected to the BT exchange, it can offer a full suite of bandwidths relatively quickly and at little incremental cost, constraining a hypothetical monopolist of a given bandwidth.[223]

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[221] Explanatory Note to the 2014 EC Recommendation, pages 49-50 mentions that "[…] a clear distinction between the terminating and trunk segment is important as the market for wholesale trunk segments of leased lines has been removed from the list of markets susceptible to ex ante regulation in the 2007 Recommendation."
[222] 2019 BCMR Statement, paragraphs 7.64-7.69.
[223] 2019 BCMR Statement paragraph 7.71.

    b) Dark fibre is in the same market for IEC services for similar reasons. On the supply side, we found that a dark fibre provider already connected to the BT exchange would be able to start supplying IEC services by purchasing and installing equipment at each end of the circuit.[224]

6.97   We propose to continue to include all bandwidths used for IEC services and dark fibre in the same product market. We have not been provided with evidence that the points above have changed since the 2019 BCMR and we do not expect that there will be market developments over this review period to suggest we should come to a different view.

Summary of proposed product market for IEC

6.98   We propose to define a single market for IEC services which:[225]

    a) includes active services at all bandwidths provided between BT exchanges;

    b) includes dark fibre between BT exchanges;

    c) excludes LL Access services; and

    d) excludes all trunk services that do not connect between BT exchanges.

Summary of proposed product market definition

6.99   We propose to define three product markets:

    a) a single market for WLA services at all bandwidths (the WLA market) which:

        i) includes broadband access services provided by networks deploying mixed copper/fibre, cable and full-fibre technologies;

        ii) excludes LL Access services; and

        iii) excludes retail provision of broadband services delivered over networks deploying wireless technologies.

    b) a single market for LL Access services at all bandwidths (the LL Access market) which:

        i) includes all wholesale fibre-based Ethernet and WDM services;

        ii) includes dark fibre used to supply or self-supply LL Access services;

        iii) excludes business-grade connectivity services provided over EFM, broadband and microwave links used to provide mobile backhaul; and

        iv) excludes IEC services between BT exchanges.

    c) a single market for IEC services (the IEC market) which:

        i) includes active services at all bandwidths provided between BT exchanges;

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[224] 2019 BCMR Statement paragraphs 7.72-7.73. The main dark fibre providers (e.g. CityFibre, Colt and Virgin Media) all supply both dark fibre and active IEC services.
[225] For clarity, Table A6.12 in Annex 6 sets out the links included in IEC.

ii) includes dark fibre between BT exchanges;

iii) excludes LL Access services; and

iv) excludes all trunk services that do not connect between BT exchanges.

Consultation question

Question 6.1: Do you agree with our provisional conclusions on product market definition for wholesale networks? Please set out your reasons and supporting evidence for your response.

7. Wholesale networks – geographic market definition

7.1 In this section we set out our geographic market definition approach and analysis for the WLA, LL Access and IEC services.

7.2 We start with a discussion of our proposed approach to the assessment of wholesale access services (WLA and LL Access) based on existing and potential network presence of rival MSNs. We then discuss how we propose to take account of additional competition from service specific networks.

7.3 Based on the proposed approach, we present results of our assessment of the network presence of different operators. We then discuss our proposals on the appropriate segmentation into different geographic markets based on differences in the level of rival network build across the UK.

7.4 Finally, we discuss our approach and the results of our analysis for IEC segments.

Summary of our proposals

7.5 We propose to define the following geographic access markets:

Table 7.1: Summary of geographic access markets[226]

WLA	LL Access
CLA (275 pcs)	
HNR (excluding CLA) (304 pcs)	
Area 2 (6,037 pcs, 21.3 million premises)	Area 2 (5,538 pcs)
Area 3 (3,521 pcs, 9.2 million premises)	Area 3 (3,515 pcs)

7.6 We propose for WLA markets:

a) a geographic market comprising postcode sectors where there is already some material commercial deployment by rival networks to BT or where this could be economic (referred to as WLA Area 2);

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[226] The postcode sectors (pcs) identified for WLA (and the premises within those pcs) are based on analysis Ordinance Survey from May 2019. For LL Access, the geographic market analysis for the CLA and HNR relies on analysis and postcode sectors used in the 2019 BCMR, so we have included these 579 postcode sectors. We otherwise rely on the postcode sectors designated as Area 2 or 3 based on our WLA analysis to identify postcode sectors for the LL Access geographic markets. We explain how we map these postcode sectors and how we have dealt with some differences in the postcode sectors datasets in Annex 8.

b) a geographic market comprising postcode sectors where where there is unlikely to be material commercial deployment by rival networks to BT (referred to as WLA Area 3).

7.7 We propose for LL Access markets:

a) Geographic markets reflecting levels of network competition from MSNs plus leased lines only networks for postcode sectors in:

i) the Central London area (referred to as LL Access CLA); and

ii) other postcode sectors where there are two or more rival networks to BT in the provision of leased lines (referred to as LL Access HNR areas).

b) For the remaining postcode sectors in the rest of the UK we propose that we identify the following geographic markets:

i) a geographic market comprising postcode sectors where there is already some material commercial deployment by rival networks to BT or where this could be economic (referred to as LL Access Area 2);

ii) a geographic market comprising postcode sectors where there is unlikely to be material commercial deployment by rival networks to BT (referred to as LL Access Area 3).

7.8 In relation to IEC markets, we propose to define each BT exchange as a distinct geographic market.

7.9 In this section we first consider the access markets – WLA and LL Access. We discuss these sequentially as follows:

a) We introduce our approach at a high level;

b) We explain the geographic unit we use for our analysis;

c) We examine the current and planned coverage of MSNs. We explain the thresholds we use to assess coverage of existing and planned MSN deployments. Based on this we identify geographic areas based on MSN deployments which are common to both WLA and LL Access:

i) Area 1: where there is already material commercial deployment by two rival MSNs to BT each with established market positions;

ii) Area 2: where there is already some material commercial deployment by rival MSNs to BT or where this could be economic; and

iii) Area 3: where there is unlikely to be material commercial deployment by rival MSNs to BT.

d) We assess whether the presence (or potential presence) of leased lines only or broadband only networks in a particular area is likely to change the conditions of competition in that area from those we would expect based on our MSN assessment alone.

7.10   Having proposed our geographic market definition for WLA and LL Access we then set out our geographic market definition for IEC.

Geographic market definition for WLA and LL Access

Overview of approach

7.11   Our geographic assessment identifies proposed geographic markets for WLA and LL Access. The key consideration in defining geographic markets is whether competitive conditions in different areas are significantly different from each other. [227]

7.12   In previous market reviews we have typically undertaken this exercise focussing on existing competitive conditions for each product market in isolation (in particular in WLA and BCMR reviews). In the period covered by this review we expect the potential for new network build to be much more dynamic than in the past. We focus not only on existing competitive conditions but also, importantly, on how we expect the competitive environment to evolve over the review period based on new network build. Moreover, much of this new build is expected to be MSNs, which supply the full range of services. Hence these competitive dynamics will apply across both WLA and LL Access.

7.13   Our starting point is, therefore, to take a forward-looking view in relation to the presence of MSNs based on their existing network presence and potential future presence. This approach allows us to take account of MSNs consistently across the different product markets in which they will compete.

7.14   However, we also recognise that some networks focus on providing only specific services and we need to take them into account in our assessment. Therefore, in addition to considering MSNs, we also examine the impact we expect leased lines only networks and broadband only networks to have on the conditions of competition in the particular areas in which they are present (or may be present over the course of this review):

   a) For LL Access, there are particularly strong concentrations of competition from leased lines only networks in HNR areas and the CLA.

   b) For WLA, we consider those networks that provide broadband only services. These tend to be networks with a targeted business case, for example to serve MDUs or to target rural areas, perhaps using public funding or support from the local community.

7.15   Based on this analysis, we define our geographic markets in WLA and, separately, LL Access taking into account all networks that provide services in these respective markets.

Geographic units

7.16   Our first step is to break down the UK into smaller units (geographic units) within which we can examine network coverage. This analysis needs to be at a level of granularity that gives

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[227] We note that separately defined geographic markets is not a pre-requisite for variations in remedies, with it being possible for remedies to be varied by geography within a single geographic market. See Annex 5 for further discussion of the regulatory framework.

a reasonable indication of the degree of competition faced in that geographic unit. Geographic units cannot be too large an area as there would likely be large differences in competition within such a unit (parts of the area may have significant competition but other parts none). On the other hand, more granular analysis may be less practicable to apply.

7.17 In our December 2018 preliminary consultation on geographic analysis (the December 2018 Consultation[228]), we proposed to reject individual premises (c. 30 million) as our geographic unit because of these practicality considerations. We expressed the view that BT exchange footprints (c. 5,600 contiguous areas) or postcode sectors (c. 10,000 areas) were our preferred candidates.

7.18 Most stakeholders expressing a view favoured more granular geographic units such as postcodes (c. 1.6 million) or some alternatives, for example BT suggested mapping based on a squared-grid. No respondent supported the use of BT exchanges. Having considered these submissions, as set out in Annex 8, we propose to use postcode sectors. Postcode sectors are a well established unit of analysis. We can also exploit features of the address system in our mapping, as they usefully follow geographic boundaries and density. Postcodes share this benefit but are far more numerous and many more postcodes are added and removed each year, so they change more often. We, therefore, consider that the use of postcode sectors strikes a reasonable balance between granularity and practicability.

Assessment of MSNs

7.19 As noted above, we start by examining MSNs. We take this approach as these networks provide services in both WLA and LL Access. In addition, across much of the country, competition today is largely based on the presence of rival MSNs to BT (i.e. Virgin Media) and we expect much of the network rollout over the period of the review to be by MSNs.

MSNs included in our analysis

7.20 In this analysis we have considered the current and planned rollouts of Virgin Media, CityFibre and FibreNation. These networks have existing coverage; have been able to provide us with rollout plans; and either already provide both WLA and leased lines, or have identified that their business plans assume the provision of both services.

7.21 Other networks may start rolling out prior to our final statement (for example, Axione[229]). In addition, some networks that we have considered to be broadband only networks may be able to provide leased lines if demand arises. If such developments were to occur, we would need to consider updating the MSNs included in our analysis for our statement.

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[228] Ofcom, 2018. *Promoting investment and competition in fibre networks: Approach to geographic markets*.
[229] https://www.ofcom.org.uk/consultations-and-statements/category-3/code-powers-axione-uk-limited.

Coverage thresholds for MSNs

7.22   As individual network operator's current and planned deployments will not map precisely to postcode sectors (i.e. their rollout in a postcode sector will rarely cover 100% of premises in that sector) we must consider a coverage threshold for a network to be regarded as being 'present' in any postcode sector.

7.23   In the December 2018 Consultation, we presented illustrative results applying a coverage threshold of 65% of premises passed in a postcode sector - largely because this threshold had been used in previous market reviews - and invited stakeholder views. In summary, BT Group and Openreach favoured a lower threshold, Virgin Media saw 65% as broadly acceptable, but the majority of stakeholders who made submissions on this point thought that the threshold should be higher. We present in more detail stakeholders' views on the coverage threshold in Annex 8.

7.24   We recognise that there are arguments for applying a higher or lower threshold. Our proposal is to apply a 50% threshold when considering MSNs. A 50% threshold means that we only include postcode sectors where an MSN network passes more than half of premises in that locality. We think that is a reasonable approach to drawing a line for where a network is present. We consider that our proposed approach of applying a slightly lower threshold than we previously consulted on is consistent with our strategy of promoting network investment and competition. Setting a higher threshold would exclude postcode sectors even where more than half of premises would likely see competition.[230] Hence, a higher threshold could result in postcode sectors being considered to have no competing networks despite existing or potential network presence covering the majority of premises.

Existing network coverage of MSNs

7.25   To assess whether MSNs have existing network presence within postcode sectors, we have used information gathered for our Connected Nations Summer 2019 report on the level of current network build across the UK.[231]

7.26   The Connected Nations dataset provides information on network coverage down to an individual premises level based on unique property reference numbers (UPRNs). Using this

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[230] We note that the choice of coverage threshold - whether at 50% or 65% or 80% - is unlikely to be material for many postcode sectors. This is because, when an operator decides to deploy to a town or city, it will aim to pass several thousand premises across multiple adjacent postcode sectors. This means that most postcode sectors within the urban deployment are likely to see very high coverage and the area to which they are allocated will be insensitive to our choice of coverage threshold. Postcode sectors with lower coverage are likely to include those at the edge of urban areas where a postcode sector covers the town and more rural areas. Therefore, the coverage threshold is likely to be more determinative of postcode sectors with partial coverage, including those at the edge of an urban deployment.
[231] Due to the time necessary to gather information from operators on their build plans and to process these data, we have used Connected Nations data based on the information request sent in May 2019. We have not used the more recent Connected Nations data collected in September 2019 as this would make it more difficult to process the planned build data we collected in July 2019. The September dataset also does not include details of take-up on different operators' networks. Therefore, to ensure a consistent set of data across existing and planned build and take-up on existing networks we have used the earlier dataset.

information, we have mapped current premises passed to relevant postcode sectors. We explain the main processing steps regarding this data in Annex 8.

Areas where there are current plans for rollout by MSNs

7.27   In addition to MSNs' current network coverage, we have also considered their plans for additional build.

7.28   We sent formal information requests to network operators deploying MSNs. We asked for information on their plans for additional build up to 2026.

7.29   In some cases, operator plans relate to extending an existing network rather than build to a new town or area. In these circumstances, we mapped the combined existing and planned network presence.[232]

7.30   In relation to planned build, there are differences in the level of certainty associated with operators' ambitions for roll-out. We found that an operator's plans for certain towns or cities might be at different stages of development. Some operators' plans included lists of target towns without further details. The same operator may also have plans for some towns at a very advanced 'ready to build' stage (i.e. with all relevant senior management sign-off, funding and planning permissions in place).

7.31   We propose to include all current plans in our assessment of the possible extent of MSN deployment over the review period.[233] Whilst we recognise that plans can change, we think that including all plans gives a good view of the areas likely to see build. If we only took into account plans that had been signed off and those in the course of build, we could be understating the scope of rollout for this review period. We think using early plans of operators gives a reasonable indication of the areas in which build is most likely to be attractive.

7.32   Where operators' plans were provided at a higher level grouping (e.g. identifying a town/city where they plan to build, but not giving us precise locations of where within the town/city the build would occur), we mapped these plans to postcode sectors. We did this using a cluster analysis which maps urban areas and the postcode sectors that are within them. Annex 8 explains the process used in our cluster analysis. Having defined the clusters we mapped the operator's plans to the clusters. Where we map plans to a cluster, we include all the postcode sectors within that cluster in our assessment.[234]

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[232] This is to ensure we correctly take account of additional build. If we treated existing and planned build separately, an operator with less than 50% coverage currently, but with plans to expand could be counted as not present if its build also covered less than 50%. We count an operator as present based on network plans if the sum of existing and planned build is 50%.

[233] In modelling operator plans, we have examined the internal status of their build plans and we present in Annex 8 some sensitivities based on this.

[234] Where an operator has provided us a view of how many premises it expects to cover we have taken that into account. So, for example, if an operator indicates it will build to 1,000 premises in a town, if this maps to a cluster with, say 10,000 premises, we do not count the operator's plans since it would not cover 50% of the premises within the cluster. In some cases, operators have provided us with a single postcode reference but have identified build will go beyond just that postcode. We have used a similar analysis by mapping the postcode to a cluster and testing whether the number of premises planned to be passed is more than 50% of premises within the cluster.

Areas where we think there is potential for build by MSNs, but which do not feature in existing roll out plans

7.33   In addition to the areas in which MSNs have either existing network presence or already have plans for build, in our December 2018 Consultation we proposed to capture those locations where there is a prospect of future network rollout that is both material in nature and based on commercial deployment of MSNs, but which do not feature in existing roll out plans. We recognised that a number of factors in an area might determine the potential for build. However, we proposed using a cluster analysis to identify geographic areas of sufficient size and density of premises to determine the potential for material commercial MSN deployment.

7.34   We have re-considered this approach. Whilst this approach provides the widest view of areas where deployment is potentially attractive, we think including these areas may be somewhat speculative. We think that including the early/uncommitted build plans provided by operators (as discussed above) better captures likely future build. As such, we have not included in our assessment areas where there is no planned build, but where build may be economic.

7.35   However, if over the next twelve months it becomes clear that the network build plans we have included are not delivered, and that build occurs in very different areas, it may be appropriate to revisit this approach and consider whether our cluster analysis may provide a more stable view of likely MSN presence on a forward-looking basis.

Outputs of modelling of MSN presence

7.36   Below we set out the results on the presence of rival MSNs taking into account existing network presence Table 7.2 and presence when including both existing and planned rollout Table 7.3.

Table 7.2: Summary of existing MSN network presence, number of postcode sectors (pcs) and premises

Number of MSNs (excluding BT)	Existing network presence	% of UK premises
2 or more	15 pcs 0.05 million premises	0.2% premises
1	4,425 pcs 16.8 million premises	55.1% premises
0	5,118 pcs 13.7 million premises	44.8% premises

Source: Ofcom.

Table 7.3: Summary of existing plus planned MSN network presence, number of postcode sectors (pcs) and premises

Number of MSNs (excluding BT)	Existing plus planned network presence	% of UK premises
2 or more	1,639 pcs 6.5 million premises	21%
1	4,398 pcs 14.8 million premises	48%
0	3,521 pcs 9.2 million premises	30%

Source: Ofcom.

7.37   Currently, we find that there is at least one existing MSN other than BT in 4,440 postcode sectors (55% of UK premises). This existing coverage is largely Virgin Media which is present in [✂]% of these postcode sectors, ([✂] million of UK premises).

7.38   Including planned build, there would be 6,037 postcode sectors (70% of UK premises) where we expect at least one rival MSN to BT by 2026.

Identification of Areas 1, 2 and 3 based on MSNs

7.39   Based on the analysis of MSN presence, we propose to identify Areas 1, 2 and 3 that would apply to each of the WLA and LL Access markets.

