
Wholesale Voice Markets Review 2021-26

Annexes 1-4

STATEMENT

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A1. Regulatory framework

- A1.1 This annex provides an overview of the regulatory framework relevant to the market review process, to give some additional context to the matters discussed in this document, including the legal instruments published at Annex 5.
- A1.2 Market review regulation is technical and complex; and requires us to apply legislation. We may also have regard to a number of relevant recommendations and guidelines. This overview identifies some of the key aspects of materials relevant to this market review but does not purport to give a full and exhaustive account of all materials that we have considered in reaching our decision for these markets.
- A1.3 Since the publication of our consultation in August 2020, the regulatory framework relevant for market reviews has been amended. In particular the Communications Act (2003)¹ (“the Act”) was amended in December 2020 to reflect the transposition of the relevant provisions of the European Electronic Communications Code (“the EECC”) and the end of the Brexit transition period.² By virtue of section 2(1) of the European Union (Withdrawal) Act 2018, the Act continues to have effect in UK law as it did prior to the UK’s departure from the European Union.³

Market review concept

- A1.4 A market review is a process by which, at regular intervals, we identify relevant markets and carry out analyses of these markets to determine whether they are effectively competitive. Where an operator has significant market power (SMP) in a market, we impose appropriate remedies, known as SMP obligations or conditions, to address this. We explain the concept of SMP below.
- A1.5 In carrying out this work, we act in our capacity as the sector-specific regulator for the UK communications industries, including telecommunications. Our functions in this regard are to be found in Part 2 of the Act. The Act requires that Ofcom carry out reviews of competition in communications markets⁴ to ensure that SMP regulation remains appropriate and proportionate in light of changing market conditions.
- A1.6 Each market review normally involves three analytical stages:
- the identification and definition of the relevant markets (the market definition stage);

¹ <http://www.legislation.gov.uk/ukpga/2003/21/contents>

² The EECC, established by Directive EU 2018/1972, entered into force on 20 December 2018. In July 2020, following public consultation, the UK government set out its approach to implementing the EECC into national law: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/902879/Government_response_EECC.pdf

³ Subsection 6(3) also provides that “any question as to the validity, meaning or effect of any retained EU law is to be decided, so far as that law is unmodified on or after IP completion day and so far as they are relevant to it—
(a) in accordance with any retained case law and any retained general principles of EU law, and
(b) having regard (among other things) to the limits, immediately before IP completion day, of EU competences”.

⁴ Section 84(A) of the Act.

- the assessment of competition in each market, in particular whether the relevant market is effectively competitive (the market analysis stage); and
- the assessment of appropriate regulatory obligations (the remedies stage).

Market definition

Relevant markets

- A1.7 The Act provides that, before making a market power determination⁵, we must identify “the markets which in [our] opinion are the ones which in the circumstances of the United Kingdom are the markets in relation to which it is appropriate to consider whether to make such a determination”⁶ and analyse those markets.
- A1.8 In identifying or analysing markets, the Act provides that we may have regard to EECC materials relating to market identification and analysis⁷, such as the Commission Recommendations on relevant product and service markets published in 2014 (‘the 2014 Commission Recommendation’)⁸ and 2020 (‘the 2020 Commission Recommendation’).⁹
- A1.9 We may only identify a market for the purpose of assessing market power where we consider the three criteria set out in section 79(2B) of the Act (the three criteria test) are met.
- A1.10 The three criteria, which are cumulative, are:
- the presence of high and non-transitory structural, legal or regulatory barriers to entry;
 - a market structure which does not tend towards effective competition within the relevant time horizon¹⁰, having regard to the state of infrastructure-based and other competition behind the barriers to entry; and
 - competition law alone is insufficient to adequately address the identified market failure(s).
- A1.11 In considering whether each of the markets under review meet the three criteria, we have had regard to the 2014 EC Recommendation and the 2020 EC Recommendation, which identify a set of product and service markets within the electronic communications sector in which *ex ante* regulation may be warranted within the EU. These are the markets which

⁵ The market power determination concept is used in the Act to refer to a determination that a person has SMP in an identified services market.

⁶ Section 79(1) of the Act.

⁷ Section 79(2ZA). Section 79(6A) of the Act defines EECC materials as “recommendations or guidelines published by the European Commission, and guidelines published by BEREC, under the Framework Directives or EECC Directive (including those published after IP completion day” i.e. after 31 December 2020.

⁸ 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.

⁹ Commission Recommendation of 18 December 2020 on relevant product and service markets within the electronic communications sector susceptible to *ex ante* regulation in accordance with Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Code.

¹⁰ Such time period as we determine to be appropriate in relation to the review.

the European Commission identified as meeting the three criteria test¹¹, after observing overall trends across the EU. This can provide a useful indicator of the markets which exhibit competition issues in neighbouring countries (and those which do not) and a consideration of the reasons for this and the trends observed, which may also be relevant to UK circumstances.

- A1.12 The 2014 Commission Recommendation identified the fixed and mobile call termination markets as susceptible to regulation but these were not included in the updated list published by the European Commission in the 2020 EC Recommendation. This is because Article 75 of Directive 2018/1972¹² empowers the Commission to set, by means of a delegated act, Union-wide voice termination rates, based on the efficient costs of providing termination services and applying to any provider of fixed and mobile termination services in the Union. As a result, termination rates within the European Union should be similar to those expected in case of competitive markets and the termination markets no longer meet the three-criteria test at Union level.
- A1.13 Since the termination rates set by the European Commission do not apply in the UK, we consider the 2020 Commission Recommendation is less directly relevant to the termination markets which are the subject of this market review.
- A1.14 The fact that we identify product and service markets that meet the three-criteria test does not automatically mean that regulation is warranted. Market definition is not an end in itself but rather one input into assessing effective competition.

Sufficiency of competition law

- A1.15 In considering the third limb of the three criteria test, that competition law alone is insufficient to adequately address the identified market failure(s), we bear in mind the specific characteristics of the relevant markets we have defined. Generally, the case for *ex ante* regulation is based on the existence of market failures which, by themselves or in combination, mean that the establishment of effective competition might not be possible if the regulator relied solely on *ex post* competition law powers which are not specifically tailored to the sector. Therefore, it may be appropriate for *ex ante* regulation to be used to address such market failures along with any entry barriers that might otherwise prevent effective competition from becoming established within the relevant markets we have defined. By imposing *ex ante* regulation that promotes competition, it may be possible to reduce such regulation over time as markets become more competitive, allowing greater reliance on *ex post* competition law.
- A1.16 *Ex post* competition law is also unlikely in itself to bring about (or promote) effective competition, as it prohibits the abuse of dominance rather than the holding of a dominant position itself. In contrast, *ex ante* regulation is normally aimed at actively promoting the

¹¹ The three criteria test applied by the European Commission is equivalent to that set out in section 79(2B) of the Act.

¹² Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Code ('the Code').

development of competition through attempting to reduce the level of market power (or dominance) in the identified relevant markets, thereby encouraging the establishment of effective competition.

- A1.17 We generally take the view that *ex ante* regulation provides additional legal certainty for the market under review and may also better enable us to intervene in a timely manner. We also consider that certain obligations are needed as competition law would not remedy the particular market failure, or that the specific clarity and detail of the obligation is required to achieve a particular result.

Forward look

- A1.18 Market definition is not a mechanical or abstract process. It requires an analysis of any available evidence of past market behaviour and an overall understanding of the mechanics of a given market sector. The Act requires that Ofcom must conduct a forward-looking assessment of the market, taking into account expected or foreseeable developments that may affect competition in the market.¹³

Approach to market analysis and Modified Greenfield

- A1.19 When identifying and analysing markets, we apply the following two principles.
- A1.20 First, when identifying wholesale markets for the purposes of section 79(1) of the Act, we start with an analysis of corresponding retail (or other downstream) market(s). We do not formally define the retail market(s), but consider if it is (they are) prospectively competitive in the absence of wholesale regulation based on a finding of SMP, and therefore whether any lack of effective competition is durable.¹⁴
- A1.21 If the underlying retail market(s) is (are) prospectively competitive under these circumstances, we would conclude that regulation is no longer needed at the wholesale level. If the underlying retail market(s) is (are) not prospectively competitive, then we identify the corresponding wholesale market(s). Where wholesale markets are vertically linked, we identify and analyse the most upstream market first, followed by a subsequent analysis of the markets that are downstream, to determine whether they would be effectively competitive in the presence of regulation upstream.
- A1.22 Second, when identifying and analysing a market, we assume that no SMP regulation exists in that particular market. This avoids the risk of circularity in our assessment – i.e. a finding of no SMP in a market which is predicated on pre-existing *ex ante* regulation of that market (this is often referred to as the ‘Modified Greenfield approach’).¹⁵

¹³ S79(1A) of the Act

¹⁴ Our analysis takes into account the effects of other types of (sector-specific) regulation, decisions or legislation applicable to the relevant retail and related wholesale market(s) during the relevant period.

¹⁵ *Hutchison 3G UK Ltd v The Office of Communications* [2009] EWCA Civ 683

https://www.catribunal.org.uk/sites/default/files/1083_Hutchison_CoA_160709.pdf, paragraphs 64-66.

A1.23 We note that this approach is consistent with that set out in the EC SMP Guidelines.¹⁶

Product and geographic dimensions

A1.24 We use competition law methodologies in the market review analysis. In particular, there are two dimensions to the definition of a relevant market: the relevant products to be included in the same market and the geographic extent of the market.

A1.25 The boundaries between markets are determined by identifying competitive constraints on the price setting behaviour of firms. There are two main constraints to consider:

- to what extent it is possible for a customer to substitute other services for those in question in response to a price increase (demand-side substitution); and
- to what extent suppliers can switch, or increase, production to supply the relevant products or services in response to a price increase (supply-side substitution).

A1.26 The hypothetical monopolist test is a tool used to identify good demand-side and supply-side substitutes. In this test, a product is considered to constitute a separate market if the hypothetical monopolist supplier could impose a small but significant non-transitory increase in price (SSNIP) above the competitive level without losing sales to such a degree as to make this price rise unprofitable. If such a price rise would be unprofitable, because consumers would switch to other products or because suppliers of other products would begin to compete with the hypothetical monopolist, then the market definition should be expanded to include the substitute products.

A1.27 The starting point for the application of hypothetical monopolist test can be referred to as the 'focal product',¹⁷ and typically starts from the narrowest potential market definition.¹⁸

A1.28 We may consider both demand-side substitution and supply-side substitution possibilities to consider whether either provide additional constraints on the pricing behaviour of the hypothetical monopolist. In this assessment, supply-side substitution is considered to be a low-cost form of entry which can take place within a reasonable timeframe (e.g. up to 12 months). For supply-side substitution to be relevant not only must suppliers be able, in theory, to enter the market quickly and at low cost by virtue of their existing position in the supply of other products or geographic areas, but there must also be an additional competitive constraint arising from such entry into the supply of the service in question.

