making communications work
for everyone

Mobile call termination market review 2018-21

Annexes 1-14

Consultation

Publication date: 27 June 2017

Closing Date for Responses: 5 September 2017

Contents

Annex 1

Responding to this consultation

How to respond

A1.1 Ofcom would like to receive views and comments on the issues raised in this document, **by 5pm on 5 September 2017**.

A1.2 We strongly prefer to receive responses via the online form at https://www.ofcom.org.uk/consultations-and-statements/category-1/mobile-call-termination-market-review. We also provide a cover sheet https://www.ofcom.org.uk/consultations-and-statements/consultation-response-coversheet) for responses sent by email or post; please fill this in, as it helps us to maintain your confidentiality, and speeds up our work. You do not need to do this if you respond using the online form.

A1.3 If your response is a large file, or has supporting charts, tables or other data, please email it to MCT.2018@ofcom.org.uk, cc lucy.reid@ofcom.org.uk, as an attachment in Microsoft Word format, together with the cover sheet (https://www.ofcom.org.uk/consultations-and-statements/consultation-response-coversheet). This email address is for this consultation only, and will not be valid after 5 September 2017.

A1.4 Responses may alternatively be posted to the address below, marked with the title of the consultation.

Lucy Reid
Ofcom
Fourth Floor, 125 Princes Street
Edinburgh EH2 4AD

A1.5 If you would like to submit your response in an alternative format (e.g. video or audio file), please contact Lucy Reid on 0131 220 7317 or email MCT.2018@ofcom.org.uk cc lucy.reid@ofcom.org.uk

A1.6 We do not need a paper copy of your response as well as an electronic version. We will acknowledge receipt if your response is submitted via the online web form, but not otherwise.

A1.7 You do not have to answer all the questions in the consultation if you do not have a view; a short response on just one point is fine. We also welcome joint responses.

A1.8 It would be helpful if your response could include direct answers to the questions asked in the consultation document. The questions are listed at Annex 3. It would also help if you could explain why you hold your views, and what you think the effect of Ofcom's proposals would be.

A1.9 If you want to discuss the issues and questions raised in this consultation, please contact Lucy Reid on 0131 220 7317, or by email MCT.2018@ofcom.org.uk cc lucy.reid@ofcom.org.uk

Confidentiality

A1.10 Consultations are more effective if we publish the responses before the consultation period closes. In particular, this can help people and organisations with limited resources or familiarity with the issues to respond in a more informed way. So, in the interests of transparency and good regulatory practice, and because we believe it is important that everyone who is interested in an issue can see other respondents' views, we usually publish all responses on our website, www.ofcom.org.uk, as soon as we receive them.

A1.11 If you think your response should be kept confidential, please specify which part(s) this applies to, and explain why. Please send any confidential sections as a separate annex. If you want your name, address, other contact details or job title to remain confidential, please provide them only in the cover sheet, so that we don't have to edit your response.

A1.12 If someone asks us to keep part or all of a response confidential, we will treat this request seriously and try to respect it. But sometimes we will need to publish all responses, including those that are marked as confidential, in order to meet legal obligations.

A1.13 Please also note that copyright and all other intellectual property in responses will be assumed to be licensed to Ofcom to use. Ofcom's intellectual property rights are explained further at https://www.ofcom.org.uk/about-ofcom/website/terms-of-use.

Next steps

A1.14 Following this consultation period, Ofcom plans to publish a statement in March 2018.

A1.15 If you wish, you can register to receive mail updates alerting you to new Ofcom publications; for more details please see https://www.ofcom.org.uk/about-ofcom/latest/email-updates

Ofcom's consultation processes

A1.16 Ofcom aims to make responding to a consultation as easy as possible. For more information, please see our consultation principles in Annex 2.

A1.17 If you have any comments or suggestions on how we manage our consultations, please call our consultation helpdesk on 020 7981 3003 or email us at consult@ofcom.org.uk. We particularly welcome ideas on how Ofcom could more effectively seek the views of groups or individuals, such as small businesses and residential consumers, who are less likely to give their opinions through a formal consultation.

A1.18 If you would like to discuss these issues, or Ofcom's consultation processes more generally, please contact Steve Gettings, Ofcom's consultation champion:

Steve Gettings
Ofcom
Riverside House
2a Southwark Bridge Road

London SE1 9HA

Tel: 020 7981 3601
Email: steve.gettings@ofcom.org.uk

Annex 2

Ofcom's consultation principles

Ofcom has seven principles that it follows for every public written consultation:

Before the consultation

A2.1 Wherever possible, we will hold informal talks with people and organisations before announcing a big consultation, to find out whether we are thinking along the right lines. If we do not have enough time to do this, we will hold an open meeting to explain our proposals, shortly after announcing the consultation.

During the consultation

A2.2 We will be clear about whom we are consulting, why, on what questions and for how long.

A2.3 We will make the consultation document as short and simple as possible, with a summary of no more than two pages. We will try to make it as easy as possible for people to give us a written response. If the consultation is complicated, we may provide a short Plain English / Cymraeg Clir guide, to help smaller organisations or individuals who would not otherwise be able to spare the time to share their views.

A2.4 We will consult for up to ten weeks, depending on the potential impact of our proposals.

A2.5 A person within Ofcom will be in charge of making sure we follow our own guidelines and aim to reach the largest possible number of people and organisations who may be interested in the outcome of our decisions. Ofcom's Consultation Champion is the main person to contact if you have views on the way we run our consultations.

A2.6 If we are not able to follow any of these seven principles, we will explain why.

After the consultation

A2.7 We think it is important that everyone who is interested in an issue can see other people's views, so we usually publish all the responses on our website as soon as we receive them. After the consultation we will make our decisions and publish a statement explaining what we are going to do, and why, showing how respondents' views helped to shape these decisions.

Cover sheet for response to an Ofcom consultation

BASIC DETAILS

Consultation title:

To (Ofcom contact):

Name of respondent:

Representing (self or organisation/s):

Address (if not received by email):

CONFIDENTIALITY

Please tick below what part of your response you consider is confidential, giving your reasons why

Nothing ☐

Whole response ☐

Part of the response ☐

Name/contact details/job title ☐

Organisation ☐

If there is no separate annex, which parts?

If you want part of your response, your name or your organisation not to be published, can Ofcom still publish a reference to the contents of your response (including, for any confidential parts, a general summary that does not disclose the specific information or enable you to be identified)?

DECLARATION

I confirm that the correspondence supplied with this cover sheet is a formal consultation response that Ofcom can publish. However, in supplying this response, I understand that Ofcom may need to publish all responses, including those which are marked as confidential, in order to meet legal obligations. If I have sent my response by email, Ofcom can disregard any standard e-mail text about not disclosing email contents and attachments.

Ofcom seeks to publish responses on receipt. If your response is non-confidential (in whole or in part), and you would prefer us to publish your response only once the consultation has ended, please tick here.

Name Signed (if hard copy)

Annex 3

Consultation questions

Question 3.1: Do you agree with our view of the relevant market and assessment of significant market power? If not, please explain why.

Question 4.1: Do you agree with our assessment of the harm that could result from a lack of effective competition in MCT markets?

Question 4.2: Do you agree with our assessment that ex post competition law alone would not be sufficient to address the competition problems we have identified, and that therefore ex ante regulation is required?

Question 4.3: Do you agree with our proposal to impose an obligation to provide network access on reasonable request on all MCT providers with SMP? If not, please explain why.

Question 4.4: Do you agree that our proposal to impose a charge control on all MCT providers with SMP is appropriate? If not, please explain why.

Question 4.5: Do you agree with our proposal that LRIC should continue to be the appropriate cost standard? If not, please explain why.

Question 4.6: Do you agree with our proposal to apply the charge control to all calls, including those originated outside the EEA? If not, please explain why.

Question 4.7: Do you agree with our proposal to remove the non-discrimination obligation on the four largest mobile providers? If not, please explain why.

Question 4.8: Do you agree with our proposal to remove the price transparency obligation on all MCT providers with SMP? If not, please explain why.

Question 5.1: Do you agree with our proposed modelling approach as discussed in Section 5, the supporting annexes and the 2017 MCT model? If not, please discuss the specific proposals that you disagree with.

Question 6.1: Do you agree with our proposed approach to implementing the MCT charge control? If not, please discuss the specific proposals that you disagree with.

Question 6.2: Do you have any other comments on the matters raised in this consultation?

Annex 4

Equality Impact Assessment

Introduction

A4.1 Ofcom is required by statute to assess the potential impact of all our functions, policies, projects and practices on equality.[1] An equality impact assessment (EIA) also assists us in making sure that we are meeting our principal duty of furthering the interests of citizens and consumers regardless of their background or identity.

Assessment

A4.2 We have considered whether our proposed remedies would have an adverse impact on promoting equality. We have looked at whether the remedies would have a different or adverse effect on UK consumers and citizens with respect to the following equality groups: age, disability, sex, gender reassignment, pregnancy and maternity, race, religion or belief and sexual orientation, and, in Northern Ireland, political opinion and persons with dependants. Our assessment is that they would not.