Area 3

7.40   We propose that Area 3 relates to all postcode sectors where there is unlikely to be material commercial deployment by rival MSNs. In these areas, no rival MSN to BT will have any current network or plans to deploy network of sufficient scale.

7.41   On the basis of our current analysis, Area 3 would represent 37% of UK postcode sectors and 30% of UK premises. We find that postcode sectors in Area 3 are typically in rural areas, villages and smaller towns. We see these areas as distinct from where BT faces or could face competition from one or more rival MSNs. Plans for MSN rollout are predominately in larger towns and cities and their suburbs.

Area 2

7.42   Area 2 comprises postcode sectors where there is already some material commercial deployment by rival MSNs to BT or where MSNs have plans to build. We consider the conditions of competition in these areas will be different to those in Area 3 as discussed above over the period to March 2026 due to the difference in existing and/or potential competing infrastructure.

7.43   In response to the December 2018 Consultation, some stakeholders argued for a further segmentation of Area 2 to reflect differences in competitive conditions between areas where there is existing rival network coverage versus where rival build is based on plans.[235] We acknowledge that, within Area 2, rival build is more certain in some areas than others. Given the uncertainty around investment plans, the only basis for any further segmentation would, as stakeholders indicate, be in relation to splitting between existing rival network presence and plans of different status (e.g. committed versus uncommitted plans).

7.44   However, market definition is a forward-looking exercise and, for this review, we are looking ahead to the period April 2021 to March 2026. Our assessment is that there are genuine prospects of future rival network rollout in areas where there are plans for rival build. Whilst some of these plans may not be deployed, we have a reasonable expectation that much of this build could be realised, leading to conditions of competition in these areas developing over the period of the review. Absent regulation, there is uncertainty in relation to where and how much rival build we might see and the competitive impact of any build that does occur. This uncertainty could also apply to more immediate and well-developed plans for rival network build. We do not, therefore, think that is appropriate to segment Area 2.

7.45   We, therefore, propose that Area 2 would represent 63% and 70% of UK postcode sectors and premises respectively.

Area 1

7.46   Area 1 comprises postcode sectors where there are at least two established rival MSNs to BT.

7.47   There are 15 postcode sectors that have already seen investment by two rival MSNs to BT. However, based on a wider assessment of competitive conditions, we do not find any postcode sectors where competition from both networks is well established.

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[235] We note these responses were based on proposals in our December 2018 Consultation where we proposed to include areas where build could be economic in Area 2.

7.48   Our view is that, absent wholesale access regulation, competitive conditions in the postcode sectors would not be sufficiently distinct from those in other postcode sectors in Area 2. In particular, there is clearly potential for material competition, but it remains uncertain how effective this will prove to be, due to:

a) the nascent and currently small scale of build, and that this build remains on-going; and

b) the overall levels of penetration operators have been able to achieve given their overall coverage.

7.49   Of the 15 postcode sectors where two MSNs and BT have existing network presence, the majority are in parts of York[236] or Bournemouth.[237] The two other postcode sectors with BT plus two rival MSNs are more isolated individual postcode sectors in Leeds and Peterborough.

7.50   However, this level of competition is nascent. In York, the FibreNation network build is ongoing. So far, this rollout covers [✂][238] premises, out of planned build of [✂].[239] As of June 2019, there were [✂] live connections on the FibreNation network in York, equivalent to a penetration rate of [✂]%.[240]

7.51   In Bournemouth, CityFibre acquired a fibre network some years ago that extends to around 20,000 homes.[241] It recently announced that work was underway to align this network with CityFibre's national network architecture and shortly has plans to expand the network. CityFibre has been providing high speed retail broadband services to homes and businesses and leased services, on the acquired network, since 2013.[242] CityFibre also reported that Vodafone would be offering ultrafast broadband services soon after network expansion is complete.[243] However, CityFibre's live connections as of June 2019, were equivalent to [✂]% of the premises passed.[244] On this basis, we propose that it is still early days in the roll-out of fibre services to Bournemouth.

7.52   We recognise that there will be further network rollout in future. Given this potential development, we may find that there is a difference in competitive conditions between some areas with two established rival MSNs to BT and other areas so that we have a separate Area 1. We have, therefore, discussed the further analysis we would consider if

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[236] The rival networks in York are Virgin Media and FibreNation which TalkTalk uses to provide ultrafast broadband services.

[237] The rival networks in Bournemouth are Virgin Media and CityFibre who acquired this network from H_2O.

[238] Figures taken directly from Table 4 of TalkTalk's response of [✂] to question 1 of the s.135 notice dated [✂]. This figure includes all premises with a York postal address including premises in those postcode sectors where TalkTalk/FibreNation covers less than 50% of premises.

[239] Figures taken directly from Table 1 of TalkTalk's response of [✂] to question 1 of the s.135 notice dated [✂].

[240] From our formal information request, we found that out of [✂] relate to TalkTalk and [✂].

[241] https://www.ispreview.co.uk/index.php/2019/04/bournemouth-get-city-manager-for-cityfibre-ftth-broadband-rollout.html [accessed 17 December 2019].

[242] https://www.cityfibre.com/news/201385cityfibre-launches-gigabit-speed-services-to-bournemouth-business-community/ [accessed 17 December 2019].

[243] https://www.cityfibre.com/news/one-million-homes-now-identified-cityfibres-full-fibre-roll-bournemouth-northampton-join-programme/ [accessed 17 December 2019].

[244] Figures taken directly from Table 4 of CityFibre's response of [✂] to question 1 of the s.135 notice dated [✂].

we were to identify any Area 1 geographic areas in future in Section 8, which discusses our SMP assessment.

Summary of approach to MSN analysis

7.53   The above sets out our approach to how we analyse MSN current and planned presence, and the results of our analysis.

7.54   Having mapped existing and planned presence of MSNs to postcode sectors, we now consider service specific networks in order to determine the boundaries of our geographic markets.

Service specific network analysis

Other networks providing WLA services

7.55   We assess the coverage of broadband only networks as a means of examining whether their presence (or potential presence) in a particular area is likely to change the conditions of competition in that area from those we would expect based on our MSN assessment alone.

7.56   We have classified broadband only networks as any provider whose network has been rolled-out only to supply residential and, possibly, business broadband services but does not provide leased lines services.[245] We included B4RN, CallFlow, Community Fibre, Gigaclear, Hyperoptic, IFNL, ITS, ZZoomm and Toob in our broadband only assessment on this basis.

7.57   We have followed the same analytical steps as our MSN analysis described above to assess existing and planned coverage of broadband only network in each postcode sector. [246, 247]

7.58   Using this analysis, we consider whether there is any postcode sector in which the additional presence of a broadband only network would sufficiently alter the conditions of competition such that it should not form part of the same market as the other postcode sectors in the geographic area to which it has been assigned based on our MSN assessment. By way of example, assume that postcode sector A has been assigned to Area 3 on the basis of our MSN assessment as we do not expect any material commercial deployment by rival MSNs to BT. We then identify that a broadband only network is also present in postcode sector A. We would then consider whether that results in the

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[245] To assess this, we spoke to different stakeholders about their business models. We found one instance where a broadband only network operator's downstream retail arm offered retail leased lines services [✂]. However, on further review, we have found that these services are delivered by reselling leased lines using network from another operator, so these leased lines services were not delivered over the provider's own fibre access network.

[246] We also sent information requests from July 2019 to operators not included within the Connected Nations dataset (see Annex 8 for further details). In practice, only one operator, Community Fibre, had completed network deployment ready for service.

[247] We derived existing network presence for most of these broadband only operators from the June 2019 Connected Nations dataset, which we also used to assess MSN existing network presence. Similar to our MSN analysis, we also asked the same questions to broadband only network providers on their planned build (and details of existing build if the operator did not feature in the Connected Nations dataset we used).

conditions of competition in postcode sector A, specifically in respect of broadband, being sufficiently different from the rest of Area 3 such that they should not form part of the same market.

7.59   Table 7.4 below presents analysis on the presence of rival broadband only networks taking into account existing network coverage only.

Table 7.4: Broadband only network presence (number of postcode sectors and premises)

Number of broadband only networks	Existing network presence
2 or more	0 pcs
	0 premises
1	84 pcs
	0.1 million premises
0	9,474
	30.4 million premises

Source: Ofcom.

7.60   Table 7.4 shows no postcode sectors with multiple broadband only networks with existing presence and 84 postcode sectors with one broadband only network (less than 1% of UK premises)

7.61   Out of the 84 postcode sectors, 33 are in Area 3, where there is no existing or planned MSN build. Hyperoptic and Gigaclear have existing coverage in the largest numbers of postcode sectors in these 84 ([✂]), with the remaining postcode sectors covered by a tail of other operators. Hyperoptic's existing network is [✂] while the [✂].

7.62   We have also examined the expansion plans of broadband only network operators. Despite the very limited existing coverage of these network operators, some have ambitious rollout plans that could increase coverage significantly.

7.63   We consider whether the presence of one of these broadband only operators in a postcode sector would be likely to change the conditions of competition from those we would expect based on our MSN assessment:

a) Hyperoptic has some existing presence in a limited number of postcode sectors. Its business model to date has focussed on targeting certain niches (e.g. MDUs). While its existing network presence is largely concentrated in London, it has plans to extend its network to cover [✂] million premises. However, we expect Hyperoptic's competitive presence to be largely complementary to that of MSNs, serving premises that might otherwise be poorly served. As its coverage is targeted at MDUs, it does not target large areas with the intention to rollout to the majority of premises within an area and its coverage is currently limited to a small number of premises across the UK. As such, we do not consider that Hyperoptic's presence (existing or planned) in a postcode sector would add to the competitive conditions we would expect based on MSN presence alone, such that we should define a separate geographic market.

b) Gigaclear has some existing presence in a limited number of postcode sectors and has plans to extend its footprint. However, we note that a proportion of Gigaclear's network build is based on state aid funding and its footprint is made up of a number of small deployments dispersed over a large geographic area. Gigaclear targets areas where it does not expect to face competition from other networks, including BT. As such, over the period of the review, whilst consumers have some choice in these areas, the degree of competition is not expected to be substantial. Gigaclear's small overall footprint means its pricing is unlikely to have a large effect as a constraint on the pricing of BT's (or other telecoms providers') services. As such, we do not consider that Gigaclear's presence (existing or planned) in a postcode sector would materially alter the competitive conditions we would expect based on MSN presence alone such that we should define a separate geographic market.

c) The other networks for which we have gathered data cover fewer premises than Hyperoptic and Gigaclear and/or are at the very formative stages of network deployment. Whilst we welcome their intentions to deploy, our view is that these plans are currently uncertain given that these operators are not yet providing services to any material extent. As such we consider it too early to reach a view on whether their presence might alter the competitive conditions in particular postcode sectors.

7.64 We also found some cases where operator plans were not sufficiently developed to be included in our modelling of the extent of planned build. This was where operators had ambitions to build (i.e. a general statement of further potential build in rural areas), but had not yet decided on specific locations. As these areas were too widely defined, we have not included them in our assessment.

7.65 We are aware of new entrants that may commence deployment soon, and that the operators discussed above have plans for developing their networks. We will review which broadband only operators should be included in our assessment for our statement.

Other networks providing leased lines services

7.66 As for broadband only networks, we have also assessed whether the presence (or potential presence) of leased lines only networks would sufficiently alter the conditions of competition in a particular area, such that it should not form part of the same market as the other postcode sectors in the geographic area to which it has been assigned based on our MSN assessment.

7.67 Leased lines only networks are typically deployed in a different way from networks supplying residential broadband connections. As leased lines only networks are targeting business users, they are not constructed to pass large numbers of premises in a particular postcode sector or coverage area. Instead, they are typically built with the intention of passing sufficiently close to the main business sites in an area (e.g. industrial parks, business districts, mobile masts, etc.) so as to be able to provide connections to business premises in future on demand. When we assess the presence of networks supplying leased lines, we, therefore, typically measure their proximity to business sites, as this is the key driver of whether they will be able to compete to serve customers.

7.68   We consider a network to be 'present' and able to compete for leased lines customers if it is connected or very close to customer sites.[248] The 2019 BCMR analysis counted network presence by identifying an operator as 'within reach' or 'present' if its network is within a certain buffer distance of a business site.[249, 250] Based on analysis of networks within reach of all relevant sites within a postcode sector, we then computed for that postcode sector the proportion of sites with the choice of 0,1,2 etc. networks within the selected buffer distance. In the 2019 BCMR, we applied a threshold of 65% to ensure that the majority of sites in an area would have network choice (e.g. if at least 65% of business sites in a postcode sector are within reach of 2 networks in addition to BT, we would treat the postcode sector as BT+2).

7.69   Although only a short time has elapsed since publication of 2019 BCMR Statement, we have considered whether to update the geographic analysis. In the 2019 BCMR, the analysis of network presence was based on existing build as at December 2017 meaning that there may have been additional build since then. The 2019 BCMR covered the period to March 2021. In this review we are looking forward to the period April 2021 to March 2026.

7.70   In light of this, we met with stakeholders and issued formal information requests. We asked for details of recent new build and found that there has been not been material new leased lines only network build since the end of 2017. We also asked for information on future investment plans and the impact of PIA. As set out in Annex 7, there are prospects of build and leased lines only network operators are exploring the opportunities for using PIA to increase the density of coverage of existing network presence. It is, however, difficult to reflect this in the data analysis as operators' build plans are still developing.

7.71   As such, we consider that the data gathered for 2019 BCMR analysis remains a reasonable basis for analysing existing leased lines network presence in this consultation.

Presence of leased lines only networks

7.72   We have considered whether the presence of leased lines only networks would sufficiently alter the conditions of competition in a particular area such that it should not form part of

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[248] The evidence in the 2019 BCMR suggests that operators would be able to compete where they had an existing fibre or duct connection into a building or the distance that the operator would have to dig was very short (e.g. <20 metres).
[249] Due to data limitations, we could not accurately measure the distances between the location of networks and customer sites. We did not have reliable information on the extent to which operators had existing fibre or duct connections into specific business sites for most of the UK. Furthermore, we had to approximate where the fibre entry point for a business sites was located and we did not always know the exact location of customer sites, which introduced a degree of error. Taking these factors into account, we considered that we should count rival networks presence for operators with network within a 'buffer distance' of 50 metres of the geographic centroid of post code where the business is located. We thought that this buffer distance would be a reasonable indicator of the number of rival operators' networks that were much closer than 50m to the actual location of businesses. This is because we considered that - due to measurement errors – the distances measured by our model will overstate the actual distances between networks and business sites. As such, the 50m buffer distance in practice captures networks with existing connections or which need very short network extensions.
[250] As set out in Annex 7, unrestricted PIA is less likely to be used on a material scale for customer specific extensions than for infill of existing networks or building networks in new areas. Therefore, we do not consider that it will have a material impact on our choice of the buffer distance.

the same market as the other postcode sectors in the geographic area to which it has been assigned based on our MSN assessment.

7.73 In doing so, we need to ensure that we are assessing the presence of leased lines only networks and MSNs consistently. As part of our MSN analysis, we counted an MSN as present in a postcode sector if it passed more than 50% of total premises in the postcode sector. However, as noted above, proximity to business premises is the key driver of network presence for the provision of LL Access. Therefore, in assessing the presence of networks providing leased lines (both MSNs and leased lines only networks), we have used the 2019 BCMR analysis on network presence.

7.74 The 2019 BCMR data and analysis identified cases where there were BT+2 operators providing leased lines (including MSNs and leased lines only networks) as being in the CLA and HNRs. The CLA and HNRs included 579 postcode sectors. We consider these postcode sectors below.

7.75 Outside the CLA and HNR areas:

a) In Area 2, presence of competitors providing leased lines is generally due to Virgin Media. There are 3,241 postcode sectors with a network other than BT providing leased lines. In nearly 95% cases these are MSNs.[251] Even in the limited cases where there is a leased lines only network operator present, we consider that it is correct to assign this postcode sector to Area 2, as there is only one existing competitor for leased lines, and MSN rollout is expected.[252] We consider conditions of competition in these postcode sectors to be sufficiently homogenous with postcode sectors where there is one rival MSN to BT and one planned (which would be allocated to Area 2 on the basis of our MSN analysis);

b) In Area 3, there are only 130 postcode sectors (i.e. less than 4% of postcode sectors in Area 3) with presence of a network providing leased lines other than BT.[253] Our view is that in these cases it is likely that there are currently few leased lines customers in the postcode sector and the leased lines only network provides services to a specific location rather than being able to compete for services across the whole postcode sector. In addition, given the low number of potential leased lines customers, further network build by network operators (leased lines only or MSN) is unlikely. We, therefore, consider that conditions of competition in these postcode sectors are sufficiently similar to those in the remainder of Area 3 that we should include them within the same market.

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[251] As discussed previously, there are a small number of postcode sectors where there are two MSNs but we do not consider the second MSN is established as yet.

[252] As our MSN analysis has allocated the postcode sector to Area 2, there is either MSN presence already existing, or it is planned. If the BCMR analysis indicates the existing network is not an MSN, this indicates the MSN is planned in this postcode sector.

[253] Of these 130 postcode sectors, 125 have presence from MSNs. These are cases where an MSN has built to specific business premises in the postcode sector, but has not extended broadband coverage widely enough to be counted as present in our MSN analysis.

7.76   As such, outside the CLA and HNR areas, we do not consider that the presence of leased lines only networks sufficiently alters the conditions of competition in any area such that it should not form part of the same market as the other postcode sectors in the geographic area to which it has been assigned based on our MSN assessment.

7.77   Having considered cases with one leased lines only network provider, we now discuss the CLA and HNR areas, where the presence of leased lines only network operators, in addition to MSNs, mean BT faces two or more competitors in the provision of leased lines. We propose that conditions of competition are likely to be different in these compared to where there is no competitor to BT or where there is only one. In these areas, customers generally have access to multiple networks in addition to BT, and the average distance to the nearest non-BT network is much closer than where only one network is present. This means that for LL Access, these postcode sectors are different to the other postcode sectors in the geographic area to which they were assigned based on our MSN analysis (either Area 2 or 3). In particular, for LL Access, the CLA and HNR postcode sectors are different from other postcode sectors in Area 2 of our MSN analysis above where there is either one or no established existing provider other than BT.[254]

Identifying postcode sectors with BT+2 or more networks providing leased lines

7.78   We have considered the CLA and HNR areas using the 2019 BCMR data. This means we have assessed the presence of MSNs and leased lines only networks in the same way, using the 2019 BCMR approach (including a threshold of 65%). Based on the 2019 BCMR data, Table 7.5 below provides data on the CLA and HNR areas, with the HNRs broken down into the largest metropolitan areas.