A1.29 In relation to defining the relevant geographic markets, this comprises an area in which the undertakings concerned are involved in the supply and demand of the relevant products or services, in which the conditions of competition are sufficiently homogeneous, and which can be distinguished from neighbouring areas in which the prevailing conditions

¹⁶ [Guidelines on market analysis and the assessment of significant market power](#) under the EU regulatory framework for electronic communications networks and services (2018/C 159/01), paragraphs 15-18.

¹⁷ This reflects the terminology used by UK competition authorities (see OFT, Market definition, December 2004, OFT403, www.of.gov.uk/shared_of/business_leaflets/ca98_guidelines/of403.pdf, which has subsequently been adopted by the CMA Board).

¹⁸ Paragraph 3.2 of the OFT Market Definition Guidelines explains that 'previous experience and common sense will normally indicate the narrowest potential market definition, which will be taken as the starting point for the analysis'.

of competition are significantly different. Areas in which the conditions of competition are heterogeneous do not constitute a uniform market.

- A1.30 Our approach to market definition follows that used by the UK competition authorities and is consistent with the EC SMP Guidelines. We make clear in the relevant sections of this statement where we have regard to the EC SMP Guidelines.

Relationship with ex post competition law

- A1.31 While competition law methodologies are used in identifying the relevant markets *ex ante*, the markets identified will not necessarily be identical to markets defined in *ex post* competition law cases, especially as (i) the markets identified *ex ante* are based on an overall forward-looking assessment of the structure and the functioning of the market under examination, and (ii) as noted above, in carrying out an *ex ante* assessment, we assume there is no SMP regulation in place in the market under examination. Accordingly, the economic analysis carried out for the purpose of this review, including the markets we have identified, is without prejudice to any analysis that may be carried out in relation to any investigation pursuant to the Competition Act 1998¹⁹ (relating to the application of the Chapter I or II prohibitions) or the Enterprise Act 2002.

Market analysis

Effective competition

- A1.32 The Act requires that we carry out market analyses of identified markets for the purpose of making or reviewing market power determinations. The Act requires that such analyses are normally to be carried out within five years from the publication of a previous market power determination relating to that market. Exceptionally, the five-year period may be extended for up to one additional year.²⁰
- A1.33 In carrying out a market analysis, the key issue for Ofcom is to determine whether any one or more operator(s) has SMP.
- A1.34 The definition of SMP is equivalent to the concept of dominance as defined in competition law.²¹ In essence, it means that an undertaking in the relevant market is in a position of economic strength affording it the power to behave to an appreciable extent independently of competitors, other telecoms providers which are its customers, and ultimately consumers.
- A1.35 The Act provides that, in considering whether to make or revise a market power determination, we may have regard to EECC materials relating to market analysis or the

¹⁹ <http://www.legislation.gov.uk/ukpga/1998/41/contents>

²⁰ Section 84A of the Act.

²¹ Section 78(1) of the Act. References in section 78 to dominance of a market are to be construed, so far as it is appropriate to do so, in the same way as the reference in section 18(1) of the Competition Act 1998 to a dominant position in a market.

determination of what constitutes significant market power, such as the EC SMP Guidelines.²²

- A1.36 The EC SMP Guidelines consider the specific application of competition law principles to the electronic communications sector. They reflect our understanding of the factors driving competitive conditions in the markets we are reviewing. We have therefore had regard to the EC SMP Guidelines in considering whether to make or revise market power determinations in this Statement.
- A1.37 In line with the EC SMP Guidelines we consider that market shares provide a useful first indicator of competitive conditions in the market, and that they should however be interpreted in light of the relevant market conditions.²³ According to established case law, a market share in excess of 50% is itself evidence of a dominant position, save in exceptional circumstances.²⁴ On this point, we have also had regard to the judgment of the Competition Appeal Tribunal in *BCMR 2019*. The Tribunal confirmed that the existence of a high market share is to be a trigger for a full assessment, but not to be determinative in itself.²⁵
- A1.38 The EC SMP Guidelines set out, additionally to market shares, criteria that can be used to measure the power of an operator to behave to an appreciable extent independently of its competitors, customers, and consumers, including:
- barriers to entry;
 - barriers to expansion;
 - absolute and relative size of the undertaking;
 - control of infrastructure not easily duplicated;
 - technological and commercial advantages or superiority;
 - absence of or low countervailing buying power;
 - vertical integration;
 - engagement in contractual relations with other market players that could lead to market foreclosure; and
 - absence of potential competition.²⁶
- A1.39 A dominant position can derive from a combination of these criteria which when taken separately may not necessarily be determinative.

²² Section 79(2BA) of the Act.

²³ EC SMP Guidelines, paragraph 54.

²⁴ EC SMP Guidelines, paragraph 55.

²⁵ *TalkTalk Telecom Group plc and Vodafone Limited v Ofcom (BCMR 2019)*, Judgment of 5 March 2020 [2020] CAT 8, at paragraphs 163-171 and 282-283.

²⁶ EC SMP Guidelines, paragraph 58.

Remedies

Powers and legal tests

- A1.40 Section 87(1) of the Act provides that where we have made a determination that a person has SMP in an identified services market, we shall set such SMP conditions authorised by section 87 as we consider it appropriate to apply to that person in respect of the relevant network or relevant facilities.²⁷
- A1.41 Section 87 of the Act identifies a number of SMP obligations that Ofcom are authorised to set including: conditions making provision for securing fairness and reasonableness in the way in which requests for network access are made and responded to, price control, transparency, non-discrimination, accounting separation and cost accounting.²⁸
- A1.42 For each and every SMP obligation, we explain why it satisfies the requirement in section 47(2) of the Act that the obligation is:
- a) objectively justifiable in relation to the networks, services, facilities, apparatus or directories to which it relates;
 - b) not such so as to discriminate unduly against particular persons or against a particular description of persons;
 - c) proportionate to what the condition or modification is intended to achieve; and
 - d) transparent in relation to what is intended to be achieved.
- A1.43 As part of ensuring that an SMP obligation meets this requirement, we consider whether it is based on the nature of the competition problem(s) we have identified in our market analysis.
- A1.44 Additional legal requirements may also need to be satisfied depending on the SMP obligation in question. For example, we are subject to additional requirements when imposing price controls and cost recovery obligations.
- A1.45 Specifically, we explain why any such SMP obligation satisfies the requirements of section 88 of the Act. Namely:
- our analysis indicates a risk that the telecoms provider concerned might fix and maintain prices at an excessively high level or impose a price squeeze so as to have adverse consequences for end-users of public electronic communications services;
 - we consider the setting of the obligation is appropriate for the purposes of –
 - (i) promoting efficiency;
 - (ii) promoting sustainable competition;

²⁷ Section 84(4) of the Act provides that where Ofcom determine that an undertaking to whom any SMP conditions apply is no longer a person with significant market power in that market, Ofcom must revoke every SMP services condition applied to that person by reference to the market power determination made on the basis of the earlier analysis.

- (iii) conferring the greatest possible benefits on the end-users of public electronic communications services having regard where relevant to the market analysis, to the long term interests of end-users in the use of next-generation networks; and
- (iv) where relevant to the market analysis, promoting the availability and use of new and enhanced networks.²⁹

A1.46 In setting such an SMP condition we also take account of:

- (i) the extent of investment by the telecoms provider in the matters to which the SMP obligation relates; and
- (ii) where the condition involves price controls on the provision of network access to existing network elements, the benefits of predictable and stable wholesale prices in ensuring:
 - a) efficient market entry; and
 - b) sufficient incentives for all undertakings to bring into operation new and enhanced networks.³⁰

A1.47 Where an obligation to provide third parties with network access is considered appropriate, we take into account factors including:

- (i) the feasibility of the provision of the network access;
- (ii) the technical and economic viability, having regard to the state of market development, of installing and using facilities that would make the network access unnecessary;
- (iii) any technological developments that, in our opinion, are likely to affect the design and management of the relevant network or facilities;
- (iv) the need to ensure that the provision of the proposed network access does not have the effect of favouring one form of technology over another in relation to the design and management of the electronic communications networks;
- (v) the investment of the network operator who is required to provide access (taking account of any public investment made);
- (vi) the need to secure effective competition (including, where it appears to us to be appropriate, economically efficient infrastructure-based competition) in the long term and to support innovative business models that support sustainable competition; and
- (vii) any rights to intellectual property that are relevant to our proposals.³¹

²⁹ Section 88(1) of the Act.

³⁰ Section 88(2) of the Act.

³¹ Section 87(4) of the Act.

A1.48 In this Statement, we demonstrate the application of the relevant requirements to the SMP obligations we are imposing.³² In doing so, we also set out our assessment of how, in our opinion, the performance of our general duties under section 3 of the Act will be secured or furthered by our regulatory intervention, and that it is in accordance with the six requirements in section 4 of the Act (see below). This is also relevant to our assessment of the likely impact of implementing our decisions.

Ofcom's general duties – section 3 of the Act

A1.49 Under the Act, our principal duty in carrying out our functions is to further the interests of citizens in relation to communications matters and to further the interests of consumers in relevant markets, where appropriate by promoting competition.

A1.50 In doing so, we are required to secure a number of specific objectives and to have regard to a number of matters set out in section 3 of the Act.

A1.51 In performing our duties, we are also required to have regard to a range of other considerations, as appear to us to be relevant in the circumstances. For the purpose of this review, we consider that a number of such considerations are relevant, in particular:

- the desirability of promoting competition in relevant markets;
- the desirability of encouraging investment and innovation in relevant markets; and
- the desirability of ensuring that relevant markets facilitate end-to-end connectivity in the interests of consumers in those markets.

A1.52 We are also required to have regard to the principles under which regulatory activities should be transparent, accountable, proportionate, consistent, and targeted only at cases in which action is needed, as well as to the interest of consumers in respect of choice, price, quality of service and value for money.

A1.53 However, we have a wide measure of discretion in balancing our statutory duties and objectives. In doing so, we take account of all relevant considerations, including responses received during our consultation process, in reaching our conclusions.

Section 4 of the Act - duties for the purposes of fulfilling obligations

A1.54 Section 4 of the Act requires us, when carrying out our market review functions, to act in accordance with six requirements for regulation which are in summary:

- a) to promote competition in the provision of electronic communications networks and services, associated facilities and the supply of directories;
- b) to promote the interests of all members of the public in the United Kingdom;
- c) to take account of the desirability of Ofcom's carrying out of its functions in a manner which, so far as practicable, does not favour one form of or means of providing

³² See the reasoning in Sections 6, 7 and 10 of this Statement and Annex 3.

electronic communications networks, services or associated facilities over another (i.e. to be technologically neutral);

- d) to encourage, to such extent as Ofcom considers appropriate the provision of network access and service interoperability for the purpose of securing: efficient and sustainable competition; efficient investment and innovation; and the maximum benefit for customers of telecoms providers and of persons who make associated facilities available;
- e) to encourage compliance with certain standards in order to facilitate service interoperability, end-to-end connectivity, and secure freedom of choice for the customers of telecoms providers; and
- f) to promote connectivity and access to very high capacity networks³³ by members of the public and businesses in the United Kingdom.