A4.3 We are consulting on the regulation of mobile call termination (MCT) for the period 2018-21. The current regulation is set to expire on 31 March 2018. Our proposals for the regulation of MCT would maintain two of the four remedies we previously imposed in respect of the period 2015 – 2018 (and in respect of which we concluded that our proposals would not have a material negative impact on the relevant equality groups).

A4.4 In particular, we propose a network access obligation on 80 MCT providers and a charge control based on the Long Run Incremental Cost (LRIC) cost standard. Our provisional assessment is that no undue discrimination and transparency obligations are no longer necessary to address risks of distortion to competition.

A4.5 On the basis that our approach in relation to the former two remedies is similar, and that the latter two are no longer necessary, our assessment of equality matters in this review is similar to that in our previous review.

A4.6 That is, requiring all MCT providers to give network access on reasonable request and subject to a charge control cap set at LRIC would be effective in encouraging competition. This would benefit all consumers, including those in equality groups who use a mobile phone to make calls. It would tend to lower prices across the board, as well as increase choice and innovation. Excessive Mobile Termination Rates (MTRs) would decrease economic efficiency, typically at the expense of consumers generally. They can lead to consumer harm including bill shock, reduced call volumes to certain numbers and distortions to competition, each of which affect all consumers.

[1] Ofcom has a general duty under the 2010 Equality Act to have due regard to the need to eliminate discrimination, advance equality of opportunity between those who share a relevant 'protected characteristic' (age, disability, sex, gender reassignment, pregnancy and maternity, race, religion or belief and sexual orientation) and those who do not, and to foster good relations between persons who share a relevant protected characteristic and those who do not."

A4.7 On these bases, our assessment is that our proposals would benefit all consumers, rather than have a material adverse impact on any equality group. Further, we do not propose to carry out separate EIAs in relation to race, gender equality or equality schemes under the Northern Ireland and Disability Equality Schemes. This is because we anticipate that our proposed regulatory intervention would not have a differential impact on people of different genders or ethnicities, consumers with protected characteristics in Northern Ireland or on disabled consumers compared to consumers in general.

Impact of our proposal for calls outside the European Economic Area ('non-EEA calls')

A4.8 Our proposal to continue to set a charge control (based on the LRIC standard) would apply to all calls regardless of origin, including those from outside the European Economic Area (EEA). An important part of our EIA is to consider whether this particular aspect of our proposals could have a disproportionate impact on certain groups of consumers.

A4.9 Some equality groups could be affected by the regulatory treatment of calls from non-EEA countries because a number of smaller MCPs make the focus of their business proposition low-priced international calls to certain countries. Therefore, they may target specific communities in the UK who would be expected to receive above average calls from overseas (including from non-EEA countries).

A4.10 However, part of our proposed justification for applying the charge control to all calls, irrespective of where they originate, is that allowing differential regulation for calls originating outside the EEA could result in a reduction in calls from there to UK consumers (if UK MTRs increase and this is passed through to retail prices).[2] Our proposed approach would ensure that consumers who receive a greater volume of calls from outside the EEA are protected against this risk. These consumers are likely to have a greater propensity to belong to BAME groups.

A4.11 Only if MTRs in non-EEA countries were reduced (in response to the threat of higher MTRs in the UK) might consumers in the UK – including those identifying as BAME – gain. However, for the reasons explained in Annex 11, we consider that lifting the charge control on UK MTRs for non-EEA calls is unlikely to lead to a reduction in MTRs in non-EEA countries.

A4.12 Our provisional assessment is that the proposal for the charge control to apply to MTRs for calls from outside the EAA would not have a material negative impact on the relevant equality groups. Rather, it is more likely to maintain positive consumer outcomes for them.

[2] For further explanation on this, see paragraph A11.55 below

Annex 5

Regulatory Framework

Introduction

A5.1 This annex provides an overview of the market review process to give some additional context and understanding of the matters discussed in this Consultation, including the draft legal instruments published at Annex 7.

A5.2 The overview in this annex 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 proposals on this market.

Market review concept

A5.3 A market review is a process by which, at regular intervals, we identify relevant markets appropriate to national circumstances 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.

A5.4 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.[3] We exercise those functions within the framework harmonised across the European Union for the regulation of electronic communications by the Member States – known as the Common Regulatory Framework (CRF) – as transposed by the Act. The applicable rules[4] are contained in a package of five EC Directives, of which two Directives are particularly relevant for present purposes, namely:

- Directive 2002/21/EC on a common regulatory framework for electronic communications networks and services (the Framework Directive); and
- Directive 2002/19/EC on access to, and interconnection of, electronic communications networks and associated facilities (the Access Directive).

A5.5 The Directives require that National Regulatory Authorities (NRAs) (such as Ofcom) carry out reviews of competition in communications markets to ensure that SMP regulation remains appropriate and proportionate in the light of changing market conditions.

A5.6 Each market review normally involves three analytical stages, namely:

- the identification and definition of the relevant markets (the market definition procedure);

[3] http://www.legislation.gov.uk/ukpga/2003/21/contents.

[4] The Directives were subsequently amended on 19 December 2009. The amendments have been transposed into the national legislation and applied with effect from 26 May 2011 and any references in this document to the Act should be read accordingly.

- the assessment of competition in each market, in particular whether the relevant market is effectively competitive (the market analysis procedure); and

- the assessment of appropriate regulatory obligations (the remedies procedure).

A5.7 These stages are normally carried out together.

Market definition procedure

A5.8 Section 79 of the Act provides that, before making a market power determination[5], 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" and analyse those markets.

A5.9 Article 15 of the Framework Directive requires that NRAs shall, taking the utmost account of the 2014 EC Recommendation[6] and SMP Guidelines[7] published by the EC, define the relevant markets appropriate to national circumstances, in particular relevant geographic markets within their territory, in accordance with the principles of competition law.

A5.10 The 2014 EC Recommendation identifies a set of product and service markets within the electronic communications sector in which *ex ante* regulation may be warranted. Its purpose is twofold. First, it seeks to achieve harmonisation across the single market by ensuring that the same markets will be subject to a market analysis in all Member States. Second, the 2014 EC Recommendation seeks to provide legal certainty by making market players aware in advance of the markets to be analysed.

A5.11 However, NRAs are able to regulate markets that differ from those identified in the 2014 EC Recommendation where this is justified by national circumstances by demonstrating that three cumulative criteria referred to in the 2014 EC Recommendation (the three-criteria test) are satisfied and where the EC does not raise any objections.

A5.12 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 horizon, having regard to the state of infrastructure-based and other competition behind the barriers to entry; and

[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] EC, *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, (2007/879/EC),*
[7] EC, *Commission guidelines on market analysis and the assessment of significant market power under the Community regulatory framework for electronic communications networks and services* (2002/C 165/03), 11 July 2002, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2002:165:0006:0031:EN:PDF.

- competition law alone is insufficient to adequately address the identified market failure(s).

A5.13 The fact that an NRA identifies the product and service markets listed in the 2014 EC Recommendation or identifies other 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 a means of assessing effective competition.

A5.14 The relationship between the market definition(s) identified in this review and in the 2014 EC Recommendation is discussed in Section 3 of this consultation.

A5.15 The SMP Guidelines make clear that 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. As market analysis has to be forward-looking, the SMP Guidelines state that NRAs should determine whether the market is prospectively competitive, and thus whether any lack of effective competition is durable, by taking into account expected or foreseeable market developments over the course of a reasonable period.[8] The SMP Guidelines clarify that NRAs enjoy discretionary powers which reflect the complexity of all the relevant factors that must be assessed (economic, factual and legal) when identifying the relevant market and assessing whether an undertaking has SMP.

A5.16 The SMP Guidelines also describe how competition law methodologies may be used by NRAs in their 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. Ofcom's approach to market definition follows that used by the UK competition authorities, which is in line with the approach adopted by the EC.

A5.17 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 the markets identified *ex ante* are based on an overall forward-looking assessment of the structure and the functioning of 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 1998[9] (relating to the application of the Chapter I or II prohibitions), Article 101 or 102 of the Treaty on the Functioning of the European Union[10] or the Enterprise Act 2002.[11]

Market analysis procedure

Effective competition

A5.18 The Act requires that we carry out market analyses of identified markets for the purpose of making or reviewing market power determinations. Such analyses are

[8] The SMP Guidelines provide that the actual period used should reflect the specific characteristics of the market and the expected timing for the next review of the relevant market by the NRA.
[9] http://www.legislation.gov.uk/ukpga/1998/41/contents
[10] Previously Article 81 and Article 82 of the EC Treaty, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2010:083:FULL:EN:PDF.
[11] http://www.legislation.gov.uk/ukpga/2002/40/contents

normally to be carried out within two years from the adoption of a revised recommendation on markets, where that recommendation identifies a market not previously notified to the EC, or within three years from the publication of a previous market power determination relating to that market. Exceptionally, the three-year period may be extended for up to three additional years where the NRA notifies the EC, and it does not object.

A5.19 In carrying out a market analysis, the key issue for an NRA is to determine whether the market in question is effectively competitive. The 27th recital to the Framework Directive clarifies the meaning of that concept:

> "[it] is essential that *ex ante* regulatory obligations should only be imposed where there is not effective competition, i.e. in markets where there are one or more undertakings with significant market power, and where national and Community competition law remedies are not sufficient to address the problem".