Table 7.5: CLA and HNR areas grouped by metropolitan area

Area	Postcode sectors		Large business sites and mobile base stations		Customer ends connected in 2017	
	Number	Share*	Number	Share*	Number	Share*
CLA	275	47%	4,229	44%	7,988	67%
Manchester	34	6%	608	6%	481	4%
Liverpool	28	5%	242	3%	189	2%
Edinburgh	21	4%	604	6%	466	4%
Glasgow	20	3%	601	6%	424	4%
Leeds	14	3%	410	4%	327	3%
Birmingham	10	2%	359	4%	283	2%
Bristol	10	2%	301	3%	280	2%
Nottingham	7	1%	201	2%	139	1%
Sheffield	7	1%	243	3%	133	1%
South East London	5	1%	183	2%	184	2%
All other HNR areas	148	26%	1686	17%	1073	9%
Total HNR areas	579	100%	9,667	100%	11,965	100%

Source: Ofcom network reach and circuit data analysis.

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[254] As we consider that the second MSN is not yet established.

Percentages presented in this table may not add up to exactly 100% due to rounding.

7.79   Table 7.6 shows the results for CLA and HNR postcode sectors (grouped by the metropolitan areas for the largest concentrations of postcode sectors), in relation to the average number of networks present to supply customer sites, and the proportion of businesses that have a choice of rival networks present to their customer site.

Table 7.6: CLA and HNR areas grouped by metropolitan area

Area	Average number of rival networks present*	Proportion of businesses with X rival networks present					
		X = 0	X = 1	X = 2	X = 3	X = 4	X = 5 or more
CLA	4.3	4%	6%	9%	17%	18%	46%
Birmingham	2.7	8%	10%	25%	27%	22%	7%
Bristol	2.9	3%	7%	24%	44%	8%	14%
Edinburgh	2.2	4%	14%	49%	26%	6%	0%
Glasgow	2.6	2%	7%	46%	28%	10%	6%
Leeds	2.7	3%	7%	32%	40%	13%	4%
Liverpool	1.9	5%	6%	80%	9%	0%	0%
Manchester	2.8	4%	5%	40%	19%	18%	13%
Nottingham	2.2	2%	15%	44%	37%	1%	0%
Sheffield	2.5	1%	11%	37%	40%	11%	0%
South East London	2.6	12%	16%	23%	28%	5%	16%
All other HNR areas	2.1	5%	17%	51%	19%	4%	3%
HNR areas exc CLA	2.4	4%	12%	44%	26%	9%	5%

Source: Ofcom network reach and circuit data analysis.

* Rival networks to BT include MSNs providing leased lines and leased lines only networks. This is likely to capture networks either connected or very close to customer site (e.g. <20m).

7.80   These results show that in the CLA there were, on average, more than four rival networks present to supply business sites (i.e. connected to or very close to the sites). Also, in the 10 metropolitan areas, there were on average between 1.9 -2.9 rival networks present.

We propose separate geographic markets for LL Access in the CLA and HNR areas

7.81   For CLA, the evidence set out above suggests that, based on existing network presence, this is a particularly distinct geographic area with significant density of large businesses and a significant number of operators present. Across the CLA, on average large business and mobile sites have a choice of four networks present to supply leased lines services. This competition is also reflected in the distribution in choice across customer sites with 90% of sites with a choice of two or more networks present and 81% with three or more.

7.82   Looking forward, based on evidence gathered from our discussions with stakeholders, we understand that there is potential created by PIA for further investment in the CLA in network density (see Annex 7 for further information on the impact of PIA). It is, however,

too early to identify exactly the scale of this network investment and where it will be deployed in the CLA.

7.83   For HNR postcode sectors, while competition is not as strong as in the CLA, on average sites have 2.4 competing networks present. This competition is also reflected in the distribution of choice across customer sites, with 84% of sites with a choice of two or more networks present and 50% with three or more.

7.84   In the 2019 BCMR, we defined seven separate markets for the HNRs: one market for each of the six largest metropolitan areas and a further market for the remaining HNR areas outside of these six metropolitan areas.[255] This was based on our assessment of current competitive market conditions and looking over the timeframe of the 2019 BCMR until 2021.

7.85   We consider that, looking forward until 2026, and based on evidence from our stakeholder discussions, we should identify a single HNR market that includes all HNR postcode sectors. This is because of the potential for material change in competitive conditions over the review period, in the light of PIA, which means that the delineations between different HNR locations previous used may evolve and change (see Annex 7 for further details). At this stage, leased lines only network operators have not identified particular areas for build, but have been generally positive about the opportunities created by PIA for investment in increasing network density. There are uncertainties around where exactly operators will deploy and it is difficult up front to draw a clear line between HNR areas that might see large changes in network density and those that do not. Accordingly, we propose to define a single geographic market including all HNR postcode sectors.

7.86   Taking into account both the potential for further investment and the existing network presence, we consider that, over the period of the review, competitive market conditions in these HNR postcode sectors will continue to be sufficiently different from those in the rest of the UK to merit identifying a separate geographic market. In addition, we might see competitive market conditions in these areas approaching those we see in CLA today.

7.87   Therefore, in the LL Access market we propose to define four geographic markets: CLA, HNR areas, Area 2 and Area 3.

Network operators not included in our analysis

7.88   There are other network operators also commencing network build in the UK. Jurassic Fibre[256] and Axione[257] are two such operators who have identified their plans to us. It appears to us that is still early days for these networks in developing their plans for new build. Therefore, we do not consider that it is appropriate to include these networks in our provisional market analysis. However, we will review these network deployments for our statement.

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[255] 2019 BCMR Statement, paragraph 5.119.
[256] https://jurassic-fibre.com/ [accessed 17 December 2019].
[257] https://www.ispreview.co.uk/index.php/2019/10/axione-uk-planning-to-build-full-fibre-broadband-isp-network.html [accessed 17 December 2019].

Other issues

7.89   One stakeholder, Network Rail, suggested an entirely separate market should be defined for the rail corridor. It submitted that mobile coverage on railways is currently variable and that using existing Network Rail fibre to connect to mobile sites along the rail corridor could help improve coverage.

7.90   Whilst there will be some locations where mobile coverage may require mobile sites to be located on the rail corridor, it may be possible for other areas to be covered from mobile sites located on other land close to the railway (for example on a privately-owned building next to the rail corridor). Whilst the demand for mobile backhaul is uncertain in terms of the specific locations at which it is needed, and the suppliers that could, therefore, provide it, we do not think it is appropriate to define a separate market comprising the rail corridor as demand and competitive constraints could vary across the rail corridor. Ofcom is currently working with the UK Government, Network Rail and other interested parties to consider how mobile coverage on trains may be improved. This includes a range of solutions, including whether and how Network Rail's assets may be used and we welcome solutions that extend mobile coverage, including the use of Network Rail assets where appropriate. Any use of Network Rail's assets is not dependent on the definition of markets in this review but should they be used to provide connectivity to mobile base stations in future, we would consider how to take account of this in our reviews, including the extent to which it is considered to be a public funded deployment and any conditions attached as a result of this.

Proposed geographic markets

7.91   We propose:

7.92   For WLA markets:

- WLA Area 2 – postcode sectors where there is already some material commercial deployment by rival MSNs to BT or where this could be economic;
- WLA Area 3 – postcode sectors where there is unlikely to be material commercial deployment by rival MSNs to BT.

7.93   For LL Access markets:

- Geographic markets reflecting levels of network competition from MSNs plus leased lines only networks for postcode sectors:

  - LL Access CLA – in the Central London area; and
  - LL Access HNR – other postcode sectors where there are two or more rival networks to BT in the provision of leased lines.

- For the remaining postcode sectors in the rest of the UK we propose that we identify the following geographic markets:

  - LL Access Area 2 – postcode sectors where there is already some material commercial deployment by rival MSNs to BT or where this could be economic;

- LL Access Area 3 – postcode sectors where there is unlikely to be material commercial deployment by rival MSNs to BT.

7.94   Based on the approach set out above, other than the postcode sectors allocated to the CLA and HNR markets, the WLA and LL Access Area 2 and Area 3 markets cover the same postcode sectors.

Assessment of wholesale IEC services

Geographic market definition

7.95   In our product market assessment, we explained that we continue to find a separate market for wholesale IEC services. In this part we set out our approach and findings in relation to geographic market definition in the supply of these services.

7.96   In the 2019 BCMR Statement we concluded that connections to one exchange are not a substitute for connections to another exchange. We also said that connectivity from another location (e.g. close to an exchange) is not a close enough substitute to be part of the markets we define. This is because, in both cases, telecoms providers need to be present at a specific exchange to use access remedies in the corresponding access area and, therefore, require onward connectivity from that exchange.

7.97   In addition, we noted that the conditions of competition can vary at each BT exchange, depending on presence of rival networks. We also said that competitive conditions vary on a route-by-route basis, but that it was not practical to assess competitive conditions for each IEC route.

7.98   Finally, we noted that, whilst in the LL Access CLA and HNR geographic markets we aggregated locations with similar competitive market conditions as the number of exchange locations is much fewer, we do not do this aggregation. We, therefore, defined each BT exchange as a distinct geographic market.[258]

7.99   We propose to adopt the same approach as that taken in 2019 BCMR Statement as, our view is that these considerations will be equally relevant for the period of this review.

Application of the three criteria test

7.100   As discussed in Section 4 (for the physical infrastructure market), where a market is not on the list of markets in the 2014 EC Recommendation, NRAs must apply the three criteria test to identify markets other than those listed.[259]

7.101   The market we propose to define for the supply of IEC is not on the list of recommended markets. Therefore, it is necessary to apply these three criteria. However, in the 2019 BCMR Statement we found the markets for IEC at BT+2 exchanges to be effectively

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[258] Our approach to SMP leads us to defining which routes are, and are not, competitive based on the rules we apply to each end of the route.

[259] The three criteria test is used to assess whether markets are susceptible to *ex ante* regulation.

competitive. We, therefore, consider it appropriate to only carry out the three criteria test for IEC services at BT+0 and BT+1 exchanges.

High and non-transitory barriers to entry

7.102   We consider that BT exchanges where there is no other telecoms provider able to supply IEC (BT+0 exchanges), or where only one provider other than BT can provide it (BT+1 exchanges) exhibit high and non-transitory barriers to entry. There are significant costs for a new entrant to build an IEC network as it requires very significant network to build a sufficiently large footprint. Even where rival network is 'nearby,' extending the network to connect to BT exchanges will involve material costs and time. While we recognise that PIA could reduce these barriers to entry such that a network operator is willing to build to some of these exchanges, we consider that this is still likely to be costly, and slow, and that there is significant uncertainty over the extent and location of this build.

A market structure that does not tend towards effective competition

7.103   In BT+0 exchanges, BT faces no competition and, for the reasons above, it is unlikely that significant new rollout will occur.

7.104   Whilst there may be the potential for some build-out to BT+1 exchanges, depending on their specific location, the extent of any such build out is unclear. Where BT faces only one competitor, we do not consider this is sufficient for there to be effective competition. This is because:

a)   The competitor is likely to price just below the price set by BT, meaning competition is weak. Evidence provided for the 2019 BCMR supported this occurs in practice. [✂] and [✂].[260]

b)   The telecoms provider that is able to provide IEC services may compete in the same downstream markets as the purchaser of IEC services. Higher backhaul costs for downstream competitors of a wholesale supplier could translate into a competitive advantage at the retail level for that wholesale supplier. This further incentivises price matching and dampens competitive pressure.

7.105   As such, in BT+0 and BT+1, we do not consider there is effective competition and BT's market power is unlikely to be reduced over the period of this review by new entrants in these exchanges.

7.106   Therefore, we consider that BT+0 and BT+1 exchanges do not have characteristics that suggest IEC services at these exchanges will tend towards effective competition.

Insufficiency of competition law

7.107   Our main concerns in relation to BT Only and BT+1 exchanges are as follows:

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[260] 2019 BCMR Statement, paragraph 8.88 [✂] and [✂].

    a) the importance of IEC services at these exchanges to the state of competition in LL Access;

    b) the risk of excessive pricing of IEC services which could result in high prices for end-users; and

    c) that it is unlikely that competitors will build to these sites.

7.108 We do not consider ex post competition law would be sufficient to address these concerns, for the following reasons:

    a) Given that it is unlikely that competitors will build to these exchanges, we consider some form of network access obligation is required to ensure effective competition;

    b) the need for timely and efficient intervention to avoid adverse effects on those providing services in the IEC and LL Access markets as well as the end-users of leased lines;

    c) if BT engaged in the behaviour mentioned above, there could be long-term or irreversible damage to competition in the markets;

    d) *ex ante* regulation provides clarity and certainty to BT and to other providers of leased lines; and

    e) the response to anti-competitive behaviour may not be sufficient to prevent harm in certain circumstances.

7.109 For these reasons, in this instance, we consider that competition law would not be sufficient by itself to address concerns in BT Only and BT+1 exchanges and, therefore, *ex ante* regulation is necessary to maintain effective competition.

Provisional conclusion of application of the three criteria test

7.110 For the reasons above, we consider that IEC at BT+0 and BT+1 exchanges meets the three criteria test and, therefore, these markets are susceptible to *ex ante* regulation.

7.111 On this basis, in the next section we assess SMP in BT+0 and BT+1 exchanges.

Consultation questions

> Question 7.1: Do you agree with our provisional conclusions on geographic market definition for wholesale networks? Please set out your reasons and supporting evidence for your response.
>
> Question 7.2: Do you agree with our provisional conclusion on the application of the three criteria test to the wholesale inter-exchange connectivity market? Please set out your reasons and supporting evidence for your response.

8. Wholesale networks – SMP analysis

8.1   This section presents our proposed SMP analysis for the relevant product and geographic markets defined in Sections 6 and 7. Specifically, we examine whether any provider has SMP in the WLA, LL Access, IEC markets in the geographic markets we propose in Section 7 above.

8.2   We set out our proposed analysis and findings in the following order:

- Proposed approach to SMP assessment;
- Proposed SMP assessment for the WLA markets (Area 2 and Area 3);
- Proposed SMP assessment for the LL Access markets (CLA, HNR areas, Area 2 and Area 3); and
- Proposed SMP assessment for the IEC markets.

8.3   Finally, we discuss our competition concerns in each of the WLA, LL Access and IEC markets.

Summary of proposals

8.4   We propose to find that BT has SMP in the following geographic markets:

- WLA: Area 2 and Area 3.
- LL Access: Area 2, Area 3 and HNR areas.
- IEC services: BT Only and BT+1 exchanges.

8.5   We propose that BT does not have SMP in the CLA for LL Access services, reflecting the extent of existing competition, the density of competing infrastructure and additional competitive constraints arising from PIA.

8.6   In Section 7, we reach the view that there are currently no postcode sectors where there are at least two established rival MSNs to BT. We are, therefore, not proposing to define an 'Area 1' market for WLA or LL Access services at this time. As operators become more established, we may find that competition will develop in some postcode sectors such that this position is reached.

8.7   In the event we define an Area 1 market in future, a separate SMP assessment would be necessary, on which we would consult. Anticipating this possibility, we set out below the factors we are likely to consider in determining whether BT has SMP in these areas. To reach a finding of no SMP our analysis would need to find that the presence of established rival network providers is not reliant on *ex ante* regulation arising from the WLA market.

Our assessment is forward-looking

8.8   As outlined below, we conduct an SMP assessment to see whether or not *ex ante* regulation is necessary over the timeframe of this review. Hence, our SMP assessment is forward-looking and considers whether markets could be prospectively competitive and thus whether any lack of competition may be temporary. We take into account expected

or foreseeable market developments over this market review period. This market review covers the period April 2021 to March 2026.

8.9   As outlined in Section 1, we expect competition in the future to be increasingly due to the presence and strength of competition from MSNs. However, as we are currently of the view that WLA and LL Access form separate markets, we also take into account the presence and constraint arising from broadband only and leased lines only network providers when conducting our forward-looking SMP assessment.

We adopt a modified greenfield approach

8.10   Similar to our market definition analysis, we apply the modified greenfield approach. The SMP assessment assumes that there is no *ex ante* regulation arising from a finding of SMP within the relevant market in question, but *ex ante* SMP remedies in other markets continue to apply.

8.11   We, therefore, assume that PIA remedies imposed in the upstream market for the supply of wholesale access to physical infrastructure apply and that, therefore, BT is required to provide unrestricted access to its ducts and poles everywhere in the UK.[261]

SMP criteria

8.12   We set out the criteria that we consider to be relevant to our assessment of the wholesale markets.[262] We set out our view on each of these criteria in the relevant assessment for each wholesale market.

Market shares

8.13   Market shares provide a useful first indication of competitive conditions in the market as the greater the number of rival networks that have managed to attain a material share of supply, the stronger is the indication that the intensity of competition is greater. According to the EC SMP Guidelines, a share in excess of 50% is itself evidence of a dominant position, save in exceptional circumstances.[263]

Control of infrastructure not easily duplicated (network presence and potential expansion)

8.14   BT has by far the largest and the only ubiquitous network in the UK, which is not easily duplicated due to the high sunk costs involved. Therefore, in large parts of the UK, BT will have network presence while other operators will not. This gives BT a significant competitive advantage in these areas as BT will be able to service customers quickly and at a significantly lower cost.[264]

8.15   Against this backdrop, the following is at the heart of our SMP assessment:

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[261] This approach addresses BT's comment in response to the December 2018 Consultation that Ofcom must take into account the remedies in the PIMR when assessing whether or not BT has SMP in the downstream markets.
[262] The complete list of criteria included in the EC SMP Guidelines are listed in Annex 5.
[263] EC SMP Guidelines, paragraph 55.
[264] We indicate the potential scale of this advantage when competing for the different wholesale markets in Annex 7.