A1.55 We consider that these requirements are relevant to the matters under review and that no conflict arises in this regard with those specific objectives in section 3 of the Act that we consider are particularly relevant in this context.

Section 4A of the Act – taking account of EC recommendations

A1.56 Section 4A of the Act provides that in carrying out certain functions (including, among others, our functions in relation to market reviews), we may take account of recommendations issued by the EC under Article 19(1) of the Framework Directive or Article 38(1) of the EEC Directive if the recommendations appear to us to be relevant to those functions.

A1.57 We make clear in the relevant sections of this statement where we have regard to the EC recommendations.

Impact assessment – section 7 of the Act

A1.58 The analysis presented in the August 2020 Consultation and in the consultation which preceded it, *Future of interconnection and call termination*³⁴, represent an impact assessment, as defined in section 7 of the Act. We have considered every representation made about our proposals before deciding to implement our proposals as set out in this Statement.

A1.59 Impact assessments provide a valuable way of assessing different options for regulation and showing why the preferred option was chosen. They form part of best practice policy-making. This is reflected in section 7 of the Act, which means that generally we have to

³³ A “very high capacity network” is set out in the Act as meaning “an electronic communications network which —

(a) consists wholly of optical fibre elements at least up to the distribution point at the serving location; or

(b) is capable of delivering, under usual peak-time conditions, network performance that, in OFCOM's opinion, is similar, in terms of available downlink and uplink bandwidth, resilience, error-related parameters and latency and its variation, to the network performance of a network falling within paragraph (a).”

³⁴ Ofcom, 2019. [First consultation: Future of interconnection and call termination](#) [accessed 21 March 2021].

carry out impact assessments where there is likely to be a significant effect on businesses or the general public, or when there is a major change in our activities. However, as a matter of policy, Ofcom is committed to carrying out and publishing impact assessments in relation to the majority of its policy decisions.³⁵

- A1.60 Specifically, pursuant to section 7, an impact assessment must set out how, in our opinion, the performance of our general duties (within the meaning of section 3 of the Act) is secured or furthered by or in relation to the regulation we impose.
- A1.61 We are separately required by statute to assess the potential impact of all our functions, policies, projects, and practices on equality.³⁶ This assessment is set out in section 2 of this Statement.

UK Government's Statement of Strategic Priorities

- A1.62 Under section 2B(2) of the Act, when exercising our functions relating to telecoms, management of radio spectrum and postal services, we are required to have regard to the UK Government's Statement of Strategic Priorities (SSP).³⁷ We set out in section 2 of this Statement further details of how we have done this.

Regulated entity

- A1.63 The power in the Act to impose an SMP obligation by means of an SMP services condition provides that it is to be applied only to a "person" whom we have determined to be a person having SMP in a specific market for electronic communications networks, electronic communications services or associated facilities (i.e. the "services market").³⁸
- A1.64 We consider it appropriate to prevent a dominant provider to whom an SMP services condition is applied exploiting the principle of corporate separation where that dominant provider is part of a group of companies. The dominant provider should not use another member of its group to carry out activities or to fail to comply with a condition, which would otherwise render the dominant provider in breach of its obligations.
- A1.65 To secure that aim, we apply the SMP conditions to the person in relation to which we have made the market power determination in question by reference to the so-called "Dominant Provider", which we define as "[X plc], whose registered company number is [000], and any of its subsidiaries or holding companies, or any subsidiary of such holding companies, all as defined in section 1159 of the Companies Act 2006".

³⁵ For further information about Ofcom's approach to impact assessments, see the guidelines, [Better Policy Making: Ofcom's approach to Impact Assessment](#) [Accessed 25 March 2021]

³⁶ Ofcom has a general duty under the 2010 Equality Act to advance equality of opportunity in relation to age, disability, sex, gender reassignment, pregnancy and maternity, race, religion or belief, and sexual orientation.

³⁷ Department for Digital, Culture, Media & Sport, 2019. *Statement of Strategic Priorities (SSP)*. The SSP for telecommunications, the management of radio spectrum, and postal services was designated on 29 October 2019, having been laid in draft before Parliament on 18 July 2019.

³⁸ Section 46(8) of the Act.

A2. Mobile call termination modelling

- A2.1 In Section 6 we briefly summarised our approach to using a cost model to estimate the LRIC of MCT. This annex provides further information on the modelling approach we have taken and explains the functionality of the 2021 MCT model. Our proposals are informed by this model, which is published alongside this document. It uses a bottom-up approach to estimate the costs of MCT for an average efficient national mobile provider with a 25% market share, and is closely based on the 2018 MCT model.
- A2.2 In this annex we explain in greater detail our approach to:
- Model structure and calculation
 - Updating the MCT model regarding:
 - Traffic volumes;
 - Cost of capital;
 - Technology choice;
 - Equipment unit costs;
 - Calibration.

Model structure and calculation

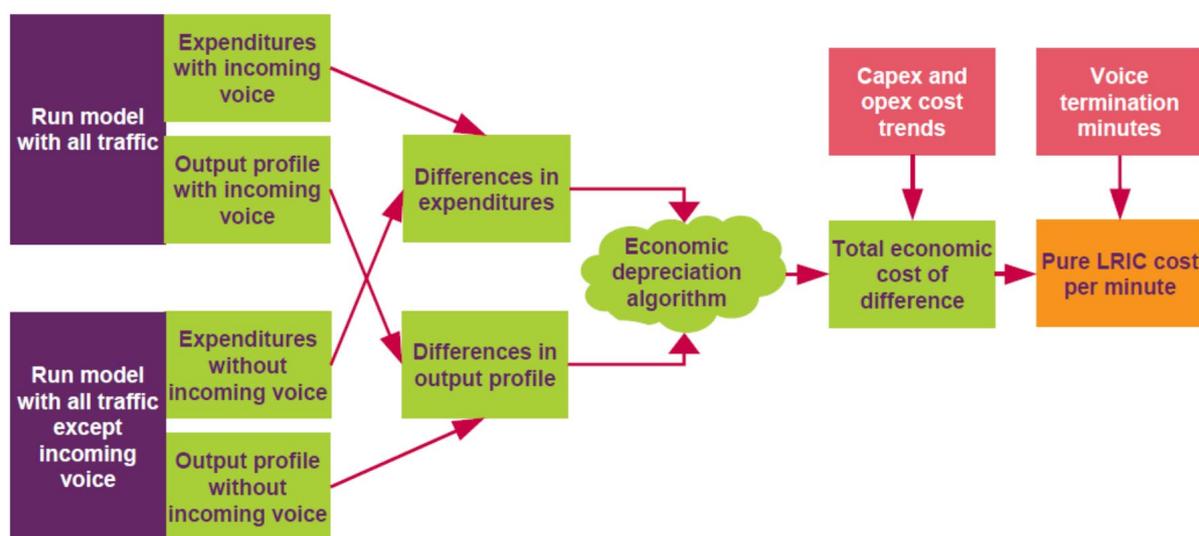
- A2.3 For the purposes of this review, we believe that the 2020 MCT model is the appropriate starting point for our analysis, which is in turn based heavily on the 2018 MCT model. Both of these model the cost of MCT of a hypothetical national mobile network operator (MNO) and the approach has been scrutinised over multiple rounds of consultation by both Ofcom and our stakeholders. As such, we consider it provides the best estimate of the LRIC of MCT in the UK that is available to us.
- A2.4 The structure of the 2021 MCT model is the same as the 2015, 2018 and 2020 MCT models and was explained in the 2015 MCT Market Review Statement. It comprises five modules, each of which is a separate Excel workbook. The functions of these modules and the linkages between them are as follows and are described in more detail further below:
- a) The **'Scenario Control'** module defines and allows the selection of the model scenarios and sensitivities. It also contains a summary of the key results.
 - The **'Traffic'** module contains the service demand forecasts and network coverage assumptions.
 - The **'Network'** module contains network dimensioning algorithms and forecasts the quantities of 2G, 3G and 4G network equipment required to provide network coverage and meet service demand ahead of time.
 - The **'Cost'** module uses the calculated equipment quantities (as derived in the network module) and unit equipment prices to calculate network costs (both capital and operating) over time.

- The ‘Economic’ module calculates service costs from the forecast network costs, based on economic depreciation. The outputs of this module form the model results.

A2.5 The 2021 MCT model calculates the LRIC of MCT using a decremental approach. This calculation involves considering MCT as a ‘final increment’ with no common costs (such as the common costs of a ‘coverage network’) being allocated to MCT. This approach to calculating LRIC is consistent with previous MCT models, the 2009 EC Recommendation and the EECC.³⁹

A2.6 The calculation flow used to determine LRIC is shown in Figure A2.1 below (with MCT referred to as ‘incoming voice’ in the flow chart).

Figure A2.1: How the LRIC of MCT is calculated



Source: Ofcom.

A2.7 The outputs of the 2021 MCT cost model are unit costs (either LRIC or LRIC+) in each year for MCT. The model works in real terms (relative to CPI inflation) indexed to 2015/16 prices, and all outputs are stated in 2015/16 prices, with final outputs also rebased to 2020/21 prices.

Scenario control module

A2.8 The scenario control module contains the main parameters that affect the cost of MCT. These parameters then feed through to all other relevant modules. The Scenario worksheet in the module is constructed to allow the user to choose between different scenarios, with a macro enabling the calculation of either LRIC+ or LRIC results pertaining to these scenarios.

³⁹ See Annex III of the EECC, established by Directive EU 2018/1972.

A2.9 The Outputs worksheet contains the most important results from the model. The functionality of the scenario control module in the 2021 MCT model remains unchanged from that published in the 2018 MCT model, with changes only to update the scenarios.

Traffic module

A2.10 The traffic module of the 2021 MCT model uses demand forecasts and network coverage assumptions to derive service traffic forecasts which are used in the Network module to dimension the 2G, 3G and 4G networks. The 2021 MCT model has the functionality to forecast out to 2039/40; however, we only included explicit traffic forecasts to Q4 2025/26 after which volumes are held constant.