A5.20 The definition of SMP is equivalent to the concept of dominance as defined in competition law. 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, customers, and ultimately consumers. The Framework Directive requires that NRAs must carry out their market analysis taking the utmost account of the SMP Guidelines, which emphasise that NRAs should undertake a thorough and overall analysis of the economic characteristics of the relevant market before coming to a conclusion as to the existence of SMP.

A5.21 In that regard, the SMP Guidelines set out, additionally to market shares, a number of criteria that can be used by NRAs to measure the power of an undertaking to behave to an appreciable extent independently of its competitors, customers and consumers, including:

- the overall size of the undertaking;
- control of infrastructure not easily duplicated;
- technological advantages or superiority;
- absence of or low countervailing buying power;
- easy or privileged access to capital markets/financial resources;
- product/services diversification (e.g. bundled products or services);
- economies of scale;
- economies of scope;
- vertical integration;
- highly developed distribution and sales network;
- absence of potential competition; and

- barriers to expansion.[12]

A5.22 A dominant position can derive from a combination of these criteria, which when taken separately may not necessarily be determinative.

Sufficiency of competition law

A5.23 As part of our overall forward-looking analysis, we also assess whether competition law by itself (without *ex ante* regulation) is sufficient, within the relevant market(s) we have defined, to address the competition problems we have identified. We consider this matter in our assessment of the appropriate remedies which, as explained below, are based on the nature of the specific competition problems we identify within the relevant market(s) as defined. We also note that the SMP Guidelines clarify that, if NRAs designate undertakings as having SMP, they must impose on them one or more regulatory obligations.

A5.24 In considering this matter, we bear in mind the specific characteristics of the relevant market(s) 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.

A5.25 *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 development of competition.

A5.26 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 may also consider that certain obligations are needed as competition law would not remedy the particular market failure(s), or that the specific clarity and detail of regulations is required to achieve a particular result.

Remedies procedure

Powers and legal tests

A5.27 Article 15 of the Framework Directive prescribes what regulatory action NRAs must take depending upon whether or not an identified relevant market has been found effectively competitive. Where a market has been found effectively competitive, NRAs are not allowed to impose SMP obligations and must withdraw such obligations where they already exist. On the other hand, where the market is found not effectively competitive, the NRAs must identify the undertakings with SMP in that market and then impose appropriate obligations.

A5.28 NRAs have a suite of regulatory tools at their disposal, as reflected in the Act and the Access Directive. Specifically, the Access Directive specifies a number of SMP

[12] SMP Guidelines, paragraph 78.

obligations, including transparency, non-discrimination, accounting separation, access to and use of specific network elements and facilities, price control and cost accounting. When imposing a specific obligation, the NRA will need to demonstrate that the obligation in question is based on the nature of the problem(s) identified, proportionate and justified in the light of the policy objectives as set out in Article 8 of the Framework Directive.

A5.29 Specifically, for each and every SMP obligation, we explain why it satisfies the requirement in section 47(2) of the Act that the obligation is:

- objectively justifiable in relation to the networks, services, facilities, apparatus or directories to which it relates;
- not such so 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 is intended to be achieved.

A5.30 Additional legal requirements may also need to be satisfied depending on the SMP obligation in question. For example, in the case of price controls, the NRA's market analysis must indicate that the lack of effective competition means that the CP concerned may sustain prices at an excessively high level or may apply a price squeeze to the detriment of end-users and that the setting of the obligation is appropriate for the purposes of promoting efficiency, promoting sustainable competition and conferring the greatest possible benefits on the end-users of public electronic communications services. In that instance, NRAs must take into account the investment made by the CP and allow it a reasonable rate of return on adequate capital employed, taking into account any risks specific to a particular new investment, as well as ensure that any cost recovery mechanism or pricing methodology that is mandated serves to promote efficiency and sustainable competition and maximise consumer benefits.

A5.31 Where an obligation to provide third parties with network access is considered appropriate, NRAs must take into account factors including the feasibility of the network access, the technical and economic viability of creating networks (including the viability of other network access products, whether provided by the dominant provider or another person) that would make the network access unnecessary, the investment of the network operator who is required to provide access (taking account of any public investment made), and the need to secure effective competition (including, where it appears to us to be appropriate, economically efficient infrastructure-based competition) in the long term.

A5.32 To the extent relevant to this review, we demonstrate the application of these requirements to the SMP obligations in question in the relevant parts of this document. In doing so, we also set our assessment of how, in our opinion, the performance of our general duties under section 3 of the Act would be secured or furthered by our proposed regulatory intervention, and that it would be in accordance with the six Community requirements in section 4 of the Act. This is also relevant to our assessment of the likely impact of implementing our proposals.

Ofcom's general duties – section 3 of the Act

A5.33 Under the Act, our principal duty in carrying out 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.

A5.34 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.

A5.35 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 the MCT market review, we consider that a number of such considerations are relevant, in particular:

- the desirability of promoting competition in relevant markets; and
- the desirability of encouraging investment and innovation in relevant markets.

A5.36 We have also had 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 in the interest of consumers in respect of choice, price, quality of service and value for money.

A5.37 Ofcom has, however, a wide measure of discretion in balancing its statutory duties and objectives. In doing so, we take into account all relevant considerations, including responses received during our consultation process, in reaching our conclusions.

European Community requirements for regulation – sections 4 and 4A of the Act and Article 3 of the BEREC Regulation

A5.38 As noted above, our functions exercised in this review fall under the CRF. As such, section 4 of the Act requires us to act in accordance with the six European Community requirements for regulation. In summary, these are:

- to promote competition in the provision of electronic communications networks and services, associated facilities and the supply of directories;
- to contribute to the development of the European internal market;
- to promote the interests of all persons who are citizens of the EU;
- 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 electronic communications networks, services or associated facilities over another (i.e. to be technologically neutral);
- to encourage, to such extent as Ofcom considers appropriate for certain prescribed purposes, the provision of network access and service interoperability, namely securing efficient and sustainable competition, efficient investment and innovation, and the maximum benefit for customers of CPs; and
- to encourage compliance with certain standards in order to facilitate service interoperability and secure freedom of choice for the customers of CPs.

A5.39 Our provisional view is that no conflict arises in this regard with these specific objectives.

A5.40 Section 4A of the Act requires Ofcom, in carrying out certain of its functions (including, among others, Ofcom's functions in relation to market reviews under the CRF) to take due account of applicable recommendations issued by the EC under Article 19(1) of the Framework Directive. Where we decide not to follow such a recommendation, we must notify the EC of that decision and the reasons for it.

A5.41 Further, Article 3(3) of the Regulation establishing BEREC[13] requires NRAs to take utmost account of any opinion, recommendation, guidelines, advice or regulatory best practice adopted by BEREC.

A5.42 Accordingly, we have taken due account of the applicable EC recommendations and utmost account of the applicable opinions, recommendations, guidelines, advice and regulatory best practices adopted by BEREC relevant to the matters under consideration in this review.

Impact assessment – section 7 of the Act

A5.43 The analysis presented in the whole of this document represents an impact assessment, as defined in section 7 of the Act.

A5.44 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 Ofcom has to 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 Ofcom's activities. However, as a matter of policy, Ofcom is committed to carrying out and publishing impact assessments in relation to the great majority of its policy decisions.[14]

A5.45 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.

A5.46 Ofcom is separately required by statute to assess the potential impact of all our functions, policies, projects and practices on race, disability and gender equality. This assessment is set out in Annex 4.

Regulated entity

A5.47 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

[13] Regulation (EC) No 1211/2009 of the European Parliament and of the Council of 25 November 2009 establishing the Body of European Regulators of Electronic Communications (BEREC) and the Office (the BEREC Regulation) http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:337:0001:0010:EN:PDF.

[14] For further information about Ofcom's approach to impact assessments, see the guidelines, *Better policy-making: Ofcom's approach to impact assessment*, which are on the Ofcom website: http://stakeholders.ofcom.org.uk/binaries/consultations/better-policy-making/Better_Policy_Making.pdf.

communications networks, electronic communications services or associated facilities (i.e. the 'services market').

A5.48 The Framework Directive requires that, where an NRA determines that a relevant market is not effectively competitive, it shall identify 'undertakings' with SMP in that market and impose appropriate specific regulatory obligations. For the purposes of EU competition law, 'undertaking' includes companies within the same corporate group (for example, where a company within that group is not independent in its decision making).[15]

A5.49 We consider it appropriate to prevent a dominant provider to whom an SMP services condition is applied, which is part of a group of companies, exploiting the principle of corporate separation. 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.

A5.50 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 [X plc] subsidiary or holding company, or any subsidiary of that holding company, all as defined in section 1159 of the Companies Act."

[15] *Viho v Commission,* Case C-73/95 P [1996] ECR I-5447, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:61995CJ0073:EN:PDF.