- presence of rival infrastructure; and
- potential competition based on network expansions, facilitated by PIA.

8.16   We consider that the most important factor affecting the strength of competition in an area is the coverage of rival infrastructure. A greater number of rival networks present is likely to lead to a greater competitive constraint on BT. We explain how we define and measure presence for each wholesale market in the relevant SMP assessments below.

8.17   Where networks are not present in an area, and there are high barriers to entry and expansion, this makes it more difficult for rivals to compete with BT. The main barrier to entry is the high sunk cost and time it takes to roll out networks.[265] Other barriers[266] may include economies of scale[267] and scope[268] as even where BT needs to extend its network it may have a lower unit cost in areas where it can recover common costs from a much larger customer base compared to other operators.

8.18   We expect that PIA has the potential to reduce some of the barriers to entry and increase the likelihood that network providers will expand their network footprint and, therefore, constrain BT's market power in certain areas:

a) PIA will have a significant impact on reducing the time and cost involved in network expansion.[269]

b) PIA is likely to reduce the scale of BT's advantage from economies of scale and scope in some areas as it enables more fibre investment by MSNs, which are better able to realise economies of scope between broadband and leased lines services.

8.19   To inform our assessment of potential competition, we gathered evidence on the prospects of network build over this review period. As set out in Annex 7, we asked providers for their views and data on planned build and usage of PIA until 2026, using our statutory information gathering powers. Responses suggest that there are prospects of commercial build by rival networks, but they are still testing the extent to which PIA could be used for roll-out.

Absence of countervailing buyer power

8.20   We consider that customers would have a degree of buyer power where they have a credible outside option – in this case a choice of networks or self-supply – and if their purchase volumes are material. Both of these requirements need to be met cumulatively.

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[265] See evidence in Annex 7.

[266] In the 2019 BCMR Statement (paragraph 6.73) we also considered whether BT may have other competitive advantages arising from customer switching costs and national coverage. We continue to consider that these advantages may hinder the ability of rivals to compete for existing customers.

[267] We define economies of scale as circumstances in which the unit cost falls as volumes of the same service increase.

[268] We define economies of scope as circumstances where the unit cost falls as volumes of a different service increase.

[269] Ofcom analysis of physical infrastructure costs based on Openreach's ECCs, see 2019 BCMR Statement, Figure A6.1.

Pricing

8.21   In a competitive market, individual firms would not be able to raise prices above costs and earn returns above the cost of capital for a sustained period. The ability to price at a level that keeps profits persistently and significantly above the competitive level is one indicator of market power. In regulated markets, pricing up to the cap indicates that a firm is not constrained by competition.

Other criteria

8.22   We also consider, specifically for WLA, external constraints. In principle, products which are outside a market can still exert some constraining effect on the prices of products within it. We consider the extent to which FWA and mobile broadband are likely to be a constraint on BT's market power in WLA below. For access leased lines, we have not identified any products outside of the product market which could act as an external constraint.

WLA

8.23   In this sub-section we set out our analysis and evidence for the SMP criteria before setting out our assessment and proposed SMP findings for each geographic market and the factors we are likely to consider in an assessment of SMP in Area 1.

Analysis and evidence

8.24   In this sub-section we set out the evidence underlying the SMP assessment.

Market shares

8.25   We present:

- BT's market share in the supply of WLA in Areas 2 and 3;
- BT's share in the supply of WLA in the UK as a whole;
- BT's share of WLA in areas of Virgin Media presence; and
- BT's share of standard, superfast and ultrafast WLA segments.

8.26   We have estimated market shares in Areas 2 and 3, and in areas of Virgin Media presence, based on shares of 2019 active broadband connections. Our analysis is based on data collected from network providers and the same underlying dataset discussed in Section 7. When calculating market shares, we have focussed primarily on copper, fibre and cable broadband connections, and have not included customers that take a standalone landline service.[270] This tends to understate BT's market position because while the number of standalone landline customers are declining, and volumes are low, BT accounts for the

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[270] Standalone landline refers to a landline service bought as a standalone contract and not as part of a bundle with other services such as broadband or pay-TV.

large majority of connections ([✂]% of 2016/17 connections).[271] If standalone landline connections were included in our estimate of market shares, we, therefore, expect that BT's share would increase.

8.27 Similarly, we have estimated BT's share of standard, superfast and ultrafast WLA segments using data from network providers, but there is considerable uncertainty over these forecasts.

Competition from existing presence of network infrastructure

8.28 BT's coverage gives it an advantage over other networks in the provision of WLA as in a large part of the UK there are no rival networks.

8.29 We assess below the extent to which rivals have coverage (in terms of premises passed) in each of our geographic markets. We note that BT's ubiquitous network also gives it a competitive advantage over other networks because it can supply a large part of retail providers' contracts. We understand from stakeholders that there is a cost to buying from multiple networks, such that an effective competitor needs to have significant scale, or to be able to offer some other advantage which offsets the cost.[272]

Potential competition based on network expansions and use of PIA

8.30 Traditionally there have been high barriers to entry and expansion in the WLA markets arising from the cost of constructing a significant scale local access network and from the existence of high sunk costs. Networks that support WLA services are most efficiently built by initially "passing" large blocks of premises (e.g. all of the houses on a particular set of streets), and then using that network to connect new customers. A considerable proportion of the costs of the investment are then sunk because, once built, many components of the network either have low resale value or, where they involve recovery of assets, significant costs would be incurred in order to extract and resell them.

8.31 This creates a large economy of scale because once the high fixed cost of investment in network build has been sunk, the marginal cost of connecting an individual premise is relatively low. In addition, there may also be regional economies of scale arising from the fixed cost of maintaining operations in a particular area, or local marketing.

8.32 As outlined above, we expect that PIA has the potential to reduce some of the barriers to entry and increase the likelihood that network providers will expand their network footprint and, therefore, constrain BT's market power in certain areas. However, while we expect PIA to substantially reduce them, the sunk costs of network build are still likely to be large and networks are unlikely to be able to roll out using PIA alone.

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[271] In the Standalone Landline Review we estimated that in 2016/17 there were 2.6 million customers who took landline outside of a bundle. Ofcom, 2017. *The review of the market for standalone telephone services- provisional conclusions*, paragraph 2.5.
[272] Meeting between Ofcom and [✂]. Meeting between Ofcom and [✂].

Key evidence

8.33   In Table 8.1 below we present a summary of the key evidence for the WLA markets namely market shares; competition from existing infrastructure presence and potential competition from network build.

Table 8.1: Key evidence for WLA markets

	Area 2	Area 3
Total premises	21.3 million	9.2 million
BT's largest rival, % of premises passed	60-70%	0-10%
BT, share of connections[273]	c. 70%	close to 100%
Next largest rival, share of connections	c.30%	c.0%
BT, Share of connections in areas with Virgin Media presence	c. 60%	
BT, share of standard broadband (UK)		99%
BT, share of superfast broadband (UK)		73%
BT, share of ultrafast broadband (UK)		11%
Qualitative evidence on network build (including use of PIA) [See Annex 7 for full more details]	These plans are not certain, and at this stage it is difficult to identify exactly where rollout will be deployed, as rollout plans are likely to change and develop during the period. Evidence of material commercial build by	There are no prospects of material commercial build by rival network providers by 2026, facilitated by PIA. No prospects, therefore, of rival networks constraining BT's market power in the review period.

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[273] Includes active broadband connections only i.e. exclude standalone landline connections.

rival networks providers by 2026.

Source: Ofcom analysis of provider data.

8.34   The evidence in Table 8.1 suggests that BT has SMP in the supply of WLA in Areas 2 and 3. Potential competition due to network build (including using PIA) is likely to increase competition in Area 2 over this review period but the extent and location of this is uncertain. We set out our full assessment in Annex 7.

8.35   In what follows we set out our proposed assessment and SMP findings based on the evidence for each geographic market.

Proposed SMP findings

Proposal that BT has SMP in Area 3

8.36   We propose that BT will have SMP in the provision of WLA in Area 3.

Market shares (Area 3)

8.37   BT's share of active broadband connections is currently well above 50% in Area 3, as shown in Table 8.1.

Control of infrastructure not easily duplicated

8.38   Coverage analysis presented in Table 8.1 above shows that given BT's ubiquitous network coverage, it has significantly larger coverage than any of its rivals in Area 3. Documentary evidence from Openreach also suggests that [✂].[274]

8.39   Based on our review of rival networks' plans, we consider that there are no prospects of sufficient commercial build (as opposed to being based on state funding or community schemes) by rival network operators that can effectively constrain BT in Area 3 by 2026. Our consideration of the evidence suggests that where investment by rivals in Area 3 is commercial they are small in nature. Although PIA is likely to reduce the barriers to entry and expansion in general, our view is that the cost per premise passed of building new networks is likely to remain very high in less dense areas of the UK, and, therefore, that barriers to entry will remain prohibitive in most parts of Area 3.

Absence of countervailing buyer power

8.40   Whether a telecoms provider has countervailing buyer power will rely on a number of factors including whether alternative network operators have sufficient coverage (either in terms of a proportion of premises passed in an area or national coverage of rival networks), the time taken and cost involved for new networks to be built, and the degree of commitment/risk required from the buyer. As rival presence in Area 3 is very limited we would not expect countervailing buyer power to be a material constraint.

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[274] Openreach response dated [✂] to the s.135 notice dated [✂], [✂].

Pricing

8.41   BT's provision of WLA connections is subject to a number of charge controls. In the 2018 WLA we imposed charge controls on BT's MPF local loop unbundling, 'up to 40Mbit/s' wholesale services and associated ancillary services.[275]

8.42   BT has priced up to the cap for its charge-controlled services since the last review. This is consistent with regulation, rather than competition, constraining BT's pricing. We note that BT does currently provide some conditional volume discounts on its VULA services.[276] However, discounts may be motivated by a number of reasons including the migration of wholesale customers to faster speeds and trying to earn additional profits from better quality services. The prices of better quality services are constrained by the price cap on 40/10 services, because consumers view those as reasonable substitutes. Unregulated, we would expect BT to raise the prices of all its services.

External constraints

8.43   We have also considered the extent to which external constraints i.e. out-of-market products such as FWA and mobile broadband, which nevertheless may be a demand-side substitute for some consumers, may reduce BT's market power. As outlined in Section 2, demand for these products is still relatively low. Although demand may grow over the review period, the timing and extent of this is unclear. We, therefore, do not consider that these services will exert a significant competitive constraint on BT within the review period.

Proposal that BT has SMP in Area 3

8.44   We, therefore, propose to conclude that BT has SMP in Area 3. As well as BT's high market share, we consider that barriers to large scale entry in Area 3 are high and likely to be permanent and, therefore, expect BT's SMP in most parts of Area 3 to be permanent.

Proposal that BT has SMP in Area 2

8.45   We propose that BT will have SMP in the provision of WLA in Area 2.

Market shares (Area 2)

8.46   BT's share of active broadband connections is currently well above 50% in Area 2, as shown in Table 8.1.

8.47   If implemented, we consider that network operators' plans will represent a substantial injection of new competition in Area 2, leading to market share losses for BT during the review period. However, we recognise that they are plans and that the outcome is uncertain. We also note, as outlined below, that rival build is dependent on our *ex ante* regulation.

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[275] 2018 WLA Statement, paragraphs 10.9-10.13 and paragraphs 9.166-9.167.
[276] https://www.openreach.co.uk/orpg/home/products/super-fastfibreaccess/downloads/Openreach_Special_Offer_GEA_Volume_Agreement.pdf [accessed 17 December 2019].

8.48   We anticipate that the greater competition arising will also be reflected in a substantial expansion in the future of Area 1. As outlined below we expect BT to have a lower market share in Area 1 than in the other areas due to the presence of two established rivals. If we define an 'Area 1', we will consider the extent to which this, and other factors discussed below, point to a finding of no SMP in these areas. Our SMP assessment will also take into account the impact of our *ex ante* regulation on rival networks.

BT's share of standard, superfast and ultrafast access segments

8.49   As explained in our market definition assessment, we consider that for this review period all broadband services are in a single market. Our analysis of market shares in Areas 2 and 3, therefore, includes all broadband services. In response to our December 2018 Consultation, BT noted that it does not currently operate a network able to supply ultrafast broadband services at scale, such that a market share analysis aggregating superfast and ultrafast was likely to over-estimate its market power.[277]

8.50   For completeness we have included current shares by individual service in Table 8.1. The data shows that BT has a 99% share in SBB (speeds of up to 30Mbit/s) and a 73% share in SFBB (speeds of between 30Mbit/s and 300Mbit/s). We note that BT's current share of SFBB is consistent with the presumption of dominance, and that although BT's share of SFBB is lower than SBB, over time we would expect some of its high share of SBB to be migrated to SFBB as customers upgrade to faster speeds.

8.51   BT currently has a small share of the ultrafast (download speed of at least 300Mbit/s) segment 11%, primarily because Virgin Media has been able to upgrade its network quickly and has migrated part of its customer base to these higher speeds. As outlined in Section 1, Virgin Media has passed 15 million premises with connections capable of providing UFBB, and intends to have passed 17 million premises by 2025. Although BT's network currently passes only 4 million premises with ultrafast services, it has plans to rollout FTTP to 15 million homes and businesses by the mid-2020s.[278] By the end of the review period we, therefore, expect BT to be able to supply a substantial number of premises with UFBB services. Documentary evidence from BT also suggests that it expects [✂].[279]

BT's share of WLA in areas of Virgin Media presence

8.52   As shown in Table 8.1, BT's share of WLA is also lower in the areas in which it competes with Virgin Media than in the other areas.[280] However, BT's share is still above 50% and, therefore, consistent with the presumption of dominance.

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[277] BT response to the December 2018 Consultation, page 11.

[278] https://www.openreach.co.uk/orpg/home/updates/briefings/ultrafastfibreaccessbriefings/ultrafastfibreaccessbriefingarticles/nga202019.do [accessed 11 November 2019].

[279] BT response dated [✂] to the s.135 notice dated [✂], [✂].

[280] In assessing areas in which BT competes with Virgin Media we have included postcode sectors where both providers serve at least 50% of the premises.

8.53   In areas where both BT and Virgin Media are present, BT also still has an advantage from having passed a greater proportion of premises. Whereas BT's network is ubiquitous, Virgin Media has passed approximately 80% of premises in these areas.

8.54   In addition, we do not consider the competitive constraint from Virgin Media sufficient to constrain BT's market power alone. Two players is not sufficient to deliver effective competition in this market. We provisionally conclude, therefore, that if we considered Virgin Media areas and non-Virgin Media areas separately, we would find BT to have SMP in both.

Control of infrastructure not easily duplicated

8.55   Coverage analysis presented in Table 8.1 above shows that given BT's ubiquitous network coverage, it has significantly larger coverage than any of its rivals in Area 2.

8.56   In contrast to Area 3, if implemented, network providers' plans represent a very substantial injection of new competition in Area 2. We are encouraged by these plans, and they are consistent with our view that given appropriate regulatory support large scale entry will occur during this review period. However, we recognise that they are plans and that the outcome is uncertain. In Area 2 we think that, supported by PIA, the costs of new networks are low enough that entry may be viable, but this is dependent on being able to achieve significant retail penetration in order to realise economies of scale.[281] We understand from one provider that a network may need to achieve at least 40%, and potentially in excess of 50%, penetration to be viable.[282] [✂] has also estimated that in order for alternative network providers to be viable they need to achieve take-up of between 30% and 50%.[283]

8.57   This customer penetration would need to be built by attracting retail customers to switch from other networks and/or by attracting wholesale customers such as Sky, TalkTalk or Vodafone.

8.58   It takes time for the entrants to win customers and grow their customer base. For example:

    a) [✂] typically assume it takes three to four years in the market to reach around [✂]% retail penetration.[284]

    b) [✂].[285]

8.59   Given that wholesale customers currently have large subscriber bases, wholesale deals potentially offer a particularly good avenue for new entrant networks to grow customer penetration quickly and reduce the risks faced by the entrant. However, the potential for these arrangements does not remove all entry impediments:

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[281] Being able to realise economies of scope, in particular by using the network to sell leased lines, can also significantly improve the viability of the entry case.
[282] Meeting with [✂].
[283] [✂] response dated [✂] to the s.135 notice dated [✂], [✂].
[284] [✂] response dated [✂] to the s.135 notice dated [✂], [✂].
[285] Email from [✂] dated 11 October 2019. [✂].

a) There are only a small number of large wholesale customers, and reducing the risks of entry by this route is conditional on reaching a deal with those customers.

b) Reduced risk will be greatest where the wholesale customer commits to long term volume take up.[286] We note that some wholesale customers have entered into volume commitments, but it is not yet clear the extent to which they would be willing to commit, particularly with regards to customers which are difficult to attract or retain.

8.60 These wholesale customers are dependent on continued wholesale access to BT's network while the new rival networks are built, and, therefore, the existence of our *ex ante* regulation in the interim is necessary for viable entry. New entrants also face uncertainty as to how strong the competitive reaction to their expansion might be, especially in circumstances where they are building at a large scale. BT's internal documents outline [✂].[287] [✂] and suggests that the extent of further competition in Area 2 may depend on both our *ex ante* regulation of the physical infrastructure market and our *ex ante* regulation of the wholesale access market.

8.61 Investment in rollout is likely to take several years to complete, even for network providers which are not dependent on attracting wholesale customers with large subscriber bases. For example, data from our statutory information request suggests that it will take [✂] three years to complete build in [✂].[288] The only network providers that can rollout quickly, and are not dependent on attracting large customer bases, are those that are very targeted (e.g. target MDUs), and are, therefore, unlikely to significantly constrain BT's SMP. This can result in BT's SMP persisting for a period of time as rival networks are not sufficiently well established to address BT's competitive advantage.

Countervailing buyer power

8.62 We note that there are features of the market which suggest that wholesale customers could leverage their position to get a good deal in Area 2. Compared to Area 3, rivals have greater coverage. A number of telecoms providers also have large customer bases which, if switched to an alternative network provider, could allow them to take advantage of network economies of scale.