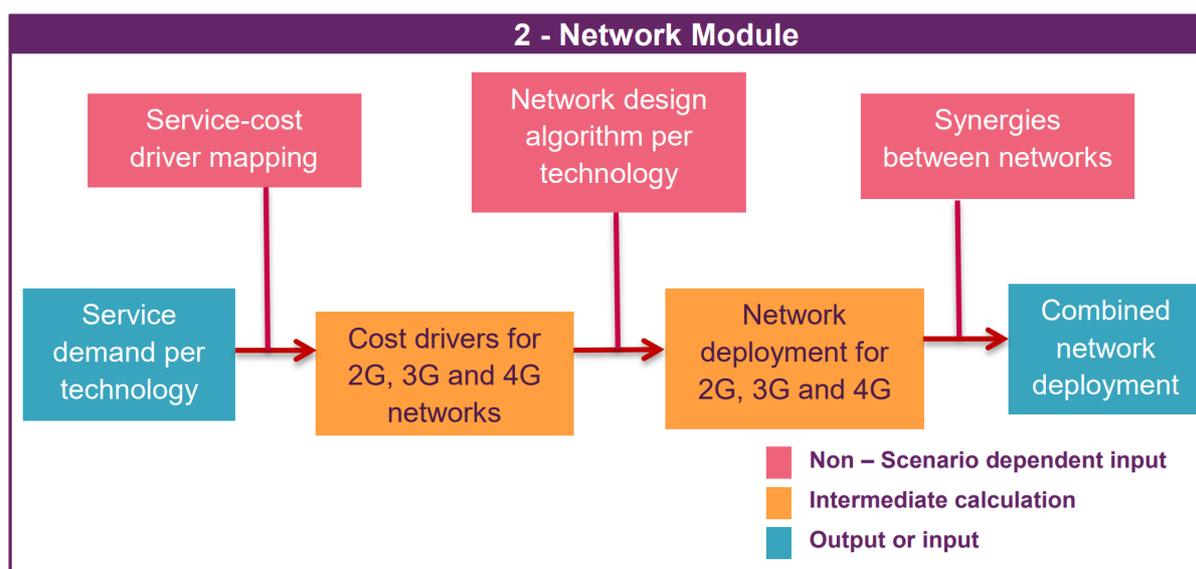
A2.11 We also note that our traffic forecasts must be consistent with our assumptions concerning network technology and spectrum. The 2021 MCT model uses the technology of the day with no further developments in the future. This means that although in the short term the 2021 MCT model forecasts are based on data from MCT providers, in the medium and longer term the forecasts are constrained by the technology and spectrum we are using.

Network module

A2.12 The network module takes the forecast levels of service demand and coverage per geotype derived in the Traffic module and uses them in calculating the quantities of each type of 2G, 3G and 4G network equipment necessary to meet these requirements. This process, which also involves the use of telecommunications engineering algorithms, is known as ‘dimensioning’, and was developed for us by Analysys Mason during the 2015 MCT review.

A2.13 The flow of the calculations in the proposed network module is illustrated in Figure A2.2.

Figure A2.2: Summary of Network Module calculations



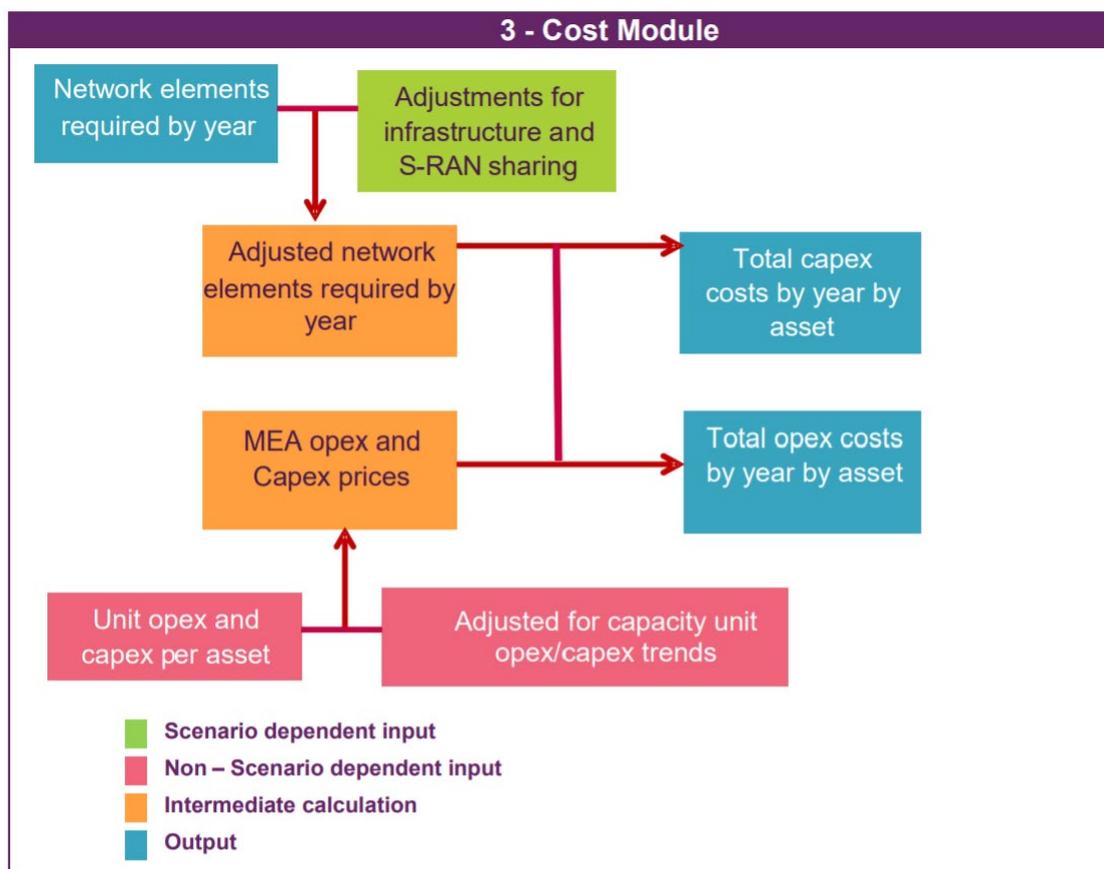
Source: Ofcom.

- A2.14 In order to dimension the modelled 2G, 3G and 4G networks on the basis of cost causation relationships, the 2021 MCT model first converts the demand for each service under the selected input scenario into a number of specific cost drivers. These cost drivers determine the deployment of certain network elements. A common measure of traffic output is required so that demand from multiple services can be aggregated appropriately. Traffic for each service is therefore converted into voice equivalent busy-hour Mbit/s. A matrix of routing factors is then applied to map the services onto a full set of network cost drivers.
- A2.15 A number of technical parameters are required in order to establish quantifiable relationships between cost drivers and network deployment. To derive a realistic assessment of the cost structures for our average efficient mobile provider, we have used a bottom-up approach that calculates the quantities of each type of network element required. Assets are dimensioned in the model according to the cost drivers. Some assets are indirectly dimensioned by the cost drivers (e.g. assets that are dimensioned on the basis of other asset quantities).
- A2.16 The general approach taken for dimensioning the modelled 2G, 3G and 4G networks is the same as we explained in the 2015 MCT Market Review Statement. Under this approach the radio network is dimensioned for coverage and capacity requirements in each geotype. An important factor in determining radio equipment requirements are the assumptions made relating to the spectrum bandwidth and the spectrum holdings of the modelled mobile provider. The spectrum holdings and associated assumptions included in the 2021 MCT model are unchanged from the 2018 MCT model, as explained later in this annex.

Cost module

- A2.17 Using the equipment quantities calculated in the network module as inputs, the cost module forecasts the total cash flows (investment and operating costs) that would be incurred in each year to purchase, renew, maintain and decommission the required number of each type of network element. This process allows us to calculate the costs that would be incurred by an average efficient mobile provider.
- A2.18 A summary of the proposed workings of the module is shown in Figure A2.3 and explained below. The structure of the cost module is unchanged from that included in the 2018 MCT model.

Figure A2.3: Summary of Cost Module calculations

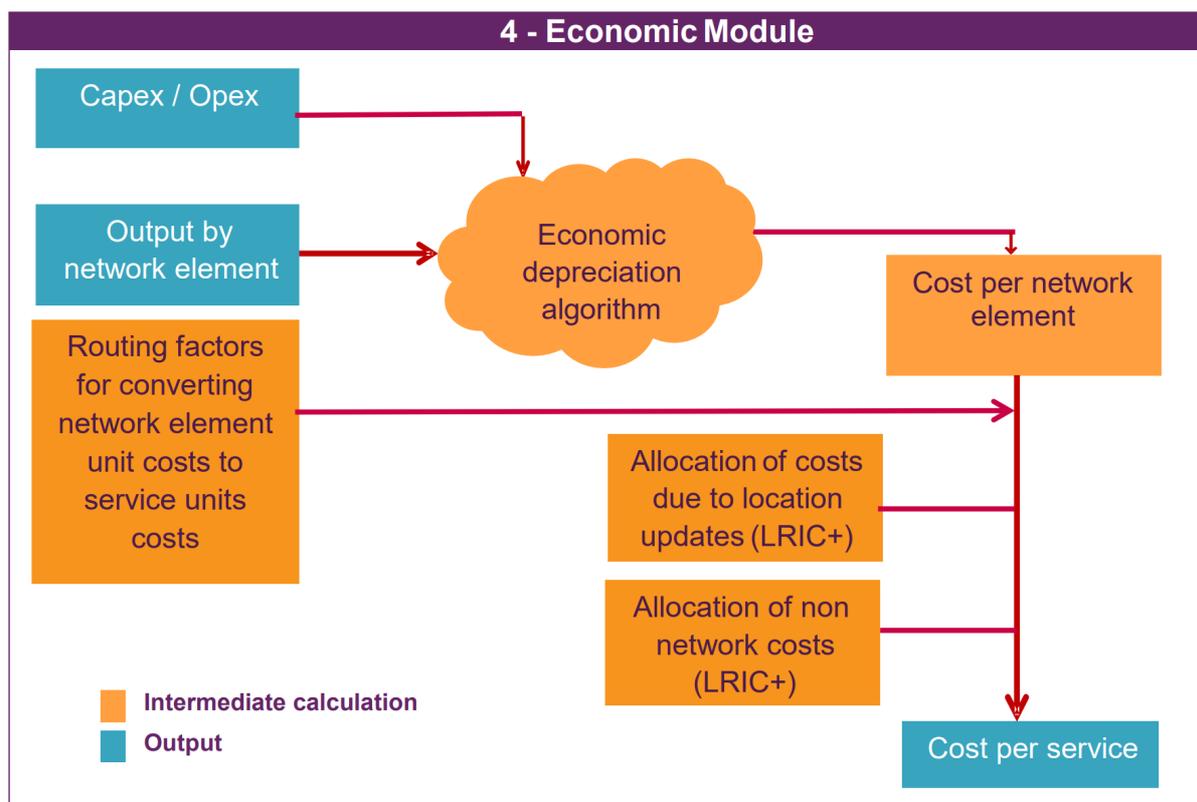


Source: Ofcom.

Economic module

- A2.19 Once the yearly capex and opex of the average efficient mobile provider have been calculated in the cost module of the model, we must determine how these costs are recovered over time. This is done in the Economic module.
- A2.20 The Economic module implements economic depreciation to calculate a cost per unit of output, in each year, for every asset in the model. An overview of the calculation flow in the economic module is shown in Figure A2.4 below. This is unchanged from the 2018 MCT model.

Figure A2.4: Summary of Economic Module calculations



Source: Ofcom.