Annex 6

General approach to market definition and SMP

Introduction

A6.1 This annex sets out in general terms the processes that we have followed in defining the markets within this review, how and on what basis we assess whether anyone has SMP in a given market, whether SMP conditions should be imposed in a relevant market, and in what form. Section 3 sets out in more detail how we have applied our analytical approach in each relevant market.

The time period under review

A6.2 Rather than just looking at the current position, market reviews look ahead to how competitive conditions may change in future. Our evaluation of the current market takes into account past developments and evidence, before then considering the foreseeable market changes that we expect to affect its development over the period to April 2021. This forecast period reflects the period covered by this market review.

A6.3 The forward look period that we have used does not preclude us reviewing the market before that point should the market develop in ways we have not foreseen to the extent that it is likely to affect the competitive conditions that are operating.

Approach to market definition

A6.4 The market review procedure requires us to analyse markets in order to determine whether they are effectively competitive. Before an assessment of competitive conditions is possible, it is necessary to define the relevant market.

A6.5 The definition of the relevant market does not simply entail identifying services that resemble each other in some way, but the set of services (and geographical areas) that exercise some competitive constraint on each other. It therefore has two dimensions:

- The relevant products or services to be included within the market; and
- The geographic extent of the market.

A6.6 It is often practical to define the relevant product market before exploring the geographic dimension to the market.

A6.7 The market definition exercise is not an end in itself, but, a means to assessing whether end-users of a product are protected by effective competition and thus whether there is a requirement for the imposition of *ex ante* regulation. It is in this light that we have conducted our market definitions in this review.

2014 EC Recommendation and the three-criteria test

A6.8 As explained in Annex 5, in defining markets for market review purposes, we are required to define relevant markets appropriate to national circumstances in accordance with the principles of competition law, taking the utmost account of the 2014 EC Recommendation[16], the accompanying explanatory note and the EC SMP Guidelines.[17]

A6.9 As explained in Annex 5, the 2014 EC Recommendation identifies a set of product and service markets within the electronic communications sector in which *ex ante* regulation may be warranted. These include the market(s) for wholesale "voice termination on individual networks." NRAs may also identify markets that differ from those in the 2014 EC Recommendation which may be susceptible to *ex ante* regulation having regard to a three-criteria test.

A6.10 The three-criteria test is related to the assessment of SMP and involves the assessment of similar evidence, but is analytically distinct. The three-criteria test focuses on overall market characteristics and structure, for the sole purpose of identifying those markets that are susceptible to *ex ante* regulation. In contrast, assessment of SMP involves determining whether an operator active in a market that has been identified as being susceptible to *ex ante* regulation should be made subject to *ex ante* regulation.[18]

Sequencing of analysis

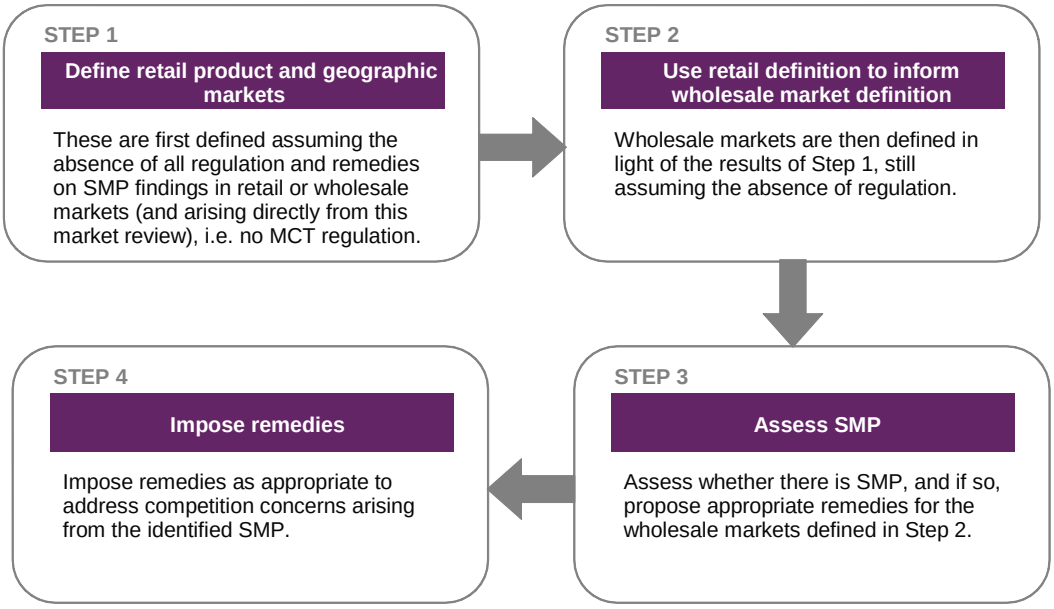
A6.11 We now provide an overview of the stages involved in assessing whether or not it is appropriate to impose *ex ante* regulation. The market review process can be characterised as having four stages.

A6.12 The sequencing of these four stages is set out in Figure A6.1. We begin with consideration of the relevant retail services, both from a product and a geographical point of view, and use this to define the relevant wholesale market. We then assess market power and, where appropriate, propose remedies to address the competition concerns.

A6.13 These steps are explained further in the following sub-sections.

[16] http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2014.295.01.0079.01.ENG
[17] Article 15(3) of the Framework Directive.
[18] See the Commission Explanatory Note accompanying the 2014 EC Recommendation.

Figure A6.1: Sequencing of market definition, SMP and remedies analysis



Market definition

A6.14 Our usual starting point for identifying markets where there may be a requirement for the imposition of *ex ante* regulation is the definition of retail markets from a forward-looking perspective (Step 1). The wholesale market is defined subsequent to this exercise being carried out (Step 2). In relevant cases, we then consider whether the wholesale market is one in which *ex ante* regulation may be appropriate (if so, we have formally identified the relevant market).[19]

A6.15 The analysis of retail market definition is logically prior to the definition of wholesale markets because the demand for the upstream wholesale service is a derived demand – i.e. the level of the demand for the upstream input depends on the demand for the retail service.

A6.16 Hence the range of available substitutes at the downstream (retail) level will inform the likely range of substitutes for the upstream (wholesale) service. This is because a rise in the price of a wholesale service which is passed through in the price of downstream retail services will cause retail customers to switch to substitute retail products, reducing demand for the wholesale input. We refer to this as an indirect constraint. Such indirect constraints might lead to products being included in the same relevant market even if those products do not constrain each other directly at the wholesale level.

A6.17 Consequently, the analysis of the retail and wholesale levels of the supply-chain should be regarded as one exercise, the ultimate purpose of which is to define those wholesale markets in the UK where there may be a requirement for the imposition of *ex ante* regulation.[20]

[19] See recital 5 and point 2 of the 2014 EC Recommendation.
[20] See, in this respect, recital 7 of the 2014 EC Recommendation which states that "*the starting point for the identification of wholesale markets susceptible to ex ante regulation is the analysis of corresponding retail markets*." See also section 2.1 of the Explanatory Note to the 2014 EC Recommendation and paragraph of the SMP Guidelines.

Demand-side and supply-side substitution

A6.18 Market boundaries are determined by identifying the constraints on price setting behaviour of firms. There are two main constraints to consider: [21]

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

A6.19 The hypothetical monopolist test (HMT) is a useful tool often used to identify close demand-side and supply-side substitutes.[22] 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.

A6.20 We must first therefore address the issue of which product(s) should form the starting point for the application of the HMT. We refer to this starting point as the 'focal product'[23], and typically starts from the narrowest potential market definition.[24]

A6.21 We define markets first on the demand-side, considering if other services could be considered as substitutes by consumers in the event of the hypothetical monopolist supplier introducing a SSNIP above the competitive level.

A6.22 Then, where relevant, we assess supply-side substitution possibilities to consider whether they provide any additional constraints on the pricing behaviour of the hypothetical monopolist which have not been captured by the demand-side analysis. 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.

A6.23 Therefore, in identifying potential supply-side substitutes, it is important that providers of these services have not already been taken into consideration. There might be suppliers who provide other services but who might also be materially present in the provision of demand-side substitutes to the service for which the

[21] See paragraph 38 of the SMP Guidelines, which also notes that potential competition also acts as a third source of competitive constraint on an operator's behaviour, but is taken into account in the SMP assessment.
[22] See paragraph 40 of the SMP Guidelines.
[23] This reflects the terminology used by the OFT (OFT, *Market definition*, December 2004, OFT403, www.oft.gov.uk/shared_oft/business_leaflets/ca98_guidelines/oft403.pdf).
[24] 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'.

hypothetical monopolist has raised its price. Such suppliers are not relevant to supply-side substitution since they supply services already identified as demand-side substitutes, and so cannot provide an additional competitive constraint on the hypothetical monopolist. However, the impact of expansion by such suppliers can be taken into account in the assessment of market power.

Relevance of existing regulation – the modified Greenfield approach

A6.24 When we conduct our analysis we use the modified Greenfield approach.[25] This requires us to assess whether markets are effectively competitive from a forward-looking perspective in the absence of any SMP regulation. To do otherwise would be circular.

A6.25 However, it remains appropriate to take into account *ex ante* regulation arising from SMP findings in markets either upstream from, or horizontally related to, the services of interest.