8.63 We understand that BT has [✂], and that Sky has issued a competitive tender to network providers[289]:

a) [✂].[290]

b) [✂].[291]

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[286] Meeting between Ofcom and [✂]. See also, https://www.cityfibre.com/news/vodafone-cityfibre-bring-gigabit-speed-fibre-uk/ [accessed 29 October 2019].
[287] [✂] response dated [✂] to the s.135 notice dated [✂], [✂].
[288] [✂] response dated [✂] to the s.135 notice dated [✂].
[289] See, for example: https://www.telegraph.co.uk/business/2019/03/14/sky-courts-openreach-rivals-ultrafast-broadband-race-accelerates/ [accessed 29 October 2019].
[290] [✂] response dated [✂] to the s.135 notice dated [✂], [✂].
[291] [✂] response dated [✂] to the s.135 notice dated [✂], [✂].

c) [✂].[292]

8.64 We also note that there has been recent speculation that Virgin Media is considering providing downstream wholesale access services (either on its own, or through a new wholesale company), and Sky is considering which networks it will use in future to deliver broadband.[293] However, to date there is no track record of Virgin Media competing in this way and, therefore, no evidence on how effective it might prove to be in practice. Moreover, even if Virgin Media were to supply downstream products, Virgin Media would be unable to supply all of a customer's requirements (for example, due to expected partial coverage, Sky or TalkTalk would still be reliant on BT to supply some of their customers). Other network operators which represent an opportunity for countervailing buyer power are currently much smaller in scale.[294]

8.65 We consider that absent *ex ante* regulation the risk of exclusionary behaviour foreclosing telecoms providers' outside options is also high. As discussed above, BT's internal documents outline [✂]. We note, therefore, that the potential for telecoms providers to use countervailing buyer power as a means of addressing BT's SMP is also dependent on *ex ante* regulation in this market.[295]

8.66 As outlined above for Area 3, we consider that absent *ex ante* regulation there is insufficient countervailing buyer power to constrain BT's position as a supplier of wholesale access services in Area 2. Hence, absent regulation, customers could not make a credible threat to switch volumes from BT to alternative suppliers.

Pricing

8.67 As outlined above, BT has priced to the cap for its WLA charge controls for the period since the last review.

External constraints

8.68 As outlined above, we do not consider that FWA or mobile broadband will exert a significant competitive constraint on BT within the review period.

Proposal that BT has SMP in Area 2

8.69 We propose to conclude that BT has SMP in Area 2 due to BT's high market share and the existence of barriers to entry and expansion, even in the presence of PIA. Together with the various challenges to new entrants described above, and noting that the existence of continued wholesale access regulation supports the new entry, our view is, therefore, that it would be premature to conclude that BT has no SMP in WLA on the basis that there are no longer any barriers to entry.

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[292] [✂] response dated [✂] to the s.135 notice dated [✂], [✂].

[293] Financial Times, September 2019. *Sky in talks to invest in Liberty Global fibre network.* [Accessed 04 December 2019.]

[294] Moreover, to the extent that these networks have been built using the existing mixed usage PIA remedy, they are not relevant under a modified greenfield approach.

[295] We have, therefore, decided to maintain a prohibition on geographic discounting, as discussed in Volume 3.

Approach to assessment of SMP in Area 1

8.70   In this section we present our proposed approach to the assessment of SMP in Area 1.

8.71   As outlined in Section 7, Area 1 comprises any postcode sectors where there are at least two existing, established MSNs present in addition to BT. We currently propose that there are no postcode sectors in which two existing, established, rival MSNs are present, based on factors such as the nascent and currently small scale of build.

8.72   We, therefore, have not conducted any detailed analysis of postcode sectors with two established rival MSNs present in addition to BT. However, anticipating the possibility of finding postcode sectors within Area 1 in the future, we would apply the usual framework, as deployed above for Area 2 and Area 3.

8.73   Consistent with the modified greenfield approach discussed above, in order to propose a finding of no SMP our analysis would need to find that the presence of established rival network providers is not reliant on *ex ante* regulation arising from the WLA market.

8.74   We recognise that as yet there is minimal evidence on the impact of a third network on competition, given that the situation as yet arises only in a few postcode sectors. As rollout occurs on a greater scale and we can observe the competitive impacts, we anticipate an improved evidence base which might support development of more precise criteria for the future.

8.75   We expect to consider the following criteria:

- **Market shares.** We expect BT to have a lower market share in postcode sectors identified as falling within Area 1 than in postcode sectors in the other Areas. This is consistent with the presence of two competing network providers with strategies to compete for a significant proportion of premises within an area. However, there may still be postcode sectors included in Area 1 where BT has a high market share which is expected to reduce. Notwithstanding high market shares, we will consider the extent to which other factors, including those discussed below, point to a finding of no SMP in these areas.

- **Barriers to entry and expansion and prospect of potential competition.** As Area 1 will be characterised by the presence of two existing, established, rival networks, these network providers will already have sunk the fixed costs of investment in the area. BT's competitive advantage in this regard will, therefore, have been reduced. Furthermore, these rival network providers will be focussed on attracting a scale customer base to take advantage of their own economies of scale and scope, thereby reducing BT's competitive advantage further.

- **Countervailing buyer power.** We would expect countervailing buyer power to increase as telecoms providers would be able to move their customer base onto rival networks that were already established.

- **Pricing.** As a result of the factors above, BT will likely be incentivised to respond to the threat of rival networks, which could impact its pricing in Area 1. We will assess the extent to which BT's pricing behaviour in Area 1 is consistent with effective

competition but note that this could be difficult given the existence of *ex ante* regulation.

LL Access services

8.76   In this section we set out our proposed SMP assessment for the LL Access markets defined in Sections 6 and 7 and discuss the criteria which we consider relevant. As for our analysis of WLA, and consistent with EC SMP Guidelines, we adopt a forward-looking, modified greenfield approach.

8.77   We first set out below our approach to each criterion in turn. We then present our key evidence before setting out our assessment and proposed SMP findings for each geographic market.

Analysis and evidence

8.78   In this sub-section we set out the evidence underlying the SMP assessment. Our analysis of market shares and presence of rival infrastructure is based on the same underlying data collected as part of the 2019 BCMR and uses the same methodology.[296] This data was collected from providers using our statutory information gathering powers, which we will consider updating for our final Statement.

Market shares

8.79   Table 8.3 below presents market shares for each of the defined geographic markets.[297]

8.80   As in the 2019 BCMR Statement, we have estimated market shares based on two measures: new customer ends connected in 2017 (referred to as 2017 connections shares), and shares of all live circuits as of December 2017 (referred to as inventory share). We would typically consider inventory shares to be the primary measure, however, we have concerns around their reliability as they are likely to understate BT's shares due to a number of data issues with Virgin Media's data[298] (except for the CLA where Virgin Media has a relatively lower presence). We, therefore, use shares of new connections as the main service share measure outside the CLA.

Competition from existing presence of rival infrastructure

8.81   As set out in Section 7, we consider a network to be "present" and able to compete for leased lines customers if it is connected or very close to customer sites. Evidence suggests

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[296] This is based on the same data processing and analysis set out in the 2019 BCMR Statement, Annex 12.
[297] When estimating market shares for Areas 2 and 3 we use the list of postcode sectors estimated from our MSN analysis. When we match the 2019 BCMR Statement postcode sectors to this list, 3% of postcode sectors are unmatched because they are missing from the 2019 dataset. This may be because postcode sectors have been removed since the previous (2019 BCMR Statement) data was collected. We will consider updating our analysis for our final Statement. The CLA and HNR areas are as defined in the 2019 BCMR Statement.
[298] 2019 BCMR Statement, paragraphs 6.41-6.44.

that competitive constraints are strongest where networks are already connected to customer sites or very close such that they only require very short network extensions.

8.82 As set out in Section 7, we cannot accurately measure the distances between the location of networks and business customer sites (e.g. we don't know which networks are connected to customer sites). We, therefore, look at indicators of local density that rely on a number of simplifying assumptions to estimate these distances.

8.83 Table 8.3 below presents the following indicators to assess the strength of competitive constraints from existing rival networks.

a) Density of rival networks. This estimates network presence i.e. networks that are either already connected to customer sites or very close such that they only require very short network extensions (which we consider to be able to compete for a customer).

b) Distance to nearest rival. As set out in Section 7, the average distances that are measured in our metrics will be considerably higher than actual distances.[299]

c) Rivals on-net vs. off-net connection: we present a breakdown of whether rivals supplied customers in 2017 on-net (i.e. using their own network) or off-net (i.e. using access to third-party infrastructure network). This informs our view on the presence of rival infrastructure and their ability to use it to compete for customers. A higher proportion of customers supplied on-net, suggests a higher presence of rival infrastructure. On the other hand, a low proportion of customers supplied on-net suggests reliance on access to BT's infrastructure as BT's is much closer to customer sites compared to rivals.

Potential competition based on network expansions and use of PIA

8.84 Where operators do not have networks in a given area or are not close to customer sites, there are high barriers to entry and expansion to build their own network, which will make it more difficult for rivals to compete with BT. When a provider has no physical connection to a site, and needs to extend its network, BT will have a significant cost advantage. The scale of the advantage increases with the length of the network extension as costs, and time to supply are likely to increase.[300, 301]

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[299] There are a number of reasons for this. Sites that are already connected to networks will likely have a positive distance because distance is measured from the postcode centroid. Even where the postcode centroid is the location of the site, this may overestimate the distance as networks build to the edge, not centre, of sites. For more details see 2019 BCMR Statement, paragraphs 5.79.

[300] Ofcom analysis of physical infrastructure costs based on Openreach's ECCs, see 2019 BCMR Statement, Figure A6.1. Ofcom analysis of the impact on network extensions on lead times, see 2019 BCMR Statement paragraphs 6.57-6.58. This evidence is appropriate to support our view for this market review period as we are not aware of major market developments to suggest otherwise.

[301] We continue to consider that BT's national coverage, due to its ubiquitous network would not materially hinder rivals when competing for multi-site contracts. Such advantages could arise if, for example, customers placed significant value on knowing that a single provider supplied the physical infrastructure for their whole contract. See 2019 BCMR Statement paragraphs 6.104-6.109.

8.85   As outlined above, we expect that PIA has the potential to reduce some of the barriers to entry and increase the likelihood that network providers will expand their network footprint and, therefore, constrain BT's market power in certain areas.

8.86   We set out our view on the potential competition from network build, facilitated by PIA in Annex 7 and summarise them in Table 8.3 below. In short, while it is too early to know where and when operators are likely to extend their networks over this review period, we expect some network build in the CLA, HNR areas and Area 2.

Countervailing buyer power

8.87   We do not consider that LL Access customers will have sufficient countervailing buyer power to constrain BT. In the majority of the UK (Areas 2 and 3) our current view of the evidence is that customers will have a limited choice of supplier[302] and even when they do, the volumes they purchase (except for MNOs) are unlikely to be large enough for them to exert buyer power.[303]

8.88   Despite the large volumes purchased by MNO customers, we do not consider that they will be able to effectively constrain BT. MNOs require a large volume of circuits to connect a large number of sites across the UK. While the larger volumes may give MNOs the ability to negotiate better deals compared to other customers, their need for wide coverage may limit their choice of supplier.[304]

Key evidence

8.89   Table 8.3 below presents the key evidence on competition for LL Access geographic markets; namely market shares; competition from existing infrastructure presence and potential competition from network build.[305]

8.90   As outlined below, this is based on the data collected for the 2019 BCMR Statement, which we will consider updating for the final statement, plus new evidence on the potential to use PIA remedy for leased lines[306] which gives greater scope for network providers to rollout networks using the remedy.

Table 8.3: Key evidence for LL Access markets

	CLA	HNR areas	Area 2	Area 3
Total postcode sectors	275	304	5536	3511
(% of total)	3%	3%	56%	35%

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[302] In Area 2 we expect material commercial deployment by rival MSNs to BT, but we expect this build to be by a limited number of players.

[303] For more details, see 2019 BCMR Statement, paragraphs 6.139-6.143.

[304] For more details, see 2019 BCMR Statement, paragraphs A9.58-A9.64.

[305] In Annex 9 we also present BT's positions in the supply of VHB and mobile backhaul LL Access services and note that BT currently has high service shares (above 50%) in both segments.

[306] This consultation covers the period to 31 March 2026, with more potential for PIA use than was expected for the period of the 2019 BCMR Statement which covered the period to 31 March 2021.

2017 customer ends connected (% of total)		7,988	3,978	38,866	12,964
		13%	6%	61%	20%
BT service share (2017 new connections)		[✂]%	[✂]%	[✂]%	[✂]%
		60-70%	60-70%	70-80%	90-100%
BT service share[307] (inventory)		[✂]%	[✂]%	[✂]%	[✂]%
		50-60%	50-60%	50-60%	80-90%
Average number of rivals present[308]		4.3	2.4	0.8	0.1
Proportion of businesses with X rivals present	X=0	4%	4%	35%	89%
	X=1	6%	12%	53%	10%
	X=2	9%	44%	9%	1%
	X=3	17%	26%	2%	
	X=4	18%	9%		
	X=5 or more	46%	5%		
Average modelled distance to the nearest rival networks[309]	X=1	0-50m	0-50m	150-200m	2.0-2.5km
	X=2	0-50m	0-50m	500-550m	5.0-5.5km
	X=3	0-50m	50-100m	1.0-1.5km	9.0-9.5km
	X=4	0-50m	200-250m	2.5-3.0km	14.0-14.5km
BT's proportion of 2017 new customer ends	On-net (fibre blowing)	[✂]%	[✂]%	[✂]%	[✂]%
		90-100%	90-100%	80-90%	80-90%
Rivals' breakdown of 2017 new customer ends[310]	On-net (fibre blowing only)	73%	55%	43%	12%
	On-net (digging required)	2%	9%	5%	2%
	Off-net	25%	36%	51%	86%

[307] As set out in paragraph 8.80 above, inventory service shares are likely to be understated, except for the CLA.

[308] Rival networks present means that the network is either connected or very close to customer site such that it only requires a very short network extension to connect a customer.

[309] As set out in footnote 301 above, due to data limitations, the distances measured by our model are likely to overstate actual distances.

[310] 'On-net duct connected' is where a telecoms provider has existing duct in place to the customer site, but fibre may need to be installed. 'On-net dig' is where a telecoms provider extends their network by building new duct. 'Off-net' is where an active wholesale leased line product is purchased from another provider to reach the customer.

Evidence on network build (including use of PIA) [See Annex 7 for full more details]	These plans not certain, and at this stage it is difficult to identify exactly where it will be deployed, as rollout plans are likely to change and develop during the period. Evidence of material commercial build by rival network providers by 2026. We expect this to mainly be network infills or rolling out to new areas, rather than customer-specific extensions to serve individual customers.[311]	No prospects of material commercial build by rival network providers by 2026. No prospects, therefore, of rivals constraining BT's market power in the review period.

Source: Ofcom analysis of provider data.[312] Percentage values may not add up to 100% due to rounding.

8.91   The evidence in Table 8.3 suggests that:

a) Based on existing competition, the CLA is the most competitive market, followed by HNR areas. The extent of competition in Area 2 and Area 3 is substantially less. These differences in competitive conditions are reflected in the lower services shares, greater presence of rival infrastructure and less reliance by rival networks on access to BT's network when serving customers.

b) Potential competition due to network build (including using PIA) is likely to add to the strength of competition in the CLA, HNR areas and Area 2 over this review period but the extent and location of this is uncertain. The main impact is likely to be densifying the presence of networks in these markets i.e. more rival networks can be close to customer sites and only require short network extensions. We set out our full assessment in Annex 7.

8.92   In what follows we set out our proposed assessment and SMP findings based on the evidence for each geographic market.

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[311] Network infill refers to rollout by network providers in order to fill gaps between areas where they already have some network coverage.
[312] Figures may have changed slightly since the 2019 BCMR Statement due to a data correction.

Proposed SMP Findings

Proposal that BT has SMP in Area 3

8.93   We propose that BT will have SMP in the provision of LL Access circuits in Area 3.

8.94   Table 8.3 shows that BT is facing very limited competition in this geographic market. This is driven mainly by the evidence on BT's very high market share (of 90-100% and 80-90% based on 2017 new connections and inventory, respectively) and the limited competitive constraint on BT's market power from existing or potential rival network presence.[313]

8.95   BT's pricing against its LL Access charge control is also consistent with regulation, rather than competition, constraining prices.[314]

Proposal that BT has SMP in Area 2

8.96   We propose that BT will have SMP in the provision of LL Access circuits in Area 2.

8.97   As for Area 3, Table 8.3 shows that BT is facing very limited competition in this geographic market from existing networks. This is driven by the evidence on BT's very high market share (of 70-80% and 50-60% based on 2017 new connections and inventory, respectively), and the limited presence of (up to) one rival network.[315]

8.98   If implemented, MSNs' rollout plans represent a very substantial injection of new competition in Area 2. As above, we are encouraged by these plans, and they are consistent with our view that given appropriate regulatory support large scale entry will occur during this review period. There is also potential for expansion of leased lines only networks. However, we recognise that these are plans and that the outcome is uncertain.

8.99   As above, BT's pricing against its access leased lines charge control is also consistent with regulation, rather than competition, constraining prices in these areas.

Proposal that BT has SMP in HNR areas

8.100   Overall, based on the evidence in the round, we propose that BT will have SMP in the provision of LL Access circuits in HNR areas over this review period; however this finding is finely balanced.