- A2.21 Economic depreciation matches the cost of equipment to its actual and forecast use over the long-term. Consequently, there is relatively little depreciation in years when utilisation is low and relatively high depreciation in years of full, or almost full, equipment utilisation. As such economic depreciation differs from typical accounting approaches to depreciation when the amount recovered is invariant to usage (and so unit costs are inversely related to utilisation).
- A2.22 In the 2021 MCT model we use the form of economic depreciation known as Original Economic Depreciation (Original ED), consistent with our previous MCT models since 2005. We continue with this approach instead of accounting approaches to depreciation, on the basis it would better reflect the forward-looking economic value of an asset and hence better mimic the outcome of a competitive market. Furthermore, using economic depreciation would be consistent with the 2009 EC Recommendation and the EECC.⁴⁰
- A2.23 We note that in our outputs there is a significant dip in MTRs followed by a slow but consistent increase over the final three years of the control period. This is due to the economic depreciation profile, specifically the recovery of opex over time, and the impact

⁴⁰ 2009 EC Recommendation, point 7 and Annex III of the EECC, established by Directive EU 2018/1972.

that the reduction in WACC has on the cost recovery profile. We note that this modelling feature was previously appealed in 2011 but was upheld by the Competition Commission.⁴¹

Approach to updating our model

- A2.24 In the 2018 MCT Market Review Statement we set out various checks on how the calculated MTR may change with updates to various parts of the model. We concluded that the 2015 MCT model served as a reasonable basis for calculating the LRIC of MCT over the 2018-2021 period. The 2018 MCT model was very similar to the 2015 MCT model, updated only minimally to account for the then-latest inflation data and to present outputs for the 2018/19 to 2020/21 control period.⁴²
- A2.25 As set out in Section 6, we have taken a proportionate approach to updating the 2018 MCT model, updating it to improve the accuracy of its outputs where it is straightforward to do so, but avoid updating those parts of the model which would require a complete overhaul of the modelling structure or architecture and a large data collection process. We have taken this approach for the 2021 MCT model because we believe it ensures sufficient accuracy to satisfy our regulatory objectives, without placing an undue regulatory burden on our stakeholders during the period of disruption caused by Covid-19.
- A2.26 We set out our approach to each of the main elements of the modelling we have considered updating below.

Traffic volumes

- A2.27 Updated traffic volumes and forecasts can significantly increase or decrease the calculated LRIC of MTR as they help determine the size and usage of the modelled network.

Updates in the 2020 MCT model

- A2.28 For the 2020 MCT model on which we consulted, we updated:
- handset and data device subscriber figures, although we noted that this is a very small change given market saturation;
 - 4G penetration, which increased from 57% (at the start of 2020) to 77%;
 - 4G data usage to ensure total data usage was consistent with actuals given the increase in modelled 4G penetration; and
 - monthly voice usage, which increased from 146 minutes per subscriber to 169 minutes per subscriber.
- A2.29 When producing the 2020 MCT model, we updated penetration rates for handset and data device users, based on actuals, for 2016/17 Q4 up to 2019/20 Q2. Given that handset penetration rates have stayed relatively flat over many years, we consider it appropriate to hold its penetration rate constant when forecasting. Data device penetration rates had

⁴¹ Competition Commission, 2012. [9 February 2012 Determination](#), paragraphs 3.511 and 3.548 [Accessed 25 March 2021]

⁴² 2018 MCT Market Review Statement, Section 5

been gradually falling over the last few years, therefore we continued this trend when forecasting with a 0.05 percentage point decline each quarter.

- A2.30 We calculated the proportion of gross additions that subscribe to 4G to ensure that the 4G penetrations figures reflect actuals (up to 2018). For our base case we assumed that the proportion of gross additions that subscribe to 4G is constant, resulting in 85% of subscribers using 4G by 2025/26.
- A2.31 We updated voice and 4G data usage in the model using actuals for 2016/17 Q4 to 2019/20 Q2, ensuring that historic figures are consistent with these actuals. When forecasting voice usage, our base case assumes that it remains constant, based on average usage over the last two years.

The 2021 MCT model

- A2.32 Since the publication of the 2020 MCT model we have further updated traffic and subscriber data with which we could further update the model. However, the period this data covers has been highly unusual due to the impact from Covid-19. Most notably, call and data traffic per subscriber have increased noticeably from the previous trend.
- A2.33 We believe that this increase in usage is likely to be a temporary effect of the Covid-19 pandemic and not a more permanent shift in consumer behaviour. Including this increase would be difficult as it would require us to predict how much further it may go and then over what period of time and by how much usage would then reduce. Were we to make this change it is not clear that it would improve the accuracy of our results, given the uncertainty involved in these adjustments.
- A2.34 Furthermore, the net impact of all traffic updates made as part of the 2020 MCT model was broadly cost-neutral. It is therefore not clear that updating to the latest actuals and then forecasting a decline to some approximation of the pre-Covid-19 trend would result in a materially different output MTR than is produced using the traffic volumes from the 2020 MCT model.
- A2.35 We have therefore decided not to update the traffic assumptions from the 2020 MCT model, as we believe doing so would not materially improve the accuracy of the model outputs.

Cost of capital

- A2.36 The weighted average cost of capital (WACC) is an important component of the LRIC for MCT given the high capital investments required to run a mobile network. As part of our work in the WFTMR 2021 Statement, Ofcom has provided its latest view of the WACC for BT Group and the different services it provides.
- A2.37 The BT Group WACC is disaggregated three-ways, to reflect the differences in the systematic risk between different activities of BT. The Other UK Telecoms (OUKT) part of BT captures its mobile activities, amongst other things. Therefore, we expect the OUKT WACC to provide a reasonable benchmark for the WACC of a UK MNO.

- A2.38 We received two stakeholder responses related to our proposed use of WACC in the August 2020 Consultation. BT agreed with the use of the OUKT WACC but it disagreed with our estimated value, and TalkTalk also commented on the specific parameter values. BT's and TalkTalk's comments were similar to those made in response to the WFTMR 2020 Consultation and these comments are addressed in full in the WFTMR 2021 Statement.⁴³
- A2.39 The 2018 MCT model used a pre-tax real WACC of 7% which reduced to 5.8% in the 2020 MCT model on which we consulted. This was consistent with the OUKT WACC estimated in the 2020 WFTMR Consultation. We have now updated our estimate to a pre-tax real rate of 5.7%, to reflect our latest view of the OUKT WACC estimated in the WFTMR 2021 Statement. The OUKT WACC of 7.8% pre-tax nominal is converted into a pre-tax real WACC using the Fisher equation and a CPI assumption of 2%. The slight reduction in the WACC reflects the combined effect of several parameter changes.⁴⁴

Technology choice

Summary

- A2.40 In the August 2020 Consultation we proposed not to update the technology included in the 2020 MCT model. We did not receive any stakeholder comments arguing that we should change the technologies modelled, with stakeholders broadly agreeing with our light-touch approach. We have maintained that position in the 2021 MCT model, leaving technology choice the same as in the 2018 MCT model. Our reasoning for this decision is set out below.

Reasoning for our decision

- A2.41 The 2015 MCT model dimensioned a network that made use of 2G, 3G and 4G technology and included VoLTE, active and passive infrastructure sharing and single-RAN deployment. This was maintained in the 2018 MCT model, in which we chose not to update the technologies deployed in the model or any spectrum deployment changes. This was largely due to these technologies either not being deployed at all during the 2018-21 charge control period or being deployed in a very limited fashion.⁴⁵
- A2.42 5G technology is now being rolled out in UK networks and we would expect usage of 5G to begin to pick up during the review period. Early in the deployment of any technology there is greater uncertainty over the cost and capacity of the new equipment to be used and how this will evolve over time, meaning any forecast of how the technology will develop and the impact on total network costs involves a relatively wide margin of error.
- A2.43 There is even greater uncertainty over the implementation and take-up of voice over 5G, which will trail the rollout of 5G in UK networks more broadly, as the primary use of 5G will be on high-speed data applications. In particular we would expect the model to be

⁴³ See Annexes 20 and 21 of the WFTMR 2021 Statement.

⁴⁴ See Annex 21 of the WFTMR 2021 Statement.

⁴⁵ Paragraphs 5.15 to 5.21 of the 2018 MCT Market Review Statement.

sensitive to the forecast balance of traffic between 5G and the other network technologies, and we believe it is too early to make such a forecast with any confidence.

- A2.44 The choice of technology to be used by the model has the potential to have a material impact on the total network costs in the model, and could in theory have an impact on the output cost of MCT.⁴⁶ However, given the uncertainties involved in modelling 5G at this early stage in its rollout, it is not clear that introducing 5G to the model would ultimately lead to a more accurate output for the duration of this market review period.
- A2.45 The likely increase in accuracy from updating the technology choice in the model is limited, and the likely benefit of this is even smaller given our decision in Section 6 that our regulatory objectives would still be met with rates that are near to, but not exactly equal to, LRIC. Compared to this, the costs of updating the model would be relatively large.
- A2.46 The introduction of a new technology in a manner which maintained the internal consistency of the model would be a major task involving significant restructuring of the model. It would also place a significant burden on stakeholders because of the need to gather large amounts of additional data. We have been particularly concerned with this factor during the ongoing Covid-19 pandemic. We have therefore decided it is neither necessary nor proportionate for us to update the model to include 5G and have based our model on a 2G, 3G and 4G network. For the reasons set out above, we believe this approach is appropriate over the next market review period and is consistent with the EECC.⁴⁷
- A2.47 With regards to new spectrum deployments, we are aware there has been more such activity recently and there will likely be more such activity in the near future than was the case in the previous two reviews of MCT; there has been an auction of 2.3 and 3.4GHz spectrum in January 2018⁴⁸ and the auction of 700MHz and 3.6-3.8GHz spectrum commenced the week starting 10 March 2021.⁴⁹ Each of these auctions involve the allocation of spectrum anticipated to be used to provide 5G services⁵⁰, and so we have decided not to introduce these spectrum assets into the model. To do so without introducing 5G technology would introduce inconsistency into the model.

⁴⁶ For example, the change in the calculated LRIC of MCT for 2015/16 in the 2015 MCT Market Review Statement was 0.502ppm compared to the 2014/15 regulated charge (also set on a LRIC basis) at the time of 0.826ppm – a reduction of 39%. This difference covers all changes to the modelling approach introduced in the 2015 MCT Market Review Statement, of which one of the most significant was the introduction of 4G technology and associated services to the model.

⁴⁷ See Annex III of the EECC, established by Directive EU 2018/1972.

⁴⁸ Ofcom, 2018. [Award of 2.3 and 3.4 GHz spectrum bands](#) [Accessed 25 March 2021].

⁴⁹ Ofcom, 2021. [A guide to Ofcom's forthcoming spectrum auction](#) [Accessed 25 March 2021]. Ofcom, 2021. [Award of 700 MHz and 3.6-3.8 GHz spectrum by auction](#) [Accessed 25 March 2021].

⁵⁰ We note that the 2.3GHz spectrum from the 2018 auction is expected to be used to increase capacity on existing technologies, rather than to introduce 5G technology.