Bundling

A6.26 A common feature of the telecoms sector is the supply of bundles of different services. However, the Explanatory Note to the 2014 EC Recommendation explains that the fact that bundling is a trend observed at the retail level does not require the definition of retail market(s) for bundles. This is because evidence to date has not indicated that there is a need for *ex ante* regulation of bundles, which may contain a previously regulated input.[26]

A6.27 The Explanatory Note goes on to explain that what matters in this regard is that:

> "NRAs are able to ensure that the vertically integrated SMP operator's regulated elements of the bundle can be effectively replicated (in terms of both technical and economic replicability) at the retail level, without an implicit extension of regulation to other components which are available under competitive conditions".

Aggregating markets

A6.28 In certain circumstances, it may also be appropriate to define a product or geographic market by grouping together services despite the absence of demand- and supply-side substitutability, on the basis of homogeneity of competitive conditions and/or a common pricing constraint.

Homogeneity of competitive conditions

A6.29 Aggregating markets on the basis of the homogeneity of competitive conditions can help streamline the subsequent market power analysis by reducing the need to review multiple markets for products.

A6.30 However, combining products and services based on homogenous competitive conditions is only appropriate where this would not substantively alter any subsequent findings of SMP (relative to defining those markets separately).

[25] See also section 2.5 of the Explanatory Note to the 2014 EC Recommendation.
[26] See section 3.2 of the Explanatory Note to the 2014 EC Recommendation.

A6.31 Our approach also takes into account the SMP Guidelines. In particular, in the context of geographic market analysis, the SMP Guidelines state that:

> 6.31.1 "*According to established case-law, the relevant geographic market comprises an area in which the undertakings concerned are involved in the supply and demand of the relevant products or services, in which area the conditions of competition are similar or sufficiently homogeneous and which can be distinguished from neighbouring areas in which the prevailing conditions of competition are appreciably different…*"[27]

A6.32 Hence, subject to the relevant caveats above, where there are products (or geographic areas) where competitive conditions are sufficiently homogeneous, the definition of the relevant market will include all of those products (or geographic areas) within one market.

Common pricing constraints

A6.33 Another factor that is sometimes considered in setting market boundaries is whether there exist common pricing constraints across customers, services or geographic areas (i.e. areas in which a firm voluntarily offers its services at a geographically uniform price). Where common pricing constraints exist, the products or geographic areas in which they apply could be included within the same relevant market even if demand-side and supply-side substitutes are not present. Failure to consider the existence of a common pricing constraint could lead to unduly narrow markets being defined.

Geographic market

A6.34 In addition to the product(s) to be included within a market, market definition also requires us to specify the geographic extent of the market within which conditions of competition are sufficiently similar.

A6.35 One approach would be to begin with a narrowly-defined area and then consider whether a price increase by a hypothetical monopolist in that narrowly defined area would encourage customers to switch to suppliers located outside the area (demand-side substitution) or providers outside the area to begin to offer services in the area (supply-side substitution). If demand and/or supply side substitution is sufficient to constrain prices then it is appropriate to expand the geographic market boundary.

A6.36 We recognise that in certain communications (product) markets in the UK, there could be different competitive pressures in different geographic areas. In this case, we therefore have to consider whether it would be appropriate to identify separate geographic markets for some services. Defining separate markets by geographic area may be problematic because, due to the dynamic nature of communications markets, the boundary between areas where there are different competitive pressures may be unstable and change over time, rendering the market definition obsolete.

A6.37 An alternative approach is to define geographic markets in a broader sense. This involves defining a single geographic market but recognising that this single market has local geographical characteristics. That is to say, recognising that within the single market there are geographic areas where competition is more developed

[27] See paragraph 56 of the SMP Guidelines.

than in other geographic areas. This avoids the difficulties of defining large numbers of markets and instability in the definition over time. Such an approach may also include the aggregation of markets as discussed above.

Market power assessment

A6.38 Having identified the relevant product and geographic market(s) and, where relevant having identified the market as susceptible to *ex ante* regulation, we go on to analyse each market in order to assess whether any person or persons have SMP as defined in section 78 of the Act (construed in accordance with Article 14 of the Framework Directive). Section 78 of the Act provides that SMP is defined as being equivalent to the competition law concept of dominance in accordance with Article 14(2) of the Framework Directive which provides:

> "*An undertaking shall be deemed to have significant market power if, either individually or jointly with others, it enjoys a position equivalent to dominance, that is to say a position of economic strength affording it the power to behave to an appreciable extent independently of competitors, customers and ultimately consumers*."

A6.39 Further, Article 14(3) of the Framework Directive states that:

> "*Where an undertaking has significant market power on a specific market, it may also be deemed to have significant market power on a closely related market, where the links between the two markets are such as to allow the market power held in one market to be leveraged into the other market, thereby strengthening the market power of the undertaking*."

A6.40 Therefore, in the relevant market, one or more undertakings may be designated as having SMP where that undertaking or undertakings enjoy a position of dominance. Also, an undertaking may be designated as having SMP where it could lever its market power from a closely related market into the relevant market, thereby strengthening its market power in the relevant market.

A6.41 In assessing whether an undertaking has SMP, we take due account of the SMP Guidelines as we are required to do under section 79 of the Act.

The criteria for assessing SMP

A6.42 The SMP Guidelines require NRAs to assess whether competition in a market is effective. This assessment is undertaken through a forward looking evaluation of the market (i.e. determining whether the market is prospectively competitive), taking into account foreseeable developments and a number of relevant criteria.[28]

A6.43 Our assessments of SMP are concerned with the prospects for competition over the review period of three years. Ultimately, we want to understand how the markets are likely to develop, and whether competition is likely to be, or become, effective during this review period. Below we set out certain key factors that we are likely to consider when assessing SMP.[29] A dominant position can derive from a

[28] See, for example, paragraphs 19 and 20, and the opening words of paragraph 75, of the SMP Guidelines.

[29] The factors listed in this annex are not intended to be exhaustive and other evidence may be relevant. Paragraph 78 of the SMP Guidelines lists the following criteria that could be used to assess

combination of these criteria, which when taken separately may not necessarily be determinative. An SMP analysis may also take into account the extent to which products or services within the market are differentiated. The constraint from products or services outside the relevant market may also be a relevant factor.

A6.44 Where a market is found to be competitive then no SMP conditions can be imposed. Section 84(4) of the Act requires that any SMP condition in that market, applying to a person by reference to a market power determination made of the basis of an earlier analysis, must be revoked.

Market shares

A6.45 In the SMP Guidelines, the EC discusses market shares as being an indicator of (although not sufficient alone to establish) market power:

> *"…Market shares are often used as a proxy for market power. Although a high market share alone is not sufficient to establish the possession of significant market power (dominance), it is unlikely that a firm without a significant share of the relevant market would be in a dominant position. Thus, undertakings with market shares of no more than 25% are not likely to enjoy a (single) dominant position on the market concerned. In the Commission's decision making practice, single dominance concerns normally arise in the case of undertakings with market shares of over 40%, although the Commission may in some cases have concerns about dominance even with lower market shares, as dominance may occur without the existence of a large market share. According to established case-law, very large market shares — in excess of 50% — are in themselves, save in exceptional circumstances, evidence of the existence of a dominant position…"*[30]

A6.46 Market shares and market share trends provide an indication of how competitive a market has been in the past. If a firm has persistently high market share, then that in itself gives rise to a presumption of SMP. However, changes in market share are also relevant to our assessment of prospects for competition. For example, a market share trend which shows decline may suggest that competition will provide an effective constraint within the time period over which the SMP assessment is being conducted, although it does not preclude the finding of SMP.[31]

Barriers to entry and expansion

A6.47 Entry barriers are important in the assessment of potential competition.[32] The lower entry barriers are, the more likely it is that potential competition will prevent undertakings already within a market from profitably sustaining prices above competitive levels. Moreover, the competitive constraint imposed by potential entrants is not simply about introducing a new product to the market. To be an effective competitive constraint, a new entrant must be able to attain a large enough scale to have a competitive impact on undertakings already in the market. This may

market power: overall size of the undertaking; control of infrastructure not easily duplicated; technological advantages or superiority; absence of, or low, countervailing buying power; easy or privileged access to capital markets/financial resources; product/services diversification (e.g. bundled products or services); economies of scale; economies of scope; vertical integration; a highly developed distribution and sales network; absence of potential competition; and barriers to expansion.

[30] Paragraph 75 of the SMP Guidelines.

[31] Ibid.

[32] Paragraph 80 of the SMP Guidelines.

entail entry on a small scale, followed by growth. Accordingly, whether there are barriers to expansion is also relevant to an SMP assessment. Many of the factors that may make entry harder might also make it harder for undertakings that have recently entered the market to expand their market shares and hence their competitive impact.

A6.48 A related factor is the growth in demand in the market. In general, providers are more willing to invest in a growing market (and less willing to invest in a declining market). As a result, barriers to entry and expansion tend to be less of an impediment to competition in rapidly growing markets.