8.101   As shown in Table 8.3, BT has a high market share in HNR areas, consistent with a presumption of dominance.

8.102   However, BT is likely to face some level of actual and potential competition from rival networks:

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[313] In addition, as mentioned earlier BT will not face material countervailing buyer power from customers.
[314] In 2016/17, BT priced to the cap for the CISBO basket in the BT Only and BT +1 geographic markets (combined). In the period December 2017-March 2018, BT reduced prices by 1% more than required by the charge control and was below the cap by 5% in 2018/19. We note that BT has previously applied discounts but as these are no longer operative, and may be driven by a number of factors, we consider the existence of these discounts consistent with regulation constraining SMP.
[315] In addition, as mentioned earlier BT will not face material countervailing buyer power from customers.

a) BT offers lower prices for EAD 1Gbps in HNR areas compared to Areas 2 and 3, which is likely to reflect the higher level of competition in HNR areas.[316]

b) While BT would face some level of infrastructure-based competition from existing networks in these areas, the current density of rival infrastructure may not be sufficient to impose effective competitive constraints on BT.[317]

c) The strength of competition is likely to increase over this review period as we expect an increase in the density of rival networks in light of the availability of a PIA remedy. Some of these plans are specifically in the HNR areas. Evidence in Annex 7 suggests that [✂] and [✂] have plans to expand their leased lines networks in the HNR areas. However, there are uncertainties around where and when rivals will deploy networks in HNR areas, and around the competitive impact this would have.

8.103   Accordingly, while we think that competition in HNR areas may eliminate BT's SMP in the future, this is not sufficiently certain that we should find no SMP on a prospective basis for the period of this review. We take account of the potential for effective competition to emerge in future, specifically in leased lines competition due to network build, in our remedy assessment.

8.104   We will continue to monitor the prospects of rival build, including using PIA, and will revisit our proposed SMP findings in light of additional evidence before our final Statement.

Proposal that BT has no SMP in the CLA

8.105   In the 2019 BCMR Statement Ofcom concluded that BT did not have SMP in the CLA in respect of leased lines in relation to the review period 2019 - 2021.[318, 319]

8.106   Our expectation is that BT will face greater competition in the CLA over our review period (2021-2026) than was the case in the 2019-2021 period covered by the 2019 BCMR Statement. This is because the potential impact of PIA is significantly greater over a longer time frame as leased lines networks gain more experience of using it. PIA is particularly likely to be used for infilling existing leased lines networks, of which there are several in the CLA. This means that there will be an even stronger case for a no-SMP finding in our review period than was the case in 2019 BCMR Statement.

8.107   Accordingly, we propose to find that BT does not have SMP in the CLA. In particular:

a) Evidence in Table 8.3 shows that although BT has a market share above the 50% threshold normally associated with a presumption of dominance, the density of rival networks suggests that, on average, BT will face competition from four rivals, which will either be connected to customer sites or requiring short network extensions.

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[316] [✂] response dated [✂] to the s.135 notice dated [✂].
[317] As set out earlier, we do not consider LL Access customers in HNR areas will have sufficient countervailing buyer power to constrain BT's behaviour.
[318] 2019 BCMR Statement, paragraphs 6.165-6.169.
[319] This decision was appealed to the Competition Appeal Tribunal by TalkTalk Telecom Group plc and Vodafone Limited on 28 August 2019.

b) This competitive pressure is reflected in BT's pricing and in its internal competitive assessment. BT not only felt obliged to match the substantial cuts in prices required by charge controls in the rest of the UK, but to undercut them, despite the fact that the CLA has been fully deregulated since 2016.[320] Evidence suggests that the price cuts were partly due to competition.[321] This shows that BT lacks the market power necessary for a finding of SMP.

c) This constraint on BT is likely to increase further due to the prospects of network build in the CLA using PIA, as set out in Annex 7. For example, one stakeholder ([✖]) told us that they have plans to rollout in London.[322]

IEC

8.108   As set out earlier in Sections 6 and 7, we propose to define a separate product market for IEC services (these are links carrying aggregated traffic between BT exchanges) and we propose that each individual BT exchange is a distinct geographic market.

8.109   The objective of our competitive assessment is to identify which connections between BT exchanges are not competitive and warrant *ex ante* regulation. As set out in Section 7, given that in the 2019 BCMR Statement we found that the markets for CI IEC at BT+2 exchanges are effectively competitive, we applied the three criteria test only in respect of the markets for CI IEC services at BT+0 exchanges and BT+1 exchanges. We have, therefore, undertaken an SMP assessment for BT+0 and BT+1 exchanges only. The 2014 EC Recommendation notes that the three criteria test and the SMP assessment may make use of similar indicators.[323]

8.110   In summary, similar to our findings in 2019 BCMR Statement, we propose that BT has SMP at its exchanges where only BT, or BT plus one Principal Core Operator (PCO),[324] are present (directly or indirectly).

We propose to assess SMP based on PCO presence at a BT exchange

8.111   To assess competitive conditions at each exchange, we propose to follow a similar approach to SMP assessment for IEC services as in 2019 BCMR Statement, which is:[325]

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[320] BT has applied large reductions in wholesale access charges for leased lines in the CLA prices (as it has done in order to comply with charge controls in areas outside the CLA). BT's wholesale access charges in the CLA are below those in areas where charges are regulated to cost.
[321] BT's internal documents suggest that its wholesale charges in the CLA were constrained by competition. For example, we note that a paper provided by [✖]. We note that [✖]. [✖] response dated [✖] to the s.135 notice dated [✖], [✖], page 7 and Annex 3.
[322] Meeting between Ofcom and [✖].
[323] 2014 EC Recommendation, paragraph 11.
[324] As explained below, to be classified a PCO, a telecoms provider needs to own its own fibre network, have a substantial footprint, and have capacity to offer wholesale IEC.
[325] In 2019 BCMR Statement, we considered and discounted alternative methodologies to assess SMP at BT exchanges 8.64-8.70. We still hold the same view.

a) We use the number of competing networks that are present at a BT exchange to assess the strength of competition faced by BT.[326, 327]

b) We only count the presence of PCOs, which we define as "a subset of telecoms providers that have substantial core infrastructure and the capacity to provide wholesale leased lines to other providers". We propose to identify the following telecoms providers as PCOs: CenturyLink, Cityfibre, Colt, eir, SSE, Virgin Media, Vodafone and Zayo.[328]

c) We count the PCO as present at an exchange if the PCO has direct or indirect connection at an exchange: [329]

   i) Directly connected: the PCO has network equipment at a BT exchange and purchasing External Cablelink[330] to connect to its own network; or

   ii) Indirectly connected: a customer (e.g. TalkTalk) purchases the External Cablelink to another network operator's network, and the PCO may not have network equipment at the BT exchange.

d) At some exchanges there are PCOs that are not connected but have network nearby. We recognise this as a source of potential competition, facilitated by the possibility of using PIA. However, based on the evidence set out in Annex 7, constraints arising from nearby PCOs extending their networks to connect to BT exchanges are likely to be too weak over this review period and there are uncertainties around their potential locations and timescale. Therefore, we consider it more appropriate to reflect constraints from nearby network in the scope of our remedies rather than the SMP findings.[331]

Proposal to find SMP at BT Only and BT+1 exchanges

8.112   In this section we consider whether BT has SMP in any of the geographic markets in relation to which we consider the three criteria test applies. As set out in Section 7, we have defined each BT exchange as its own geographic market and we, therefore, assess presence at each BT exchange. For brevity, we present our SMP assessment for the following groups of exchanges:

a) BT Only exchanges; and

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[326] 2019 BCMR Statement, paragraphs 8.37-8.41.

[327] We note - similar to our view in 2019 BCMR Statement- we do not propose to undertake a comprehensive assessment of market shares because a) there are number of practical constraints, which make the calculation of market shares challenging and b) once a network operator is present at an exchange it provides a competitive constraint even if its share of current sales is low. For more details see 2019 BCMR Statement paragraphs 8.34-8.36.

[328] 2019 BCMR Statement, paragraph 8.55-8.63. 8.1. In identifying PCOs we considered telecoms providers that: Own their own infrastructure; Have a substantial footprint; and Have the capacity to offer a wholesale IEC service to other telecoms providers.

[329] For more detail see 2019 BCMR Statement, paragraph 8.42-8.49.

[330] External Cablelink is a product Openreach provides to connect between nodes within a BT exchange, and to other networks nearby.

[331] This is similar to our approach in 2019 BCMR Statement (paragraphs 8.50-8.54).

b) BT+1 exchanges.

8.113   Table 8.4 below summarises our key evidence and proposed SMP findings.

Table 8.4: Key evidence for IEC services markets

	BT Only	BT +1
SMP proposal	SMP	SMP
Number of exchanges*	4,269	733
Nearest PCO network (average distance)	5.8km	33m
Evidence on network build using PIA [for more details see Annex 7]	While PIA may reduce the time and cost barriers to connect to BT exchanges, there are uncertainties around the scale and location of potential rival build– facilitated by PIA – by 2026. However, evidence suggest that it is unlikely to be material and more likely to be for BT+1 exchanges, where distances are shorter and demand is higher.	

*Presence at exchanges is based on the data used in the 2019 BCMR Statement and we will consider updating this data for the final statement.[332]

Source: Ofcom analysis of provider data.

Proposal that BT has SMP at BT Only exchanges

8.114   We propose that BT has SMP for IEC services at BT Only exchanges over this review period. BT has a *de facto* monopoly at BT Only exchanges as it is the only operator present. [333]

8.115   The nearest PCO are on average 6km away from the exchange and are likely to impose very weak competitive constraint on BT, even in the presence of PIA. As set out in Annex 7, evidence suggests that rival build to BT Only exchanges is likely to be limited over this review period, particularly given the long build distances and lower demand at these exchanges.

8.116   We recognise that some BT Only exchanges may have the potential to be served by rival networks using PIA where distances are very short; however, it is too early to predict the scale or location of this potential build. We reflect this in our remedy assessment and will monitor any developments before our final Statement.

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[332] This is based on the data and methodology set out in 2019 BCMR Statement, Annex 15. The analysis used Main Distribution Frame identifiers (MDF IDs) as references to BT exchanges. We recognise that some exchanges may have multiple MDF IDs, however this is immaterial (2019 BCMR Statement, paragraphs 8.107-8.113).
[333] We also consider that there is no countervailing buyer power because users of regulated wholesale access services (WLA and LL Access) will be reliant on BT for connections from BT Only exchanges as there is no other choice of supplier.

Proposal that BT has SMP at BT+1 exchanges

8.117   We propose that BT has SMP for IEC services at BT+1 exchanges over this review period due to the limited presence of PCOs at these exchanges.[334] Some telecoms providers use non-Openreach PCOs from BT+1 exchanges, which indicates a greater constraint on BT than on routes from BT Only exchanges. However, we consider this constraint is still insufficient to support a "no SMP" finding.

8.118   We do not consider that two competitors present at an exchange are enough for effective competition in these markets for the following reasons:

   a) Evidence suggests reliance on BT to connect to and from BT+1 exchanges.[335]

   b) In a market in which one of the two suppliers publishes its prices, the other provider has the ability and incentive to either just match or slightly undercut its prices. This would lead to a weakening of competitive pressure.[336]

   c) Suppliers of wholesale services at BT+1 exchanges are also the major competitors of many of the main purchasers in the retail market (for example Virgin Media is the PCO with most presence at exchanges, and also competes with Sky and TalkTalk in the retail broadband market downstream). Higher backhaul costs for downstream competitors of a wholesale supplier could translate into a competitive advantage at the retail level for that wholesale supplier. This further incentivises price matching and dampens competitive pressure.

8.119   While other PCOs are closer to BT+1 exchanges compared to BT Only exchanges, they are unlikely to impose a material constraint on BT, even in the presence of PIA. As set out in Annex 7, some PCOs may be considering build to BT+1 exchanges during the review period, however, the extent and location of this build is unclear.

8.120   Therefore, similar to our view on BT Only exchanges – we reflect the potential for network build to some BT+1 exchanges in our remedy assessment and we will monitor any developments before our final Statement.

Competition concerns in the WLA, LL Access and IEC services markets

8.121   BT's SMP in the markets discussed above gives rise to a number of competition concerns since, absent regulation, BT's SMP would give it the incentive and ability to engage in forms of conduct that could distort competition and/or harm consumers. BT also has the ability to design its network, and make strategic investment decisions, which in the absence of

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[334] We also consider that there is no countervailing buyer power as users of regulated wholesale access services (WLA and LL Access) will have limited choice of alternative suppliers.

[335] For example, Sky indicates that it purchases [✂] to connect to and from BT+1 exchanges [✂]. TalkTalk [✂]. Sky response to the 5th 2019 BCMR s.135 notice dated 14 February 2019. TalkTalk response to the 5th 2019 BCMR s.135 notice dated 14 February 2019.

[336] Evidence [✂]. See 2019 BCMR Statement, paragraph 8.88.

regulatory measures designed to address its SMP could lead to poor outcomes for consumers.

8.122   These forms of conduct fall in broad terms into two categories:

a) Exclusionary behaviour by BT to prevent potential rival networks from competing in the wholesale access market or to prevent them from gaining market share, thereby protecting its market position. This type of behaviour can lead to competitors being excluded from the market, in the long-run leading to poorer outcomes for end-customers;

b) Exploitative behaviour by BT at the expense of its wholesale access customers, who compete in the retail market, and, therefore, ultimately end-users (including higher prices, poorer quality services and less innovation and investment).

8.123   Although our concerns vary according to whether the behaviour is exclusionary or exploitative, both ultimately lead to poorer outcomes for end customers. In the long-term we expect network competition to incentivise efficiency, investment and innovation, and to become a constraint on exploitative behavior, including high prices and poor quality of service. However, in the short-run we need to balance this incentive to invest with the need to protect consumers from exploitative behaviour such as excessive pricing.

8.124   With regards to exclusionary behavior, our competition concerns are:

- BT has the incentive and ability to refuse to supply access and thus restrict competition in the provision of products and services in the relevant downstream markets.
- BT could set excessive wholesale charges for WLA and LL Access services or engage in margin squeeze behaviour.
- BT could provide access on less favourable terms compared to those obtained by its own downstream businesses.
- BT could target discounts or price reductions in order to distort competition in the rollout of new networks. These could take a number of forms - for example BT could adjust its wholesale prices in geographic areas subject to competitive rollout of new networks, or it could offer other forms of pricing with a loyalty inducing effect. By offering low prices initially, BT could discourage rival network build.

8.125   With regard to exploitative behaviour, our competition concerns are:

a) Where there is no specific charge control, BT could set excessively high prices, or charges that, in combination with downstream prices, amount to a price squeeze, so as to have adverse consequences for end-users of public electronic communications services (also referred to as "margin squeeze").

b) BT may not have sufficient incentives to continuously deliver an adequate level of service quality in relation to network access.

8.126   IEC services are necessary to enable our access regulation to work. If BT has SMP in certain links between BT exchanges, and these were to remain unregulated, this could undermine our access remedies by leaving a regulatory gap between access and competitive backhaul provision.

8.127 In summary we consider that BT's SMP in the markets discussed above could lead to adverse effects for consumers, namely a lack of choice of services and weaker incentives for BT (and other providers) to invest and innovate in new technologies including full-fibre, which would make it less likely that consumers would realise the benefits of network competition.

8.128 We discuss our proposed remedies to address these competition concerns in Volume 3.

Consultation question

> Question 8.1: Do you agree with our provisional SMP findings and resultant competition concerns for wholesale networks? Please set out your reasons and supporting evidence for your response.

9. Wholesale Fixed Analogue Exchange Lines and Wholesale ISDN exchange lines

Market definition and three criteria test – WFAEL

9.1 This section explains the product and geographic market definition in relation to Wholesale Fixed Analogue Exchange Lines (WFAEL) and applies the three criteria test to that market.

9.2 Given the known technological changes that are taking place in the industry, our approach to the assessment of WBA is to first review market developments that are likely to occur over the forthcoming review period and, secondly, to consider whether the market definition that we defined as part of our 2017 NMR review remains an appropriate frame of reference.

9.3 We provisionally conclude that the three criteria test is not met and accordingly that this market is not suitable for *ex ante* regulation. Consequently, we propose to remove existing regulation from the WFAEL market.

Background

9.4 Wholesale fixed analogue exchange lines are intermediate products that are sold to CPs to enable them to provide a fixed landline service to residential and business customers.

9.5 In our 2017 NMR Statement we found that the number of fixed lines had remained relatively stable despite significant increases in retail line rental prices and falling call volumes. Our analysis suggested that mobiles and voice services delivered over IP were not in the same market as fixed lines. We, therefore, defined a market for WFAEL, which included all copper lines, cable lines and voice-enabled fibre lines.

9.6 There are several providers of WFAEL in the UK. Openreach supplies WFAEL services over the PSTN using its WLR product. WLR is used by BT and other telecoms providers to provide voice services to end users.[337] Sky and TalkTalk use their LLU networks to provide fixed voice services end users and Virgin Media provides fixed voice services using its Cable network.

9.7 In the 2017 NMR Statement we found that, notwithstanding increased competition from Sky, TalkTalk and Virgin Media, BT continued to hold SMP in this market in the UK. Other telecoms providers continued to rely on access to BT's network to compete with BT. This is particularly important in the supply of lines to some consumer groups, namely: fixed voice only residential consumers, those outside the footprint of competing networks and businesses using analogue lines.

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[337] BT's Regulatory Financial Statements for 2019 report that there were 15 million WLR connections of which 11.8 million were internal and 3.3 million external. This represents a 4.9% decline on the number of WLR lines compared to the same period in 2017.

9.8   We imposed regulation on Openreach's WLR product to address BT's SMP, including requiring supply and non-discrimination obligations. However, in recognition of the growing alternatives to traditional fixed voice services, we concluded that BT's WLR product should be subject to a fair and reasonable charging obligation, rather than a cost-based charge control.

Market developments over the forthcoming review period

9.9   Since the 2017 NMR Statement, Openreach has consulted on plans to withdraw its WLR products and transition to IP voice services. Openreach plans to discontinue WLR by the end of 2025, when it switches off its public switched telephone network (PSTN), i.e. before the end of this review period.

9.10   Providers using their LLU networks will not be affected by PSTN switch off as the access product they use to provide voice services (MPF) is regulated as part of the WLA market which we discuss in Sections 6 and 7 of this volume. Similarly, Virgin Media, which uses its cable network to supply voice services, will not be affected. However, providers that currently use WLR will need to change the way they supply voice services to end users.

9.11   Following PSTN switch off voice services over the Openreach network will be carried over a broadband connection rather than a dedicated analogue telephone network. To supply voice services to end users, providers will, therefore, need a suitable Voice over Internet Protocol (VOIP) service and a suitable broadband access line to provide a connection to the internet.