Equipment unit costs

Summary

A2.48 In the August 2020 Consultation we proposed not to update the cost trends used by the 2020 MCT model. Stakeholders broadly agreed with this approach. One stakeholder, Telefonica, suggested that we supplement the data we hold on cost trends with a light-touch information request to stakeholders. We have decided not to conduct such an exercise in producing the 2021 MCT model. We set out our reasoning for this decision below.

Reasoning for our decision

A2.49 The unit costs and trends used in the 2018 MCT model are the same as those in the 2015 MCT model. As part of the 2018 MCT Market Review Statement we checked these against the more recently published French model and found them to still be a reasonable estimate of how costs were expected to change.

A2.50 Updating the unit costs and trends in the model could result in costs increasing or decreasing, depending on the nature of the change. The assumptions made in the 2015 model were the best we could make about the evolution of how the cost of the elements required for the network would evolve, accounting for both changes in the cost of equipment and changes in capacities or other factors which would affect the unit cost of the services run across those elements. We do not have an expectation of whether such an update would be more likely to increase or decrease costs, but we would not expect any impact on the costs to be large.

A2.51 We have considered updating the cost and trend data used in the model with data gathered as part of the EC's modelling exercise in the context of harmonising MCT and roaming rates across the EU ('the EC's Eurorates modelling'). As part of this exercise we gathered data from MNOs including data on the unit costs and cost trends of their equipment. However, upon examination we have determined that this data is not fit for this purpose, due to a combination of:

- the short forecast horizon of the data provided (firms provided cost trends over a two-year basis);
- the architecture and level of aggregation assumed, which does not match well to that of the 2018 MCT model; and
- the completeness and range of responses received.

A2.52 As such we do not have more recent data available to us that we could use to update these assumptions, and any such update would therefore require gathering data from our stakeholders. Telefonica has suggested that we could send a light-touch information request to stakeholders to check our cost trend data against stakeholder data. While this would increase the accuracy of our outputs were we to do it, we do not expect that such an update would have a large impact on the level of our results. There is also a risk that updating the cost trends of certain types of equipment may risk introducing inconsistency

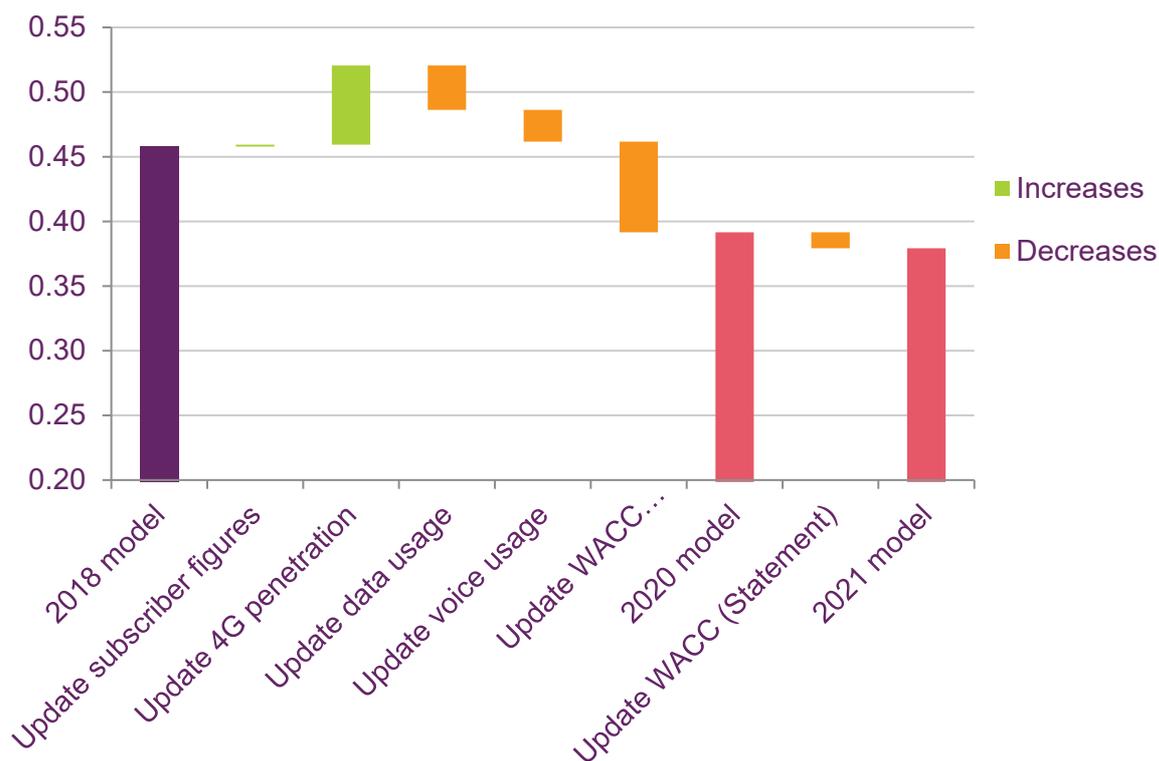
in the model as these cost trends may reflect technological developments related to the introduction of 5G. This risk is particularly large in the case of a light-touch information request, as ensuring that cost trends are produced on a basis that is consistent with the technology choice of the model is likely to be a complex task given the degree to which equipment is shared between technologies.

A2.53 We have therefore decided not to update the equipment unit costs, cost trends, and capacity assumptions from the values used in the 2020 MCT model.

Summary of model updates and impact on modelled MTR

A2.54 As set out above, we have only updated the 2020 MCT model to use our most recent view on the OUKT WACC. This results in a 2021/22 MCT LRIC of 0.379ppm, as compared to the 0.458ppm from the 2018 MCT model and 0.392 ppm from the 2020 MCT model (all updated to 2020/21 real prices). We show the breakdown of each of our updates from the 2018 MCT model to the 2021 MCT model, showing the updates made in producing the 2020 MCT model separately, in the chart below:

Figure A2.5: Impact of updating the 2018 MCT model, 2021/22 real ppm



Source: 2021 MCT model

Calibration

A2.55 The purpose of calibration is to ensure that the model produces a reasonably realistic network. Any bottom-up model has a risk of missing key dimensioning relationships and

producing a network which, while internally consistent based on the assumptions made, does not adequately match the reality it is designed to model.

- A2.56 In its response to the August 2020 Consultation, Telefonica said that the light-touch nature of our proposed update to the 2018 MCT model increased the need for diligent calibration to ensure that the model is producing reasonable outputs.
- A2.57 In response to Telefonica, our view is that calibration is important for a variety of reasons, chief among which is that bottom-up models may miss important dimensioning relationships or involve other simplifications which result in them producing unrealistic outputs. Calibration was an important part of the process of developing the 2015 MCT model and resulted in modelled asset counts and costs were reasonably in line with those of the 2G/3G/4G national mobile providers.⁵¹ Given this, we are reasonably confident that the architecture picks up all key dimensioning relationships.
- A2.58 Calibration is also not intended to ensure that the model in question is producing a specific output. Rather, it is intended to check that key outputs of the model are not unrealistic – for example, that the modelled network is not built at a scale significantly larger or smaller than those that have been built in reality.
- A2.59 This is not to say that a model, once calibrated, can be relied upon in perpetuity. Given the period of time that has elapsed since this exercise was last conducted and the updates we have made to the model as part of this review, as in with the 2020 MCT model, we have conducted some additional cross-checks against more recent data to ensure that the model has not been pushed out of line with reality to a significant extent.
- A2.60 To do this, we have used data gathered as part of the EC's Eurorates modelling. As part of this exercise, most MNOs provided to us a breakdown of the assets they had in operation in their networks, as well as the gross book value, net book value and depreciation costs of their networks. We have compared the numbers of assets dimensioned by the model, and the financial costs of the modelled network, with the data provided by stakeholders.
- A2.61 The numbers of network elements in most categories are within the range of responses provided by stakeholders. In some cases, such as Home Subscriber Servers, the model dimensions slightly more than the highest number in the stakeholder data, while for some others, such as Radio Network Controllers, the model dimensions slightly fewer than the lowest number in the stakeholder data. Given the sizes of ranges of responses provided, and the general result of the model dimensioning numbers of elements within the ranges of responses for most network elements, we are satisfied that the model is dimensioning reasonable amounts of the key network equipment utilised. While there is some difference from the stakeholder range for some specific elements, there is no consistent pattern of over- or under-dimensioning of the network.
- A2.62 A similar result is found for the financial costs of the dimensioned network – for almost all categories of capital costs, the dimensioned network is either within the range of responses provided or is very close to the top or bottom of the range. It does not appear

⁵¹ See Annex 9 of the 2015 MCT Market Review Statement.

that the model is systematically higher or lower than the ranges of responses provided by stakeholders. We are therefore satisfied that the model is producing a reasonably-costed network in comparison to MNO data.

A2.63 As a result of these cross-checks, we do not propose to make any further amendments to the input assumption of the model.

A3. Legal tests

A3.1 In this Annex, we explain, by reference to each of the markets we have identified, how the SMP conditions we have set and the directions we have made meet the applicable legal tests in the Act.

WCT markets

A3.2 In Sections 6 to 8 we set out our decisions to impose on BT, and other telecoms providers, SMP conditions to provide network access and associated remedies, including charge controls, to ensure that our competition concerns are addressed effectively.

A3.3 We have decided to impose on BT the following package of remedies:

- Requirement to provide network access on reasonable request and on fair and reasonable terms, conditions and charges (subject to any charge control);
- Charge controls on WCT and TDM interconnection;
- Requirement not to unduly discriminate;
- Requirement to publish a Reference Offer;
- Requirement to notify changes to charges for TDM interconnection;
- Requirement to publish quality of service information for interconnection;
- Requirement to publish a migration timetable in respect of interconnection;
- Requirement to offer interconnection with its IP network for all landline calls at the regulated termination rate from April 2025 onwards; and
- Requirement to meet financial reporting requirements.

A3.4 We have decided to impose the following remedies on other telecoms providers in the WCT markets in which they operate:

- Requirement to provide network access on reasonable request and on fair and reasonable terms, conditions and charges (subject to any charge control);
- Charge controls on WCT.

A3.5 In order to give regulatory effect to our decisions, we have set the SMP conditions set out in Annex 5.

Section 47 tests

A3.6 When setting SMP obligations, we must demonstrate that the obligations in question are based on the nature of the problem identified, proportionate and justified, taking account of our general duties under section 3 and the requirements under section 4 of the Act. We are satisfied that each SMP condition we are setting in relation to WCT and interconnection meets the tests set out in section 47 of the Act, namely that the obligation is:

- objectively justifiable in relation to the networks, services or facilities to which it relates;

- not such as to discriminate unduly against particular persons or against a particular description of persons;
- proportionate to what the condition or modification is intended to achieve; and
- transparent in relation to what it is intended to achieve.