Countervailing buyer power (CBP)

A6.49 A concentrated market need not lead to harmful outcomes if buyers have sufficient CBP to curtail the exercise of market power. In general, purchasers may have a degree of buyer power where they purchase large volumes and can make a credible threat to switch supplier or to meet their requirements through self-supply to a significant degree. It is important to note, however, that the volumes involved must be large enough to make a material difference to the profitability of the current supplier. That is, an individual wholesale customer must represent a significant proportion of the total volume supplied by the relevant provider.

Excessive pricing and profitability

A6.50 In a competitive market, individual firms should not be able to persistently raise prices above costs and sustain excess profits. As costs fall, prices should be expected to fall too if competition is effective.

A6.51 The ability, therefore, to price at a level that keeps profits persistently and significantly above the competitive level is an important indicator of market power. The SMP Guidelines refer to the importance, when assessing market power on an *ex ante* basis, of considering the power of undertakings to raise prices without incurring a significant loss of sales or revenue.[33] Factors that may explain excess profits in the short term, such as greater innovation and efficiency, or unexpected changes in demand, should however be considered in interpreting high profit figures.

A6.52 However, consistently low profits, i.e. profits at or below the cost of capital, cannot be taken as evidence of an absence of market power. It may simply be evidence of inefficiency or other factors such as predatory pricing. For example, if a firm with SMP were to have inefficiently high costs, it may charge a price above the level we would expect to see in a competitive market but this would not result in high profits. In addition, price regulation exists in many of the wholesale markets considered, and therefore low profits may simply be the result of regulation rather than a reflection of the underlying competitive conditions.

[33] Paragraph 73 of the SMP Guidelines.

Annex 7

Proposed SMP Conditions

Draft legal instrument

PART I – NOTIFICATION OF PROPOSALS UNDER SECTION 48A(3) AND 80A(3) OF THE COMMUNICATIONS ACT 2003

Proposals for identifying markets, making market power determinations and setting SMP services conditions in relation to each of the persons named in Schedule 1 to this Notification under section 45 of the Communications Act 2003

Background

A7.1 On 17 March 2015, Ofcom published a statement concerning the provision of wholesale mobile voice call termination (the "**2015 MCT Statement**")[34] which identified the relevant markets, made market power determinations and imposed certain significant market power ("**SMP**") conditions. These SMP conditions included a charge control, which expires on 31 March 2018.

A7.2 Together with this notification, Ofcom is today publishing a consultation document entitled *Mobile call termination 2018-21* setting out Ofcom's proposals to identify markets, make market power determinations and set SMP conditions for the period from 1 April 2018 to 31 March 2021.

Proposals for service market identifications and market power determinations

A7.3 Ofcom is proposing to identify 80 separate markets as described below for the purpose of making a market power determination.

A7.4 The markets that Ofcom is proposing to identify are the markets for call termination services that are provided by each of those 80 persons named in Schedule 1 to this notification to another communications provider, for the termination of voice calls to UK mobile numbers[35] allocated to that person by Ofcom in the area served by that person and for which that person is able to set the call termination charge (each a "**relevant market**").

A7.5 Ofcom is proposing to make a market power determination that each of the persons set out in Schedule 1 to this notification has significant market power in relation to the relevant market in which that provider operates. As specified in Schedule 1, for each of the persons identified in that Schedule, the SMP designation holds with respect to the registered company identified and any of its subsidiaries or holding

[34] The 2015 MCT Statement is available here: https://www.ofcom.org.uk/consultations-and-statements/category-1/mobile-call-termination-14.

[35] For the purpose of this review, we define UK mobile numbers as those numbers in the format 07xxx xxx xxx and beginning 071 to 075 and 077 to 079. [36] The relevant markets we propose include any mobile provider which has requested transfers of relevant UK mobile numbers and offers (or plans to offer) MCT.

companies, or any subsidiary of such holding companies, all as defined by section 1159 of the Companies Act 2006, in so far as they operate on the relevant market.

A7.6 The effect of, and Ofcom's reasons for making, the proposals for identifying the markets and making the market power determinations referred to above are set out in the consultation document accompanying this notification.

Proposals to set and revoke SMP service conditions

A7.7 Ofcom is proposing to set SMP conditions **M1** and **M2** as set out in Schedule 2 to this notification on each person listed in Schedule 1.

A7.8 Ofcom is proposing that those SMP conditions shall apply, in the case of each person on whom they are set, in respect of the relevant market on which that person operates.

A7.9 Unless otherwise stated in Schedule 1 to this notification, the SMP conditions that Ofcom is proposing shall take effect from the date of the notification under sections 48(1) and 79(4) of the Communications Act 2003 (the "**Act**") adopting the proposals set out in this notification and shall have effect until the publication of a notification under section 48(1) of the Act revoking such conditions.

A7.10 Ofcom is proposing to revoke the SMP conditions set out at Annex 1 to the 2015 MCT Statement with effect from the date of publication of any subsequent notification under section 48(1) of the Act adopting these proposals to revoke those conditions. Ofcom proposes that section 16 of the Interpretation Act 1978 shall apply as if this proposed revocation were a repeal of an enactment by an Act of Parliament.

A7.11 The effect of, and Ofcom's reasons for making, the proposals referred to above are contained in the consultation document accompanying this notification.

Ofcom's duties and legal tests

A7.12 In identifying and analysing the markets referred to in this notification, and in considering whether to make the corresponding proposals set out in this notification, Ofcom has, in accordance with section 79 of the Act, taken due account of all applicable guidelines and recommendations which have been issued or made by the European Commission in pursuance of the provisions of a European Union instrument, and which relate to market identification and analysis or the determination of what constitutes SMP.

A7.13 Ofcom considers that the proposed SMP conditions set out in Schedule 2 comply with the requirements of sections 45 to 47, 87 and 88 of the Act, as appropriate and relevant to each such SMP condition, and further that the proposed revocation of the SMP conditions set out in the 2015 MCT Statement referred to above comply with the requirements of sections 45 to 47, 87 and 88 of the Act, as appropriate and relevant to them.

A7.14 In making all of the proposals referred to in this notification, Ofcom has also considered and acted in accordance with its general duties set out in section 3 of the Act and the six Community requirements set out in section 4 of the Act. In accordance with section 4A of the Act, Ofcom has also taken due account of all applicable recommendations issued by the European Commission under Article 19(1) of the Framework Directive. In doing so, pursuant to Article 3(3) of Regulation

(EC) No. 1211/2009, Ofcom has also taken utmost account of any relevant opinion, recommendation, guidance advice or regulatory practice adopted by BEREC.

Making representations

A7.15 Representations may be made to Ofcom about any of the proposals set out in this notification and the accompanying consultation document by no later than [5] September 2017.

Notification of the Secretary of State

A7.16 Copies of this notification and the accompanying explanatory statement have been sent to the Secretary of State in accordance with sections 48C(1) and 81(1) of the Act.

Interpretation

A7.17 For the purpose of interpreting this notification-

a) except in so far as the context otherwise requires or as otherwise defined in this notification, words or expressions used shall have the same meaning as it has in the Act;

b) headings and titles shall be disregarded;

c) expressions cognate with those referred to in this notification shall be construed accordingly; and

d) the Interpretation Act 1978 (c. 30) shall apply as if this notification were an Act of Parliament.

A7.18 The Schedules to this Notification shall form part of this Notification.

Signed

Brian Potterill
Competition Policy Director

A person authorised by OFCOM under paragraph 18 of the Schedule to the Office of Communications Act 2002

[27] June 2017

SCHEDULE 1

For each of the persons identified below, the SMP designation holds with respect to the registered company identified and any of its subsidiaries or holding companies, or any subsidiary of such holding companies, all as defined by section 1159 of the Companies Act 2006, in so far as they operate in the relevant market.

1. **(AQ) Ltd,** whose registered company number is 03663860 and registered address is 13-15 Hunslet Road, Leeds, West Yorkshire, LS10 1JQ, United Kingdom.

2. **08Direct Ltd,** whose registered company number is 06428331 and registered address is Mazhar House, 48 Bradford Road, Stanningley, Leeds, West Yorkshire, LS28 6DD, United Kingdom.

3. **09 Mobile Ltd**, whose registered address is Hamraborg 10, 200 Kopavogur, Iceland.

4. **24 Seven Communications Ltd,** whose registered company number is 4468566 and registered address is c/o Novis & Co Chartered Accountants, 1 Victoria Court Bank Square, Morley, Leeds, West Yorkshire, LS27 9SE, United Kingdom.

5. **Ace Call Ltd**, whose registered company number is 6729339 and registered address is 11 Hatton Garden, Liverpool, Merseyside, L3 2HA, United Kingdom.

6. **Airwave Solutions Ltd,** whose registered company number is 3985643 and registered address is Jays Close, Viables Industrial Estate, Basingstoke, Hampshire, RG22 4PD, United Kingdom.

7. **Alliance Technologies LLC,** whose registered entity number is 1616678 and registered address is 1932 Service Corp., 1301 East Ninth Street Suite, 3500 Cleveland, OH 44114, USA.

8. **AMS UK Ltd**, whose registered company number is 08746458 and registered address is Highfield House, Headless Cross Drive, Redditch, Worcestershire, B97 5EQ, United Kingdom.