9.12   Openreach has stated that it does not intend to provide a VOIP service following the PSTN switch off.[338] Providers will, therefore, need to develop their own VOIP service or purchase a service from an existing supplier. We expect the widespread launch of managed VOIP services by a range of CPs and third-party providers over the course of this review period. These managed VOIP services are likely to provide near-identical or improved voice quality for consumers relative to services currently provided over the PSTN.

9.13   The majority of end users take a voice service alongside a broadband service and the broadband connection can be used to carry both the voice service and the broadband service. Broadband access lines are currently regulated as part of the WLA market which is discussed in Sections 6 and 7 of this Volume.

9.14   Whilst broadband lines are a suitable access product for supplying a voice service alongside a broadband service, providers of voice-only services to residential and business users do not require the facility to provide a broadband service per se to their customers. Openreach have committed to provide a low bandwidth broadband access line over which a voice-only service can be provided.[339]

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[338] See https://www.openreach.co.uk/orpg/home/updates/briefings/generalbriefings/generalbriefingsarticles/gen04819.do (behind industry firewall).

[339] We do not consider we need to underpin this commitment with a specific access obligation. We discuss this question in Section 5 of Volume 4.

9.15   Over the period of the review we will see the steady migration of existing WLR lines to VoIP, as well as the termination of new supply of WLR services. By the end of the review period we would not expect WLR services to remain in operation, except potentially in a few specific cases.

Market definition

Product market

9.16   In previous reviews, we have found that the number of analogue fixed lines has remained relatively stable despite significant increases in retail line rental prices and falling call volumes. End users have not been willing, in the past, to give up their analogue fixed voice line and substitute to mobile only or other alternatives; in part because for many of them this would mean giving up their broadband service.[340] Consequently we have defined product markets that include the main fixed access technologies (copper lines, cable lines and voice-enabled fibre lines).

9.17   It remains the case that the number of fixed analogue voice lines is stable, at around 29.5m lines between 2015 and 2018. For much of the review period the PSTN will remain in place. While this is the case, we expect modest change in terms of the substitutability of other products and that the 2017 NMR Statement will remain an appropriate frame of reference.

9.18   In the longer term, we expect the withdrawal of WLR-based fixed voice services by the end of this review period will change the way that WFAEL is provided for many end users of voice services. We expect that the PSTN switch-off and the move to IP will increase the number of broadband only packages available to end users, as the provision of broadband services will no longer include the provision of a fixed voice access line by default.[341] This may lead to a greater propensity for end users to give up their analogue fixed line, which may increase the propensity for consumers to view mobile as an alternative to fixed lines for voice calls. However, it is difficult to predict in advance precisely how substitution patterns will be affected.

9.19   Given this, we have not repeated our detailed assessment of the direct and indirect constraints that we undertook in the 2017 NMR Statement and previous reviews of the WFAEL market. Rather, we consider whether the product market as defined in the 2017 NMR Statement still meets the three criteria test and should be subject to *ex ante* regulation.[342]

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[340] Where providers use LLU to supply broadband services, the MPF product will include both a broadband and a voice facility. Similarly, where providers use SMPF or GEA to supply broadband services they need a copper bearer in the form of an MPF or WLR line (which will include a voice facility) in order for the broadband service to function. Consequently, the majority of the products available in the retail market for broadband are either dual or triple play products and broadband only products are relatively rare.

[341] This is currently standard practice for broadband providers that do not use the Openreach network, such as Hyperoptic and Gigaclear. Virgin Media currently offer broadband only packages for those consumers who do not want a fixed voice service.

[342] We note that, where a narrower product market does not pass the three criteria test, a wider product market definition that included alternative services would also not pass the three criteria test.

9.20   This means that that voice services over WLR, MPF, Cable and FTTP with an analogue telephone adaptor (ATA) are included in the relevant product market. We expect that voice services provided over a broadband connection using VoIP will also form an effective substitute in the future as the major providers migrate to those methods as their main technology for supplying voice services to end users.

Geographic market

9.21   In the 2017 NMR Statement, we said there is a common pricing constraint at the retail level across the UK excluding the Hull Area and this is likely to extend to pricing at the wholesale level, even absent SMP regulation. We, therefore, defined a geographic market that comprised the UK excluding the Hull Area.

9.22   The reasons for this can be summarised as follows:

- At the retail level, the Universal Service Conditions (USC)[343] require the designated provider (BT in the UK excluding the Hull Area) to provide retail telephony services that are priced uniformly, irrespective of geographic location. Setting low wholesale charges in low-cost geographic areas would create an opportunity for other retail providers to set lower retail prices (i.e. allowing them to undercut the uniform retail price set by the USC provider), whereas setting high wholesale charges in high-cost geographic areas would undermine retail sales as the USC provider has to offer a uniform national price.[344] This would create unsustainable commercial conditions for the USC provider in terms of the wholesale charge and the retail price.

- An additional point is that localised pricing may involve costs. We also note that other telecoms providers price uniformly across the areas in which they are present (at least to residential customers).

9.23   The USC's remain in place and we expect them to remain in place for the foreseeable future. On this basis, we consider that a single market for WFAEL in the UK excluding the Hull area remains an appropriate frame of reference to consider the three criteria test.

Three criteria test for WFAEL

9.24   As discussed in Section 4 (for the physical infrastructure market), where a market is not on the list of markets in the 2014 EC Recommendation, NRAs must apply the three criteria test to identify markets other than those listed.[345]

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[343] Further information is available on the Ofcom Website: http://stakeholders.ofcom.org.uk/telecoms/ga-scheme/specific-conditions-entitlement/universal-service-obligation/designation-of-bt-and-kingston/. Ofcom also conducted a review in 2006 http://stakeholders.ofcom.org.uk/consultations/uso/main/.

[344] In the case of sales to the downstream division of a vertically integrated USC provider, this presumes that high wholesale charges cannot be sustained due to the requirement not to impose a margin squeeze (e.g. under competition law).

[345] The three criteria test is used to assess whether markets are susceptible to *ex ante* regulation.

9.25   The WFAEL market is not listed in the 2014 EC Recommendation as a market in which *ex ante* regulation may be warranted.[346] In the 2017 NMR Statement, we considered the three criteria test for WFAEL and found that these three criteria were satisfied. As part of this review, we have assessed whether this continues to be the case.

9.26   We have also had regard to our statutory duties, which include an obligation to carry out our functions with a view to securing that regulation does not involve the imposition or maintenance of regulatory burdens that are unnecessary.[347]

Presence of high and non-transitory barriers to entry

9.27   In the 2017 Review we considered the following factors relevant to our assessment of the first criterion, including:[348]

- the historical reliance by telecoms providers on WLR (and WCO) to supply voice services to certain groups of interest (e.g. business, fixed voice-only, off-net) which suggests it has not been cost effective or otherwise commercially effective to use MPF or cable to supply these segments; and
- although there may be scope for rivals to provide a stronger competitive alternative for these customer groups, substitution of this type is not of sufficient likelihood and scale to eliminate the high barriers to entry.

9.28   We expect that the closure of the PSTN and the removal of WLR will result in new methods of supply (i.e. broadband access connection and VOIP) for providers offering voice services to end users. All providers of voice services that currently use WLR (including BT) will need to transition to these alternative methods of supply over the review period.

9.29   As set out above the competitive provision of broadband access services is ensured by our regulation of the WLA market as set out in sections 6 and 7. We expect a range of providers will develop managed VoIP services during the review period. Consequently, alternative providers of fixed voice services are unlikely to face high and non-transitory barriers to entry in the supply of WFAEL in the UK excluding the Hull Area by the end of the period of this review.

Market structure tending toward competition

9.30   We expect a rapid decline in the number of WLR lines over the review period as the PSTN is switched off and WLR is discontinued. Openreach has announced that it will not be developing a managed VOIP product following the PSTN switch off. The services that will replace those provided over WLR will be supplied by other providers and we expect significant growth in the use of managed VOIP services as consumers who value voice

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[346] Note, retail access to the public telephone network at a fixed location for residential and non-residential customers was previously identified as a market susceptible to *ex ante* regulation in the 2007 EC Recommendation but not in the 2014 EC Recommendation.

[347] Section 6 of the Act.

[348] We note that point 11 of the 2014 EC Recommendation says that the "main indicators to be considered when assessing the first and second criteria are similar to those examined as part of a forward-looking market analysis to determine the presence of significant market power".

services at a fixed location are migrated to all-IP services. The market for WFAEL will, therefore, tend towards effective competition over the review period.

9.31 Effective competition in the supply of broadband access will be an important enabler of this change and the broadband access lines will continue to be reviewed and *ex ante* regulation put in place as appropriate.

The insufficiency of competition law alone to adequately address the market failure(s) concerned

9.32 The three criteria tests are cumulative and all three criteria need to be satisfied for a market to be susceptible to *ex ante* regulation. Given that the first two criteria are not met we have not considered this criterion further.

Conclusion to market analysis

9.33 Given that the market for WFAEL in the UK excluding the Hull Area does not meet two of the three criteria in the three criteria test we do not consider that it is appropriate to impose *ex ante* regulation in the supply of WFAEL, in particular, following the switch off of the PSTN.

9.34 That said, fixed voice services remain an important product for end users and there will be a period of transition over the course of the review period. We discuss this further below.

Transitional arrangements

9.35 While the WFAEL market is no longer suitable for *ex ante* regulation we are conscious that there will remain a substantial number of WLR customers through the early years of the market review period.

9.36 We have considered whether transitional regulation is required to support those customers. Openreach has made a voluntary commitment, published alongside this consultation, as follows in light of which we do not consider it necessary to impose transitional regulation. Openreach has committed to:

- continue to provide new WLR and ISDN2/ISDN30 circuits until December 2023 unless the provision of new copper services have been withdrawn from that location;
- continue to support the existing WLR and ISDN2/30 customer base (including any new circuits provided up to December 2023) on a reasonable basis until December 2025;
- continue to provide network access with respect to the WLR and ISDN2/30 products on fair and reasonable terms; will not unduly discriminate; will supply on Equivalence of Input (EoI) terms; will maintain published reference offers; and will notify changes to terms and conditions on the same basis as for SMP products;
- price these products on a 'fair and reasonable' basis until withdrawal i.e. on wholesale terms that do not distort downstream competition by squeezing margins; and
- maintain a good level of quality of service for these products until withdrawal and will continue to provide Ofcom with monthly KPI reports (and publish KPI reports on a quarterly basis if required).

9.37   Openreach has said it will develop a low bandwidth broadband product to support existing voice-only and similar low bandwidth applications within its GEA footprint (FTTC and FTTP) after PSTN switch off. This will support the migration to IP for those premises that wish to retain a fixed voice service that do not otherwise wish to receive a broadband service. As noted above, Openreach has also made a voluntary offer to sell this wholesale service to communications providers at charges comparable to the WLR service. As this product is a regulated form of access falling within the WLA market, it is required to be supplied on an EOI basis.

9.38   Openreach[349] proposes that the low bandwidth fibre products will be 500kbit/s symmetric which should enable CPs to provide high quality voice calls and key features like three-way calling. Openreach expects to be able to launch these products in Q1/Q2 2020.

9.39   More broadly Ofcom and the industry are also considering the broader implications for end users of the transition of fixed voice services to IP.[350]

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[349] See
https://www.openreach.co.uk/orpg/home/updates/briefings/generalbriefings/generalbriefingsarticles/gen04819.do
(behind industry firewall)
[350] See for example The Future of Voice Services, Ofcom February 2019.

Market definition and three criteria test – ISDN2 and ISDN30

9.40   This sub-section explains our proposals for product and geographic markets in relation to ISDN2 and ISDN30 and applies the three criteria test to these markets.

9.41   As with our review of WFAEL above, our approach to the assessment of ISDN2 and ISDN30 is first, to review market developments that are likely to occur over the forthcoming review period and, second, to consider whether the market definition that we established as part of our 2017 NMR review remains an appropriate frame of reference.

9.42   We provisionally conclude that the three criteria test is not met and accordingly that each of the ISDN2 market and the ISDN30 market is not suitable for *ex ante* regulation. Consequently, we propose to remove existing regulation from each market.

Background

9.43   ISDN2 and ISDN30 are narrowband access services, most commonly used by businesses to provide multiple lines for calls. ISDN2 services are appropriate for business sites requiring fewer than eight voice channels, whereas ISDN30 services are more appropriate when a larger number of channels is required.

9.44   Volumes for both ISDN2 and ISDN30 have been declining over time as end users migrate to more modern services, primarily IP-based services. There has been a further decline in ISDN2 and ISDN30 lines since our 2017 NMR Statement and volumes are expected to decline further over the forthcoming review period.351 This pattern reflects ISDN's legacy position. Businesses purchasing new multiple lines have long had good IP alternatives available to them. However, those that have installed systems that use ISDN face switching costs when using the newer and better alternatives, hence the process of transition over time.

9.45   In our 2017 NMR Statement, we found that each of ISDN2 and ISDN30 were in separate product markets. We also found that the markets for ISDN2 and ISDN30 did not include alternatives such as IP-based services, despite these IP-based services typically offering the same or better functionality compared to ISDN services.

9.46   We also imposed a charge control in relation to existing ISDN2 and ISDN30 circuits but did not impose a control on new ISDN2 or ISDN30 lines.

Market developments over the forthcoming review period and implications for market definition

9.47   As noted above, Openreach has consulted on its plans to withdraw the PSTN, which supports ISDN services as well as WLR services, by the end of 2025 (i.e. before the end of this review period). End users who currently take ISDN services will, therefore, have to

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351 Between Q4 2017-18 and Q4 2018-2019 the number of ISDN2 lines fell from [✂] to [✂] (a decline of [✂]%). Over the same period the number of ISDN2 lines fell from [✂] to [✂] (a decline of [✂]%).

migrate to non-PSTN-based services, such as IP-based services, by the end of the review period.

Product market

9.48   In our 2017 NMR Statement, we did not find IP-based services to be in the same market as ISDN2 or ISDN30 services. We found that the lack of substitution from ISDN to IP-based services in response to a SSNIP was in large part due to the high migration costs that many firms would face in moving from ISDN services to more modern alternatives.

9.49   In previous reviews, businesses purchasing ISDN lines had the option to delay their switch to IP-based services for several years. Following Openreach's plans to switch off the PSTN by the end of the forthcoming review period, this will no longer be an option for these customers.

9.50   The withdrawal of ISDN services by the end of this review period means that Openreach will no longer be supplying services that are regulated under the ISDN2 and ISDN30 market reviews. Access to the broadband lines that enable the provision of IP-based services (i.e. the closest substitutes to ISDN services) will continue to be regulated.

9.51   It is possible that the switch off of the PSTN may cause current customers of ISDN to anticipate that they will need to replace their services with an alternative based on IP and this may increase their propensity to switch to those alternatives in response to a SSNIP. The extent to which this will happen and whether this will be sufficient to render a SSNIP unprofitable is unclear at this stage. Given this, we have not repeated the detailed assessment of competitive constraints that we undertook in the 2017 NMR Statement and previous reviews of the ISDN2 and ISDN30 markets. Rather, we consider whether the separate ISDN2 and ISDN30 markets as defined in the 2017 NMR Statement each still meet the three criteria test and should be subject to *ex ante* regulation.[352]

Geographic market definition

9.52   In 2017 we noted that BT's wholesale prices for ISDN2 and ISDN30 exchange line services were uniform across the UK excluding the Hull Area and, given that competitors tend to price relative to BT, this suggested national pricing outside of the Hull Area. We, therefore, defined the geographic markets for ISDN2 and ISDN30 as the UK excluding the Hull area.

9.53   We consider that the geographic market as defined in the 2017 NMR Statement is an appropriate frame of reference to consider whether each of ISDN2 and ISDN30 still meet the three criteria test and should be subject to *ex ante* regulation.

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[352] We note that, where a narrower product market does not pass the three criteria test, a wider product market definition that included alternative services would also not pass the three criteria test.

Three criteria test for ISDN2 and ISDN30

9.54   As discussed in Section 4 (for the physical infrastructure market), where a market is not on the list of markets in the 2014 EC Recommendation, NRAs must apply the three criteria test to identify markets other than those listed.[353]

9.55   The ISDN2 and ISDN30 markets are not listed in the 2014 EC Recommendation as markets in which *ex ante* regulation may be warranted.[354] In the 2017 NMR Statement, we considered the three criteria test for each of the ISDN markets and found that these three criteria were satisfied in relation to each of them. As part of this review, we have assessed whether this continues to be the case.

9.56   We have also had regard to our statutory duties, which include an obligation to carry out our functions with a view to securing that regulation does not involve the imposition or maintenance of regulatory burdens that are unnecessary.[355]

Presence of high and non-transitory barriers to entry

9.57   As in our 2017 NMR Statement, we consider that barriers to entry and expansion in each of the ISDN2 and ISDN30 markets are high due to the large sunk costs that would need to be incurred to establish the infrastructure required to provide an ISDN30 exchange line, and the fact that these costs would need to be recovered in a declining market. The number of ISDN2 and ISDN 30 lines has continued to decline and we do not expect new entry into the supply of ISDN lines over the review period.

9.58   For these reasons, we propose that barriers to entry into each of the ISDN2 and ISDN30 markets are likely to remain high and non-transitory over the period of this review in the UK excluding the Hull Area.

A market structure that does not tend towards effective competition

9.59   As noted above, the number of ISDN2 and ISDN30 lines has continued to decline since the time of our 2017 NMR Statement.

9.60   With PSTN scheduled for switch off, ISDN services are not sustainable in the longer term and we do not expect significant new demand for ISDN lines. Modern alternatives already exist in the form of IP based services which are provided by a variety of telecoms providers. The underlying broadband access lines which carry IP based services will continue to be regulated over the review period and so we expect competition to persist in IP services.