Objectively justified

- A3.7 We consider that each of the SMP conditions is objectively justifiable. The remedies we have decided upon are designed to address the competition concerns that we have identified in our market analysis (see Sections 5 and 6).
- A3.8 In relation to the **network access obligation and the charge control on BT and other providers**, as explained in Section 6, our market analysis has found that BT and other telecoms providers that terminate calls to geographic numbers:
- could have the ability and incentive to make network access subject to unfair or unreasonable terms or to refuse access to their network. This could place the originating provider at a competitive disadvantage, potentially distorting retail competition;
 - would have the ability and incentive to set prices for WCT at an excessively high level. This would not only increase the margin of the WCT provider, but also alter the incentives of its rivals on the retail side of the market (by reducing their margins and/or leading them to increase retail prices), all of which could distort competition in retail markets and harm consumers.
- A3.9 Therefore, in the absence of a requirement to provide network access and the charge control on WCT, BT and other telecoms providers could refuse or impede access to WCT by offering unfair or unreasonable terms and setting excessively high prices.
- A3.10 We explain in Section 6 why the network access obligations and charge control for WCT that we are imposing are objectively justified in the context of the markets we have reviewed.
- A3.11 In relation to the **no undue discrimination and transparency remedies on BT**, our market analysis has found that as a vertically integrated provider BT has an incentive to provide WCT on terms and conditions that disadvantage downstream rivals or to discriminate selectively between competing providers. Given BT's scale in the provision of WCT, this could have a significant impact on the availability of WCT. We explain in Section 6 why these additional remedies on BT that we are imposing in respect of WCT are objectively justified in the context of the markets we have reviewed.
- A3.12 In relation to the **specific interconnection remedies on BT** our market analysis has found that because of its high share of WCT volume and importance as a partner for other fixed providers, there is scope for BT to leverage its SMP in WCT into interconnection by:
- refusing access to its network or providing access subject to unfair or unreasonable terms or excessive prices;
 - discriminating between telecoms providers in a way that harms competition.

- A3.13 We explain in Section 7 why the package of remedies we are imposing in respect of BT's interconnection, including a network access obligation, a charge control on TDM interconnection, a requirement to provide network access at IP POCs from 1 April 2025, a non-discrimination obligation and transparency measures are required to remedy these harms.
- A3.14 We also explain in Section 7 that BT's plans to migrate its fixed telephone line services to its IP network has the potential to distort competition for telecoms providers, if there is uncertainty about BT's plans or unexpected changes to those plans as they apply to BT's interconnection services and WCT. We explain in Section 7 why **the transparency remedies in respect of BT's migration plans** that we are imposing will provide greater certainty for telecoms providers and are objectively justified.
- A3.15 The **financial reporting requirements on BT** we are imposing form part of the package of remedies to address the competition concerns we have identified in relation to BT's SMP in WCT and associated interconnection services, as explained in Section 8. The accounting separation requirement allows us and stakeholders to monitor the activities of BT to ensure that, where relevant, it does not discriminate unduly in favour of its own downstream business. This, combined with the cost accounting obligation, helps us to ensure that costs are not inappropriately loaded onto one set of regulated services to the benefit of BT.
- A3.16 The cost accounting obligation is necessary to ensure the appropriate maintenance and provision of accounts in order to monitor BT's activities with regard to the pricing remedies we are implementing and monitor their effectiveness at addressing the competition concerns. It is also necessary to secure that information continues to be created and captured so as to secure, and to give stakeholders confidence, that pricing can continue to be appropriately regulated in future, creating the conditions for the price controls we are now imposing to be effective. It also relates to the need to ensure competition develops fairly, to the benefit of consumers, by providing transparency of BT's compliance with rules set to address the risk of exploitative or anti-competitive pricing.

Not such as to discriminate unduly

- A3.17 We consider that each of the conditions are not unduly discriminatory in that the same conditions in relation to the provision of network access and the charge controls on WCT apply to all telecoms providers operating in WCT markets.
- A3.18 We are imposing a different charge control in relation to WCT for international calls compared to that imposed in relation to WCT for domestic calls. We set out the reasons for this in Section 6 and do not consider this to be unduly discriminatory.
- A3.19 We are imposing additional remedies on BT, because, as we explain in Section 6, there are particular features of its market position identified in our market analysis, which distinguish it from other telecoms providers. In particular, we have found that its high share of WCT volumes and importance as a partner for other fixed providers, and in relation to TDM interconnection the scale of its network, give it the incentive and ability to

set terms or prices for WCT and interconnection that discriminate between telecoms providers. Our market analysis is that the impact of discriminatory conduct by BT would have a greater effect on downstream competition than similar conduct undertaken by other number range holders. We are therefore imposing additional remedies on BT to address these particular concerns.

Proportionate

A3.20 We consider that each of the conditions is proportionate to what that condition is intended to achieve. In each case, the conditions: are effective to achieve our aim; are no more onerous than is required to achieve that aim; and do not produce adverse effects which are disproportionate to our aim. We explain in Sections 6 to 8 why we consider each imposed remedy is proportionate in the context of the markets we have reviewed.

Transparent

A3.21 We consider that each of the SMP conditions we are imposing is transparent in relation to what is intended to be achieved. The text of the SMP conditions is published in Annex 5 to this Statement and the operation of those SMP conditions is aided by our explanations in this Statement. This statement sets out our analysis of responses to our August 2020 Consultation and the basis for the decisions we have taken.

Section 49 tests

A3.22 In Section 7 we explain why we have decided to make a Direction to BT under SMP Condition 6 which requires it to publish certain quality of service information in respect of interconnection services it provides in association with WCT. In Section 8, we explain why we have decided to make a Direction to BT under SMP Condition 8, and to apply Directions in respect of regulatory financial reporting set out in the WFTMR 2021 Statement, to BT's WCT and interconnection services.

A3.23 We consider that the Directions we have decided to make satisfy the tests set out in section 49(2) of the Act, namely that in each case the Direction is:

- objectively justifiable in relation to the networks, services or facilities to which it relates;
- not such as to discriminate unduly against particular persons or against a particular description of persons;
- proportionate to what it is intended to achieve; and
- transparent in relation to what it is intended to achieve.

Direction in relation to quality of service information

A3.24 We consider that the direction to require BT to publish information about its performance under specified key performance indicators in relation to the provision of interconnection services meets the tests set out in the Act. As set out in section 7, SMP Condition 6 includes

a power for Ofcom to direct BT about the information it must publish in respect of its quality of service. We have decided to make this Direction pursuant to that power.

A3.25 We consider that the Direction meets the criteria set out in section 49(2) of the Act. In particular, it is:

- Objectively justifiable, in that we consider service provision and fault repair to be critical areas in which to maintain transparency since they are key to monitoring the effectiveness of the network access and no undue discrimination remedies we are imposing on BT. The Direction we are making aims to ensure that there is transparency about the quality of service that BT provides in these areas;
- Not unduly discriminatory, in that the condition under which the Direction is made applies only to BT, for the reasons set out in paragraph A3.19 above.
- Proportionate, in that the Direction is limited to the publication of information about provisioning for TDM interconnection circuits and port capacity and fault repair times for interconnection and so is no more intrusive than necessary to achieve its intended goals.
- Transparent, in that it is clear in its requirements and intention, as explained in this document and the text of the Direction is set out at Annex 5.

Directions in relation to financial reporting

A3.26 As set out in Section 8, the financial reporting requirements that we have imposed in SMP Condition 8 includes powers for Ofcom to make directions in relation to BT's accounting separation and cost accounting obligations. Under these powers, we have decided to apply to BT, where relevant, six Directions, five of which we made in the WFTMR 2021 Statement, in relation to WCT and interconnection.

A3.27 We consider these Directions meet the criteria set out in section 49(2) of the Act for the reasons set out in detail in volume 6 of the WFTMR 2021 Statement.⁵²

A3.28 In addition, in relation to the application of the Preparation, Delivery, Publication, Form and Content of the RFS (Regulatory Financial Statements) Direction (at Annex 5 to this Statement) relating to the WCT market and associated interconnection services, we consider it is:

- objectively justifiable because the information to be provided, both in public and in private, seeks to ensure that stakeholders have sufficient information about the products and services they purchase to provide them with reasonable confidence about BT's compliance with its SMP conditions and that we have sufficient information necessary to carry out our functions. This direction will ensure visibility of financial information for WCT and associated interconnection services;
- not unduly discriminatory in that the condition under which the Direction is made (and the other five Directions detailed in Section 8) applies only to BT, for the reasons set out in paragraph A3.19 above;

⁵² See paragraphs 6.33 – 6.53 of the WFTMR Statement.

- proportionate because the Direction is no more than is required to ensure the effectiveness of our decisions in this market review and to ensure that Ofcom and stakeholders are provided with a sufficient level of information; and
- transparent in that it is clear in its requirements and intention, as explained in Section 8 of this document (and in volume 6 of the WFTMR Statement) and the text of the Direction is set out at Annex 5.

Section 88 tests

- A3.29 We have decided to impose SMP conditions requiring BT and other telecoms providers in relation to the WCT markets in which they operate (including associated interconnection services) to:
- provide network access on reasonable request on fair and reasonable terms, conditions and, where no charge control applies, charges;
 - adhere to charge controls in relation to WCT in respect of domestic and international calls.
- A3.30 The reasoning set out in Section 6 for determining that a charge control on WCT is required also demonstrates how the remedy satisfies the tests in Section 88. The reasoning set out in Section 7 for imposing on BT and other telecoms providers in relation to interconnection the obligation to provide network access on fair and reasonable terms, conditions and charges, demonstrates how the remedy satisfies the tests in Section 88.
- A3.31 We impose a charge control on BT in relation to TDM interconnection services that it provides which are associated with WCT. The reasoning set out in section 7 for setting the charge control also demonstrates how it satisfies the tests set out in section 88 of the Act.

Ofcom's duties

- A3.32 We consider the SMP conditions and Directions described above meet our general duties and the requirements set out in section 3 and section 4 of the Act. As set out in Sections 6, 7 and 8, we consider that the remedies will secure efficient and sustainable competition and thereby further the interests of consumers.

MCT and 070 markets

- A3.33 In Section 6 we set out our decisions to impose on telecoms providers SMP conditions to provide network access, and associated remedies, including charge controls, to ensure our competition concerns in MCT markets are addressed effectively. In Section 10, we set out our decision to impose on telecoms providers an SMP condition imposing a charge control for termination services to 070 numbers.
- A3.34 In summary, in relation to MCT markets, we have decided to impose on telecoms providers the following remedies:

- Requirement to provide network access on reasonable request and on fair and reasonable terms and conditions; and
- Charge controls on MCT.

A3.35 In relation to termination services to 070 numbers, we have decided to impose a charge control which is the same as the charge control for MCT for domestic calls.

A3.36 In order to give regulatory effect to our decisions, we have set the SMP conditions set out in Annex 5.

Section 47 tests

A3.37 For each SMP condition set out in this Statement in relation to MCT and 070 call termination respectively, we are satisfied that the conditions meet the tests set out in section 47 of the Act, namely that the obligation is:

- objectively justifiable in relation to the networks, services or facilities to which it relates;
- not such as to discriminate unduly against particular persons or against a particular description of persons;
- proportionate to what the condition or modification is intended to achieve; and
- transparent in relation to what it is intended to achieve.