9. **Andrews & Arnold Ltd,** whose registered company number is 3342760 and registered address is Enterprise Court, Downmill Road, Bracknell, Berkshire, RG12 1QS, United Kingdom

10. **AQL Wholesale Ltd**, whose registered company number is 5134355 and registered address is 11-15 Hunslet Road, Leeds, LS10 1JQ, United Kingdom.

11. **Bellingham Telecommunications Ltd,** whose registered company number is 7038166 and registered address is Unit 7, 2 Exchange Court, London, WC2R 0PP, United Kingdom.

12. **BT OnePhone Ltd,** whose registered company number is 08043734 and registered address is 81 Newgate Street, London, EC1A 7AJ, United Kingdom.

13. **British Telecommunications Plc,** whose registered company number is 1800000 and registered address is 81 Newgate Street, London, EC1A 7AJ, United Kingdom.

14. **CFL Communications Ltd,** whose registered company number is 4419749 and registered address is Abbey House, 25 Clarendon Road, Redhill, Surrey, RH1 1QZ, United Kingdom.

15. **Citrus Telecommunications Ltd,** whose registered company number is 3517870 and registered address is Second Floor, 99 Holdenhurst Road, Bournemouth, Dorset, BH8 8DY, United Kingdom.

16. **Cloud9 Communications Ltd,** whose registered company number is 7153956 and registered address is Grove House, Lutyens Close, Chineham Court, Basingstoke, Hampshire, RG24 8AG, United Kingdom.

17. **Cloud9 Mobile Communications Ltd**, whose registered company number is 5474679 and registered address is Grove House, Lutyens Close, Chineham Court, Basingstoke, Hampshire, RG24 8AG, United Kingdom.

18. **Compatel Ltd,** whose registered company number is 7456831 and registered address is 26-28 Bedford Row, London, WC1R 4HE, United Kingdom.

19. **Confabulate Ltd,** whose registered company number is 5605939 and registered address is 9 Market Row, Saffron Walden, Essex, CB10 1HB, United Kingdom.

20. **Core Communication Services Ltd,** whose registered company number is 5467282 and registered address is 11 York Road, London, SE1 7NX, United Kingdom.

21. **Core Telecom Ltd,** whose registered company number is 5332008 and registered address is Mazhar House, 48 Bradford Road, Stanningley, Leeds, West Yorkshire, LS28 6DD, United Kingdom.

22. **Dynamic Mobile Billing Ltd,** whose registered company number is 3383285 and registered address is 12th Floor Lyndon House, 58-62 Hagley Road, Birmingham, B16 8PE, United Kingdom.

23. **Edge Telecom Ltd,** whose registered company number is 3101247 and registered address is Global House, 2 Crofton Close, Lincoln, LN3 4NT, United Kingdom.

24. **EE Ltd,** whose registered company number is 02382161 and registered address is Trident Place, Mosquito Way, Hatfield, Hertfordshire, AL10 9BW, United Kingdom.

25. **Euro Thai Exchange Process Company Ltd,** whose registered company number is 10254601272 and registered address is 102/55 Floor.11, #1101 JC Tower, Soi Thonglor 25, Sukhumvit 55, Klongton NUA, Wattana, Bangkok 10110, Thailand.

26. **Flextel Ltd,** whose registered company number is 2772380 and registered address is Griffins Court, 24-32 London Road, Newbury, Berkshire, RG14 1JX, United Kingdom.

27. **Gamma Telecom Holdings Ltd**, whose registered company number is 4287779 and registered address is 5 Fleet Place, London, EC4M 7RD, United Kingdom.

28. **Global Reach Networks Ltd**, whose registered company number is 4349826 and registered address is First Floor, Telecom House, 125-135 Preston Road, Brighton, BN1 6AF, United Kingdom.

29. **Globecom International Ltd,** whose registered company number is 08825524 and registered address is 20-22 Wenlock Road, London, N1 7GU.

30. **Globetouch AB**, whose registered organisation number is 5569992-0902 and registered address is Engelbrektsgatan 9-11, 114 32 Stockholm, Sweden.

31. **Guernsey Airtel Ltd,** whose registered company number is 45232 and registered address is 45 High Street, St Peter Port, Guernsey, GY1 2JT.

32. **Hanhaa Ltd,** whose registered company number is 9097664 and registered address is Rainmaking Loft, International House, 1 St. Katharine's Way, London, E1W 1UN, United Kingdom.

33. **Hay Systems Ltd,** whose registered company number is SC201362 and registered address is c/o Grant Thornton UK LLP, 7 Exchange Crescent, Conference Square, Edinburgh, EH3 7AN, United Kingdom.

34. **Hutchison 3G UK Ltd,** whose registered company number is 03885486 and registered address is Star House, 20 Grenfell Road, Maidenhead, Berkshire, SL6 1EH, United Kingdom.

35. **Invomo Ltd,** whose registered company number is 6267056 and registered address is Global House, 2 Crofton Close, Lincoln, Lincolnshire, LN3 4NT, United Kingdom.

36. **IPV6 Ltd,** whose registered company number is 6711525 and registered address is Berrycentre, Chiltern Drive, Surbiton, Surrey, KT5 8LS, United Kingdom.

37. **Jersey Airtel Ltd**, whose registered company number is 92186 and registered address is First Floor, Le Masurier House, La Rue Le Masurier, St Helier, Jersey, JE2 4YE.

38. **JT (Guernsey) Ltd**, whose registered company number is 39971 and registered address is PO Box 296, Sarnia House, Le Truchot, St Peter Port, Guernsey, GY1 4NA.

39. **JT (Jersey) Ltd**, whose registered company number is 83487 and registered address is No 1 The Forum, Grenville Street, St Helier, Jersey, JE4 8PB.

40. **LegendTel LLC,** whose DOS ID number is 3472935 and registered address is 45 John Street, Suite 711, New York, 10038, USA.

41. **Lycamobile UK Ltd,** whose registered company number is 5903820 and registered address is 3rd Floor Walbrook Building, 195 Marsh Wall, London, E14 9SG, United Kingdom.

42. **Magrathea Telecommunications Ltd,** whose registered company number is 4260485 and registered address is Unit 5, Commerce Park, Brunel Road, Theale, Reading, RG7 4AB, United Kingdom.

43. **Manx Telecom Trading Ltd**, whose registered company number is 005629V and registered address is Isle of Man Business Park, Cooil Road, Braddan, IM99 1HX, Isle of Man.

44. **Marathon Telecom Ltd**, whose registered company number is 93007 and registered address is 28 Halkett Place, St Helier, Jersey, JE2 4WG.

45. **Mars Communications Ltd,** whose registered company number is 6478834 and registered address is Forest House, Forest Road, Ilford, Essex, IG6 3HJ, United Kingdom.

46. **Mobile FX Services Ltd**, whose registered company number is 6028074 and registered address is 49 Greek Street, London, W1D 4EG, United Kingdom.

47. **Mobiweb Telecom Ltd**, whose registered company number is 8851141 and registered address is Third Floor, 207 Regent Street, London, W1B 3HH, United Kingdom.

48. **Nationwide Telephone Assistance Ltd,** whose registered company number is 4315226 and registered address is Ivy Lodge Farm, 179 Shepherds Hill, Harold Wood, Romford, Essex, RM3 0NR, United Kingdom.

49. **Nodemax Ltd,** whose registered company number is 6127089 and registered address is 75 Springfield Road, Chelmsford, Essex, CM2 6JB, United Kingdom.

50. **Premium Routing GmbH,** whose registered company number is CHE-113.847.561 and registered address is Steinackerstrasse 2, CH-8302, Kloten, Switzerland.

51. **QX Telecom Ltd,** whose registered company number is 3820728 and registered address is 2 Glenmore Close, Thatcham, Berkshire, RG19 3XR, United Kingdom.

52. **Resilient Networks Plc,** whose registered company number is 1403177 and registered address is 25/27 Shaftesbury Avenue, London, W1D 7EQ, United Kingdom.

53. **Simwood eSMS Ltd,** whose registered company number is 3379831 and registered address is c/o HW Chartered Accountants, Keepers Lane, The Wergs, Wolverhampton, WV6 8UA, United Kingdom.

54. **Secretary of State for the Foreign and Commonwealth Office in respect of the National Cyber Security Centre**, whose address is Hubble Road, Cheltenham, GL52 0EX, United Kingdom.

55. **Secretary of State for the Home Office**, whose address is 6th Floor, Fry Building, 2 Marsham Street, London, SW1P 4DF, United Kingdom.

56. **Sky UK Ltd,** whose registered company number is 29606991 and registered address is Grant Way, Isleworth, Middlesex, TW7 5QD, United Kingdom.

57. **Sound Advertising Ltd,** whose registered company number is 3218628 and registered address is Aston House, Cornwall Avenue, London, N3 1LF, United Kingdom.

58. **Sure (Guernsey) Ltd**, whose registered company number is 38694 and registered address is Centenary House, La Vrangue, St Peter Port, Guernsey, GY1 2EY

59. **Sure (Isle of Man) Ltd**, whose registered company number is 004621V and registered address is 33-37 Athol Street, Douglas, IM1 1LB, Isle of Man.