9.61   We expect that all of the remaining ISDN2 and ISDN30 volumes will migrate, towards IP-based services, over the review period. As this migration progresses and the number of

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[353] The three criteria test is used to assess whether markets are susceptible to *ex ante* regulation.
[354] Note, retail access to the public telephone network at a fixed location for residential and non-residential customers was previously identified as a market susceptible to *ex ante* regulation in the 2007 EC Recommendation but not in the 2014 EC Recommendation.
[355] Section 6 of the Act.

end users using IP-based services increases, the market will tend towards effective competition.

Competition law alone would not adequately address the market failure(s)

9.62 In previous reviews we have considered that the speed of an intervention based solely on competition law in response to anti-competitive behaviour may not be sufficient to prevent harm in certain circumstances and that the greater certainty provided by *ex ante* regulation was necessary.

9.63 As set out above, end users purchasing ISDN services will increasingly be willing to migrate to IP-based services as their equipment reaches end of life and/or they anticipate their need to move to an alternative before support for these services is withdrawn. BT's ability to exploit any market power in the supply of ISDN2 and ISDN30 will, therefore, diminish and will be temporary. Moreover, high prices for ISDN2 or ISDN30 would simply accelerate an inevitable migration to IP.

9.64 In that context we do not consider it is necessary to provide for rapid intervention or take pre-emptive action to constrain prices by imposing *ex ante* regulation in these markets. We, therefore, consider that, during this period of transition to IP-based services the markets for ISDN2 services and for ISDN30 services do not meet the third criteria of the three criteria test.

Conclusion to market analysis

9.65 Given that the markets for ISDN2 and ISDN30 in the UK excluding Hull do not meet two of the three criteria in the three criteria test, we do not consider that is appropriate to impose *ex ante* regulation in the supply of ISDN2 and ISDN30 services.

9.66 We also do not consider that it is necessary to impose transitional arrangements in relation to these services. We set out our reasons for this below.

Transitional arrangements not required

9.67 We have signalled our progressive withdrawal of regulation in these markets over the last few market reviews, with the most recent 2017 Narrowband Market Review limiting regulation on to existing lines as we considered that there were suitable IP-based alternatives in the market for new lines.

9.68 Given the nature of the end consumers of these products (medium to large businesses); the availability of suitable IP alternatives and the need for all consumers to plan a migration to such alternatives, we provisionally do not consider that transitional arrangements are necessary or appropriate for this market.

9.69 We note though as discussed in the context of the WFAEL market, Openreach has made a voluntary commitment published alongside this consultation, in light of which we do not consider it necessary to impose transitional regulation. Openreach has committed to:

- continue to provide new WLR and ISDN2/ISDN30 circuits until December 2023 unless the provision of new copper services have been withdrawn from that location;
- continue to support the existing WLR and ISDN2/30 customer base (including any new circuits provided up to December 2023) on a reasonable basis until December 2025;
- continue to provide network access with respect to the WLR and ISDN2/30 products on fair and reasonable terms; will not unduly discriminate; will supply on Equivalence of Input (EoI) terms; will maintain published reference offers; and will notify changes to terms and conditions on the same basis as for SMP products;
- price these products on a 'fair and reasonable' basis until withdrawal i.e. on wholesale terms that do not distort downstream competition by squeezing margins; and
- maintaining a good level of quality of service for these products until withdrawal and will continue to provide Ofcom with monthly KPI reports (and publish KPI reports on a quarterly basis if required).

Consultation question

Question 9.1: Do you agree with our proposal not to regulate WFAEL, ISDN2 and ISDN30 markets on the basis that they no longer fulfil the three criteria test set out in the EC Recommendation? Please set out your reasons and supporting evidence for your response.

10. Wholesale Broadband Access

Market definition and three criteria test - WBA

10.1 This section considers the product and geographic market definition in relation to Wholesale Broadband Access (WBA) market A and applies the three criteria test to this market.

10.2 Our approach to the assessment of WBA is to first, review market developments that are likely to occur over the forthcoming review period and, second, consider whether the market definition that we defined as part of our 2018 WBA Statement remains an appropriate frame of reference to consider the three criteria test.

10.3 We provisionally conclude that the three criteria test is not met and accordingly that this market is not suitable for ex-ante regulation. Consequently, we propose to remove existing regulation from the WBA Market A.

Background

10.4 WBA sits between retail broadband services, i.e. the services that end consumers buy, and the WLA market, which relates to the physical connections to consumers' premises.

10.5 Historically, BT's WBA products, supported by the regulation we have put in place in previous WBA market reviews, have played an important role in enabling telecoms providers to offer broadband services without having to invest in their own equipment. In some cases this was with the intention of building a customer base prior to investing (for example by putting equipment in BT's exchanges to facilitate LLU or VULA).

10.6 However, the use of WBA products by telecoms providers other than BT has fallen steadily and significantly over the last decade. The larger telecoms providers have invested in their own equipment and unbundled BT's exchanges in many areas of the UK. These providers now use LLU and/or VULA to serve the vast majority of UK premises with retail broadband services, and WBA no longer plays significant role supporting downstream competition.

10.7 In our 2018 WBA Statement, we defined the relevant product market as wholesale broadband access services provided at a fixed location. For these purposes, wholesale broadband access services comprise the provision of asymmetric broadband access and any backhaul as necessary to allow interconnection with other telecoms providers. This enables an "always-on" capability and allows both voice and data services to be used simultaneously.

10.8 We also concluded that there were two distinct geographic markets for WBA in the UK excluding the Hull Area (covering 99.4% of premises):

- Market A (0.9% of premises) – areas in the UK where there is limited or no competition based on LLU, VULA or from the Virgin network (exchange areas where there are less than two Principal Operators (PO) in addition to BT[356]); and
- Market B (98.5% of premises) – areas in the UK where there is sufficient competition based on LLU, VULA or from the Virgin network (exchange areas in which there are at least two PO's in addition to BT).

10.9   We found that BT had SMP in WBA in Market A and that no person had SMP in Market B.

Product market definition

10.10   In our 2018 WBA statement, we made the following conclusions in relation to product market definition:

- retail packages offering SBB services delivered over a copper/fibre connection were likely to be constrained by retail packages offering SFBB services delivered over a fibre connection (and vice versa) and there was not further segmentation between faster SFBB packages and those offering basic SFBB speeds;
- retail broadband services offered over cable, were sufficiently close substitutes to such services over copper/fibre connections;
- retail broadband services offered over wireless connections, such as satellite services, mobile data services and FWA, as well as services offered over leased lines, were not strong constraints on retail packages offering broadband services over copper/fibre or cable connections; and
- the supply of broadband services to residential and business customers were in the same product market.

10.11   We, therefore, defined the relevant product market as wholesale broadband access services provided at a fixed location. This included broadband access of all speeds provided over copper, fibre and cable to business and residential customers.

10.12   We review the constraints that are likely to operate on providers of wholesale fixed broadband access, over the current review period, in Sections 6 and 7 as part of our assessment of the relevant product market for WLA. This includes a review of the constraints that operate at the retail level which are also relevant for the definition of the product market for WBA. As we set out in that section, in the context of WLA, we conclude that the relevant product market includes broadband access of all speeds provided over a copper, fibre and cable to business and residential customers.

10.13   We, therefore, consider that the product market definition adopted in our 2018 WBA Statement is an appropriate frame of reference for assessing whether the market for WBA services continues to meet the three criteria test.

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[356] We defined principal operators (POs) as operators which we considered were large enough to impose a material competitive constraint on the other operators, across the UK. We designated BT, Sky, TalkTalk, Virgin Media and Vodafone as PO's.

Geographic market definition

10.14   As explained above, we take as a starting point the definition of Market A as in the 2018 WBA Statement. We consider below the extent to which this continues to be an appropriate frame of reference for assessing the three criteria test in light of changes and prospective changes to competitive conditions in the market.

10.15   In our 2018 WBA Statement, we considered a PO to be present in an exchange area where that PO:

a) had unbundled the local copper exchange and had more than two active lines in that exchange; or

b) was able to serve at least 65% of premises using a cable network; or

c) was able to serve at least 65% of premises using FTTC services (including where the CP had not unbundled the local copper exchange but was able to reach the premises only using fibre-based services).

10.16   We also took into account the potential emergence of additional competition where a PO had committed roll-out based on one of the criteria above even if they were not currently present in that exchange area. We did not take into account FTTP deployment because of the very low take up of FTTP by non-BT POs at that time.

Increases in network coverage

10.17   There has been no further unbundling of exchanges in Market A since our 2018 review. Of the 707 Openreach exchanges in Market A Sky and TalkTalk have unbundled a small number of additional exchanges (Sky has unbundled [✂] exchanges and TalkTalk has unbundled [✂] exchanges). We do not expect that Sky or TalkTalk will unbundle any more copper exchanges during review period.

10.18   Virgin Media's expansion under Project Lightning has been primarily in areas that are already defined as Market B and we do not expect Virgin Media to build significant amounts of new cable network with the area defined as market A in 2018.[357]

10.19   We have, however, observed a small increase in the number of premises able to receive a FTTC based broadband service. Since the publication of our 2018 WBA Statement, Openreach has enabled a further 239 cabinets in Market A exchange areas with FTTC. There are now 1,050 GEA-enabled cabinets in Market A, and data received from Openreach suggests that they have plans to enable a further significant number of [✂] cabinets in Market A between now and 2023/24.[358]

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[357] We focus in this section on the ability of POs to supply broadband services to premises in Market A. However, we are aware that there are other providers of broadband services that target customers in rural areas. Whilst these are not POs they will nonetheless provide an alternative and some competitive constraint where they are able to provide broadband services within Market A.

[358] There may be further cabinet upgrades between now and 2023/4 for which no specific plans currently exist.

10.20   We expect further expansion of Openreach's FTTC and FTTP coverage over this review period as part of BT's obligations under the broadband USO and state-supported programmes to improve broadband speeds in rural areas. There are several interventions already in progress that will improve network coverage over the review period and we expect that improvements in rural broadband coverage will remain a priority over the review period. These interventions include the following.

a) In June 2019 Ofcom designated BT as Universal Service Provider for the UK excluding the Hull area. From March 2020 end users that cannot access a decent affordable broadband service will be able to request one from BT subject to a reasonable cost threshold of £3,400.

b) The UK government has announced a range of subsidy schemes aimed at boosting fixed broadband coverage in rural areas. DCMS announced in March 2018 that it expected BDUK to deliver 24Mbit/s to at least 97% of UK premises by 2020. In July 2018, the UK Government published its Future Telecoms Infrastructure Review, in which it set out how it would support its ambition for the UK to become a world leader in digital connectivity. As part of its "outside in" strategy, in October 2019 the UK Government pledged £5 billion to support the rollout of gigabit-capable broadband in the hardest to reach 20% of the country.

c) There are also plans to improve coverage in the Nations. The Scottish Government has committed to extending the availability of superfast broadband to 100% of premises in Scotland through its Reaching 100% (R100) programme and has committed £600 million to the procurement. The Welsh Government has announced that BT has won all three lots of the new Phase 2 Superfast Cymru programme. This will provide access to fast broadband to 26,000 premises by March 2021 with the majority of these premises being served by FTTP connections using almost £26 million of Welsh Government and EU funding. The Welsh Government is looking at a range of measures to bring faster broadband to the remaining premises and has committed to invest more than £90 million to deliver this. In Northern Ireland the Department for the Economy launched a procurement for Project Stratum, its £165 million broadband roll-out scheme, in August 2019. Project Stratum is expected to improve broadband access in primarily rural areas.

10.21   Where fixed network build is subsidised, contracts typically include access requirements which allow other CPs to serve these customers using the network. Where Openreach is the provider of the new lines the remedies imposed on Openreach under the WLA market also apply.

10.22   At this stage we cannot say precisely where the new lines will be deployed, or precisely what technology will be used in each instance, because detailed build plans tend to be developed closer to the time that the network is deployed. However, as a consequence of these developments we expect a significant proportion of the premises in areas defined as Market A in 2018 will be provided with an upgraded connection during the course of the review period.

Increase in usage of Openreach's FTTC and FTTP networks by non-BT providers

10.23   Sky, TalkTalk and Vodafone are already present in a large proportion (between [✂]) of Openreach's fibre exchanges and make extensive use of the Openreach FTTC network to supply end users with broadband services.

10.24   We also expect that POs will make increasing use of Openreach's FTTP network to supply end users with broadband services. We understand that both Sky and TalkTalk have plans to offer FTTP services in the near future and that the relevant processes will be established at the start of this review period.

10.25   Furthermore, given the likely expansion of Openreach's FTTP network over the review period, we believe that CPs will be increasingly willing to serve customers over Openreach FTTP connections, where they previously would not be willing to provide ADSL-based services to these customers due to the fixed costs of providing services from the local copper exchange. For example, [✂].

10.26   We expect that it will become easier for PO's other than BT to supply customers in rural areas over the review period.

a) Previously, some operators had told us that they were unwilling to provide services to premises with very slow line speeds (even where they could serve these premises using Openreach's FTTC network) due to the increased level of consumer complaints and risk to brand reputation from serving these lines. We expect that the increase in the speeds of rural lines under the USO and state-supported build programmes should resolve this issue.

b) Previously, some POs said that they preferred not to serve consumers outside their LLU footprint because they would need to purchase a WLR line (in conjunction with GEA) to provide a copper bearer for the broadband service, and that this complicates their systems and processes. Openreach has now trialled and released its SOGEA product, which allows telecom providers to provide a broadband service without the need for a separate copper bearer. [✂]. POs will, therefore, be able to supply broadband services to customers both within and without their LLU footprint using the same product (i.e. SOGEA) and without the need for a WLR line.

Conclusion on the appropriate geographic frame of reference

10.27   As set out above we have seen only modest change so far in the ability of POs to supply broadband services into the exchange areas that we defined as Market A in our 2018 statement.

10.28   Over the course of the review period we expect that there will be extensive deployment of new network within Market A and that this will improve the ability and willingness of POs to supply broadband services to customers in Market A in competition with BT.

10.29   Given the uncertainty over precisely where and when those deployments will take place, and noting that market definition is a means to an end, we consider that it is appropriate

to use our 2018 Geographic Market definition as a frame of reference. We consider the impacts of these longer-term changes within Market A as part of our assessment of the three criteria test below.

Three criteria test for WBA

10.30   The 2014 EC Recommendation sets out those product and service markets which, at a European level, the Commission has identified as being susceptible to *ex ante* regulation. These markets are identified on the basis of the cumulative application of the three criteria (as set out in Section 4).

10.31   Recital 20 explains that "For the markets the Commission has identified as being susceptible to ex ante regulation, a national regulatory authority may still consider it appropriate, on the basis of specific national circumstances, to conduct its own three criteria test. A national regulatory authority may conclude that the three criteria test is or is not met in the national circumstances. If the three criteria test is not met for a specific market listed in the Recommendation, the NRA should not impose regulatory obligations on that market".

10.32   Although WBA corresponds to Market 3b in the Commission's Recommendation, given developments in the market, we consider it appropriate to conduct a three criteria test on the WBA market in Market A, which for the reasons set out above, remains the appropriate frame of reference for application of the test.

Presence of high and non-transitory barriers to entry

10.33   In the 2018 WBA Statement we noted that the significant sunk costs incurred through unbundling exchanges meant that LLU-based entry was unlikely to be profitable in exchanges where the number of customers served by the exchange is small. Due to the small size of exchanges in Market A, their geographical locations (which tend not to map well to POs' backhaul networks) and the increasing focus on fibre broadband, we believed it was unlikely to be economically attractive for POs to roll-out LLU in these exchanges over the market review period.

10.34   We noted that POs may also be able to offer services to more premises in Market A if there were additional fibre roll-out by BT (facilitating the availability of VULA) and that it was too early to say what the eventual market impact of SOGEA would be.

10.35   We do not expect further LLU-based entry during this review period. However, as set out in our geographic market definition above, we expect the availability of VULA-based broadband will expand further into market A due to continued rollout by Openreach of FTTC and FTTP as part of the broadband USO and government subsidy programmes. We also expect that ongoing improvements to broadband speeds and the expected take-up of both FTTP and SOGEA on the Openreach network on a national basis will make it easier for POs to use those networks to supply broadband services within Market A.

10.36   Considering WBA Market A as a whole, on a forward-looking basis over the review period, we, therefore, consider that there are no longer high and non-transitory barriers to entry.

A market structure which does not tend towards effective competition within the relevant time horizon

10.37   In our 2018 WBA Statement we found that no provider has SMP in the WBA market for 98.5% of UK premises, with BT only holding SMP in Market A, containing 0.9% of premises.[359]

10.38   Historically, in the absence of the availability of WBA services, a large proportion of UK premises would be unable to receive a broadband service from a provider other than BT. However, the competitive landscape has changed significantly over the last 15 years and will change further over the course of this review period. The near-universal availability of fibre-based services, combined with a nationwide transition from copper to fibre, means that providers will increasingly be willing and able to serve premises that are within Market A without the need to purchase WBA from Openreach.

10.39   As set out above, we believe that the proportion of premises that cannot receive services from multiple operators will continue to fall significantly over the review period. We, therefore, consider that WBA Market A will tend towards effective competition over this review period.

The insufficiency of competition law alone to adequately address the market failure(s) concerned

10.40   The three criteria test is cumulative and all three criteria need to be satisfied for a market to be susceptible to *ex ante* regulation. Given that the first two criteria are not met we have not considered this criterion further.

Conclusion

10.41   It follows from the above analysis that WBA does not satisfy the first two of the three criteria and, therefore, is not suitable for ex-ante regulation. Consequently, we propose to remove all existing regulatory obligations from WBA Market A.

10.42   We do not consider that there is a need for transition arrangements. BT continues to supply WBA to third parties in Market B despite there being no obligation for it to do so and so we do not expect it to cease supply of WBA to third parties in Market A once regulation is removed. We also note that Sky and TalkTalk do not make use of WBA to supply new customers in Market A which further limits any impact of any removal of the WBA remedy on competition in Market A.

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[359] The remaining 0.7% of premises are in the Hull Area, where we found KCOM to have SMP in the provision of WBA services.

Consultation question

Question 10.1: Do you agree with our proposal not to regulate WBA market on the basis that it no longer fulfils the three criteria test set out in the EC Recommendation? Please set out your reasons and supporting evidence for your response.