Objectively justified

A3.38 We consider that each of the SMP conditions we have set is objectively justifiable. The remedies that we have set are designed to address the competition concerns that we have identified in our market analysis (see Section 5 and 6 in relation to MCT and Section 10 in relation to 070 call termination).

A3.39 In relation to remedies in respect of MCT, as explained in Section 6, our market analysis has found that telecoms providers which terminate calls to mobile numbers:

- could have the ability and incentive to provide access subject to unfair or unreasonable terms or to refuse access to their network. This could place the originating provider at a competitive disadvantage, potentially distorting retail competition;
- would have the ability and incentive to charge excessively high MTRs. High MTRs could distort competition in retail markets and thereby harm consumers.

A3.40 Therefore, in the absence of a requirement to provide network access and the charge control on MCT, telecoms providers could refuse or impede access to MCT by offering unfair or unreasonable terms and setting excessively high prices.

A3.41 In relation to the charge control on termination services to 070 numbers, our market analysis in Section 10 has found that telecoms providers operating in these markets have the ability and incentive to charge excessively high termination rates. In the absence of a charge control, this leads to:

- high retail prices to the detriment of consumers;
- distorted choice between 070 services and other services; and
- incentives for fraudulent practices.

A3.42 We explain in Section 6 why the network access obligations and charge control for MCT and in Section 10 why the charge control for 070 call termination are objectively justified in the context of the markets we have reviewed.

Not such as to discriminate unduly

A3.43 We consider that each of the conditions are not unduly discriminatory in that the same conditions in relation to the provision of network access and the charge controls on MCT apply to all telecoms providers operating in MCT markets.

A3.44 We have decided to impose a different charge control in relation to MCT for international calls compared to that imposed in relation to MCT for domestic calls. We set out the reasons for this in Section 6 and do not consider this to be unduly discriminatory.

A3.45 We have decided to impose the same charge control on all providers of termination services to 070 numbers in respect of all calls and for this reason consider that the proposed SMP condition is not unduly discriminatory.

Proportionate

A3.46 We consider that each of the conditions we have imposed in respect of MCT and 070 termination services respectively are proportionate to what that condition is intended to achieve. In each case, the conditions: are effective to achieve our aim; no more onerous than is required to achieve that aim; and do not produce adverse effects which are disproportionate to our aim. We explain in Sections 6 to 10 why we consider each imposed remedy is proportionate in the context of the markets we have reviewed.

Transparent

A3.47 We consider that each of the SMP conditions we have imposed in respect of MCT and 070 termination services respectively is transparent in relation to what is intended to be achieved. The text of the SMP conditions is published in Annex 5 to this Statement and the operation of those SMP conditions is aided by our explanations in this Statement. This statement sets out our analysis of the responses to the August 2020 Consultation and the basis for the decision we have taken.

Section 88 tests

A3.48 We have decided to impose SMP conditions requiring telecoms providers in relation to the MCT markets in which they operate (including associated interconnection services) to adhere to charge controls in relation to MCT in respect of domestic and international calls.

A3.49 The reasoning set out in Section 6 for determining that a charge control on MCT is required also demonstrates how the remedy satisfies the tests in Section 88.

A3.50 We have decided to impose a charge control on providers of termination services to 070 numbers and set out in Section 10 how we consider this satisfies the tests in Section 88.

Ofcom's duties

A3.51 We consider the SMP conditions in respect of MCT and 070 termination services respectively meet our general duties and the requirements set out in section 3 and section 4 of the Act. As set out in Sections 6 and 10, we consider that the remedies will secure efficient and sustainable competition and further the interests of consumers.

A4. Glossary

Term	Description
Access network	The part of a telecoms provider's network that connects customers' premises to the telecoms provider's Local Access Node, which is the local exchange in the case of BT.
Bill and Keep	An approach to termination pricing where communications providers make no payments to each other for call termination (that is, termination rates are zero).
BT	British Telecommunications plc.
Charge control	A control that limits the price that a telecoms provider can charge for a particular product or service. Most charge controls are imposed for a defined period.
CLI (Calling Line Identity)	Data about the calling party, in particular the telephone number that has initiated the call.
Common costs	Costs that are shared across multiple services supplied by a firm.
Conveyance costs	Costs relating to the transport of calls across or between networks.
Countervailing buyer power	The restraint a buyer is able to place on any attempt by the seller to set its prices above the competitive levels.
CPI (Consumer Price Index)	An official measure of inflation of consumer prices in the UK.
DCCs (Donor Conveyance Charges)	Wholesale charges for the provision of 'onward routing' of calls to mobile numbers that have been ported (i.e. when a consumer has kept their mobile number but has switched mobile provider).
DLE (Digital Local Exchange)	The local exchange switching component in BT's telephone network. Customer lines are connected to remote concentrator units subtended to DLEs.
EC	The European Commission.
EC SMP Guidelines	Guidelines on market analysis and the assessment of significant market power under the EU regulatory framework for electronic communications networks and services (2018/C 159/01).
EECC	European Electronic Communications Code.
End to end connectivity	The facility for users of retail telephone services to call all other telephone users on their provider's network and those on all other providers' networks.

End to End Connectivity Condition	An access condition on BT under sections 73 and 74 of the Communications Act 2003 which requires BT to purchase wholesale call termination services as soon as reasonably practicable and on reasonable terms and conditions, including charges.
End user	The final consumer of a product or service.
Ethernet	A packet-based technology originally developed for use in Local Area Networks (LANs) but now also widely used in telecoms providers' networks for the transmission of data services.
FTR (Fixed Termination Rate)	The wholesale charge levied by fixed telecoms providers for WCT.
Fibre to the Premises (FTTP)	An access network structure in which optical fibre runs from the local exchange to the end users' houses or business premises. The optical fibre may be point-to-point (there is one dedicated fibre connection for each home) or may use a shared infrastructure. Sometimes also referred to as fibre to the home (FTTH).
GC (General Condition)	One of the General Conditions of Entitlement imposed under the Act, which apply to all telecoms providers or all telecoms providers of a particular type.
Hull Area	The area defined as the 'Licensed Area' in the licence granted on 30 November 1987 by the Secretary of State under Section 7 of the Telecommunications Act 1984 to Kingston upon Hull City Council and Kingston Communications (Hull) plc (KCOM).
ISDN (Integrated Services Digital Network)	A digital telephone service that supports telephone and switched data services.
Interconnection	The linking (whether directly or indirectly by physical or logical means) of one network and another, enabling end users of different networks to communicate with one another and to access services provided on a different network.
Interconnect circuits	Communications circuits used to facilitate interconnection.
IP (Internet Protocol)	Packet data protocol used for routing and carriage of messages across the internet and other modern communications networks.
IPEX	BT's IP Exchange IP interconnection service.
ISP (Internet Service Provider)	A company that provides customers with internet access.
Jitter	A measure of variation of delay in transmission over a transmission path.

LLU (Local Loop Unbundling)	A process by which a dominant provider's local loops are physically disconnected from its network and connected to competing providers' networks. This enables operators other than the incumbent to use the local loop to provide services directly to customers.
LRIC (Long-run Incremental Costs)	Only those costs which are caused by the firm's provision of a defined increment or service including fixed costs specific to that increment or service – i.e. those costs that would not be incurred if the firm was structured in such a way as not to provide that service, while still producing all other services and products that are currently produced.
LRIC+	The long-run (average) incremental costs plus a mark-up for the recovery of shared and common costs (often in the form of an equi-proportionate mark-up). LRIC+ should be taken to mean the same as LRAIC+ (a term used by some other NRAs).
Mandated reciprocity	Where mobile termination rates and fixed termination rates are set at the same level.
MCT (Mobile Call Termination)	The wholesale service provided by an MCT provider to allow an originating telecoms provider to connect a caller with the intended mobile call recipient on that MCT provider's network.
MNO (Mobile Network Operator)	A provider which owns a cellular mobile network.
MPF (Metallic Path Facility)	The provision of access to the copper local loop from the customer site to a BT main distribution frame (MDF) that covers the full available frequency range, including both narrowband and broadband channels, allowing a competing provider to provide the customer with both voice and/or data services over such copper local loop.
MTR (Mobile Termination Rate)	The wholesale charge levied by mobile telecoms providers for MCT.
Narrowband access services	A collective term used to refer to WFAEL, ISDN2 and ISDN30 services.
NICC	A technical forum for the UK communications sector that develops interoperability standards for public communications networks and services in the UK. It is an independent organisation owned and run by its members. Ofcom participates in NICC as an observer.
NMR	Narrowband Market Review.
Off-net call	A call that terminates on a network different to the one it originated on; that is, calls between customers of different networks.
On-net call	A call originated and received by customers of the same network.

OTA2 (Office of the Telecommunications Adjudicator)	An organisation independent of Ofcom and the industry, tasked with overseeing cooperation between telecoms providers.
OTT (Over the top)	A service that allows end-users to make and receive voice calls using an internet connection where the service is provided independently of the provision of the internet connection.
POC (Point of Connection)	The point where two telecoms providers' networks are interconnected.
Ppm	Pence per minute.
PSTN (Public Switched Telephone Network)	A telephone network that uses circuit-switching technology to connect telephone calls.
RFS (Regulatory Financial Statements)	The financial statements that BT is required by Ofcom to prepare, have audited and publish.
Reference offer	A document published by a telecoms provider setting out matters such as technical information, the terms and conditions for provisioning, SLAs and SLGs, and availability of other related services such as accommodation.
SIA (Standard Interconnect Agreement)	BT's standard terms and conditions for the provision of TDM interconnection and related services.
SIP (Session Initiation Protocol)	A signalling protocol that is commonly used for call control in IP networks.
SMP (Significant Market Power)	An undertaking will have significant market power if, either individually or jointly with others, it enjoys a position equivalent to dominance, that is to say a position of economic strength affording it the power to behave to an appreciable extent independently of competitors, customers and ultimately consumers.
SS7 (Signalling System No. 7)	A set of telephony signalling protocols used for interconnection between TDM telephone networks.
TDM network	A circuit switched telephone network which uses time division multiplexing (TDM) technology.
IP voice service	A telephone service provided over a modern IP network.
WCO	Wholesale fixed call origination services.
WCT	Wholesale fixed geographic call termination services.
Wholesale Fixed Analogue Exchange Line (WFAEL)	A narrowband access connection between a customer's premises and a local exchange.

WLR (Wholesale Line Rental)	The service offered by BT to other UK telecoms providers to enable them to offer retail line rental services in competition with BT's own retail services.
2007 EC Recommendation	Commission Recommendation 2007/879/EC of 17 December 2007 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 EC Recommendation	Commission Recommendation 2014/710/EU 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.
2020 EC Recommendation`	Commission Recommendation (EU) 2020/2245 of 18 December 2020 on relevant product and service markets within the electronic communications sector susceptible to ex ante regulation in accordance with Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code.

A5. Legal instruments

This annex has been [published separately](#) on the Ofcom website.