60. **Sure (Jersey) Ltd**, whose registered company number is 84645 and registered address is The Powerhouse, Queen's Road, St Helier, JE2 3AP, Jersey.

61. **Stour Marine Ltd,** whose registered company number is 5914603 and registered address is Good Easter House, Good Easter, Chelmsford, Essex, CM1 4RS, United Kingdom.

62. **Swiftnet Ltd,** whose registered company number is 2469394 and registered address is 1st Floor, Olympia House 1 Armitage Road, Golders Green, London, NW11 8RQ, United Kingdom.

63. **Synectiv Ltd,** whose registered company number is 3706138 and registered address is 2 Spring Villa Park, Spring Villa Road, Edgware, Middlesex, HA8 7EB, United Kingdom.

64. **TalkTalk Communications Ltd,** whose registered company number is 3849133 and registered address is 11 Evesham Street, London, W11 4AR, United Kingdom.

65. **Telecom2 Ltd,** whose registered company number is 6926334 and registered address is Cotswold Hse, 219 Marsh Wall, London, E14 9FJ, United Kingdom.

66. **Telecom 10 Ltd,** whose registered company number is 6974505 and registered address is 3a Station Road, Cippenham, Slough, SL1 6JJ, United Kingdom.

67. **Telecom Cloud Networks Ltd,** whose registered company number is 9071980 and registered address is 22 Studio F, Jordan Street, Liverpool, L1 0BP, United Kingdom.

68. **Telecom North America Mobile Inc,** whose registered entity number is C11057-1999 and registered address is Nevada Business Center, LLC, 701 S Carson Street STE 200, Carson City, NV 89701,USA.

69. **Teleena UK Ltd,** whose registered company number is 7069424 and registered address is New Derwent House, 69-73 Theobalds Road, London, WC1X 8TA, United Kingdom.

70. **Telefónica UK Ltd**, whose registered company number is 01743099 and registered address is 260 Bath Road, Slough, Berkshire, SL1 4DX, United Kingdom.

71. **Test2date B.V,** whose registered company number is 30194024 and registered address is Ypelobrink 150, 7544 CG, Enschede, The Netherlands.

72. **TGL Services (UK) Ltd,** whose registered company number is 9293520 and registered address is 33 St. James's Street, London, SW1A 1HD, United Kingdom.

73. **Tismi BV,** whose registered company number is 32081827 and registered address is Catharijnesingel 30 G, 3511 GB, Utrecht, The Netherlands.

74. **Truphone Ltd,** whose registered company number is 4187081 and registered address is 25 Canada Square, Canary Wharf, London, E14 5LQ, United Kingdom.

75. **Vectone Mobile Ltd,** whose registered company number is 4553934 and registered address is 54 Marsh Wall, London, E14 9TP, United Kingdom

76. **Virgin Mobile Telecoms Ltd,** whose registered company number is 3707664 and registered address is Media House, Bartley Wood Business Park, Hook, Hampshire, RG27 9UP, United Kingdom.

77. **Vodafone Ltd**, whose registered company number is 01471587 and registered address is Vodafone House, The Connection, Newbury, Berkshire, RG14 2FN, United Kingdom.

78. **Voxbone SA,** whose registered establishment number is BR017510 and registered address is The Podium, 1 Evershold Street, London, NW1 2DN, United Kingdom.

79. **Wavecrest (UK) Ltd,** whose registered company number is 3042254 and registered address is 1st Floor Bishopsgate Court, 4-12 Norton Folgate, London, E1 6DB, United Kingdom.

80. **Ziron (UK) Ltd,** whose registered company number is 7597853 and registered address is Greyfriars Court, Paradise Square, Oxford, Oxfordshire, OX1 1BE, United Kingdom.

SCHEDULE 2

The SMP Conditions

Part 1: Commencement

1. The SMP conditions in Part 3 of this Schedule 2 apply from **1 April 2018**.

Part 2: Definitions and interpretation

1. In this Schedule -

"Call" means a voice call which originates on a public electronic communications network (whether fixed or mobile) and is terminated to a mobile number within a number range allocated to the dominant provider by Ofcom, for which the dominant provider is able to set the call termination charge;

"call termination charge" means either a fixed-to-mobile call termination charge or a mobile-to-mobile call termination charge.

"controlling percentage" means-

(i) in relation to the Second Relevant Period, the amount of change in the Consumer Prices Index in the period of 12 months ending on the 31 December immediately before the beginning of that relevant period, expressed as a percentage (rounded to one decimal place) of that Consumer Prices Index as at the beginning of that period; reduced by 4.1%; and

(ii) in relation to the Third Relevant Period, the amount of change in the Consumer Prices Index in the period of 12 months ending on the 31 December immediately before the beginning of that relevant period, expressed as a percentage (rounded to one decimal place) of that Consumer Prices Index as at the beginning of that period; reduced by 3.7%.

"Consumer Prices Index" means the index of consumer prices compiled by an agency or a public body on behalf of Her Majesty's Government or a governmental department (which is the Office for National Statistics at the time of publication of this Notification) from time to time in respect of all items;

"dominant provider" means each person named in Schedule 1;

"fixed-to-mobile call" means a Call originating on a fixed public electronic communications network;

"fixed-to-mobile call termination charge" means the charge made by the dominant provider to terminate a fixed-to-mobile call;

"mobile number" means a UK telephone number that begins with 071, 072, 073, 074, 075, 077, 078 or 079;

"mobile-to-mobile call" means a Call originating on a mobile public electronic communications network of another mobile communications provider;

"mobile-to-mobile call termination charge" means the charge made by the dominant provider to terminate a mobile-to-mobile call;

"network access" means the provision of interconnection to the public electronic communications network provided by the dominant provider, together with any services, facilities or arrangements which are necessary for the provision of electronic communications services over that interconnection;

"Ofcom" means the Office of Communications;

"pence per minute" means the sum in pence charged for a minute of a Call;

"relevant period" means any of the following -

(i) the period of twelve months beginning on 1 April 2018 and ending on 31 March 2019 (the "First Relevant Period");

(ii) the period of twelve months beginning on 1 April 2019 and ending on 31 March 2020 (the "Second Relevant Period");

(iii) the period of twelve months beginning on 1 April 2020 and ending on 31 March 2021 (the "Third Relevant Period");

and

"third party" means a person operating a public electronic communications network.

2. For the purpose of interpreting the conditions in Part 3 of this Schedule -

(a) except in so far as the context otherwise requires, words or expressions shall have the meaning ascribed to them in paragraph 1 of this Part above and otherwise any word or expression shall have the same meaning as it has in the Communications Act 2003;

(b) the Interpretation Act 1978 shall apply as if each of the SMP conditions were an Act of Parliament (c. 30); and

(c) headings and titles shall be disregarded.

Part 3: SMP conditions

Condition M1 – Requirement to provide network access on reasonable request

M1.1 Where a third party reasonably requests in writing network access, the dominant provider must provide that network access.

M1.2 Where condition M2 below applies, the dominant provider shall provide network access in accordance with condition M1.1 as soon as reasonably practicable and on fair and reasonable terms and conditions and on such terms and conditions as Ofcom may from time to time direct. In relation to charges, the dominant provider must comply with condition M2.

M1.3 Where condition M2 does not apply, the dominant provider must provide network access in accordance with condition M1.1 as soon as reasonably practicable and on fair and reasonable terms, conditions and charges and on such terms, conditions and charges as Ofcom may from time to time direct.

M1.4 The dominant provider must comply with any direction Ofcom may make from time to time under this condition.

Condition M2 – Control of call termination charges

M2.1 The dominant provider must ensure that for each Call on any day, during any relevant period, the call termination charge (which shall be expressed in pence per minute) does not exceed the charge ceiling.

M2.2 The charge ceiling is –

(a) for any Call on a day in the First Relevant Period, **0.493** pence per minute;

(b) for any Call on a day in the Second Relevant Period and Third Relevant Period-

a. an amount equal to -

i. the charge ceiling, expressed in pence per minute (rounded to three decimal places), in the relevant period preceding the relevant period in which the Call was made; multiplied by,

ii. the sum of 100 per cent and the controlling percentage for the relevant period in which the Call was made, and is

b. expressed as being pence per minute and rounded to three decimal places.

M2.3 Within one month of the end of each relevant period, the dominant provider shall notify Ofcom in writing of the level of the call termination charge or charges it made to each third party during that relevant period.

M2.4 Without prejudice to Ofcom's statutory information gathering powers, the dominant provider must provide to Ofcom in writing at any time upon reasonable notice any information reasonably required by Ofcom for the dominant provider to demonstrate compliance with this condition.

M2.5 The dominant provider must comply with any direction Ofcom may make from time to time under this condition.

Annex 8

Smaller Mobile Providers

Introduction

A8.1 As set out in Section 3, in addition to the four largest mobile providers, we are proposing to designate 76 smaller MCT providers as having SMP on the basis of our analysis of each of the companies or persons to whom Ofcom has allocated UK mobile number ranges.[36] This analysis included checking Companies House records to see whether all of the companies were still active, and checking BT's Carrier Price List (CPL), which details BT's interconnect charges for calls originating, transiting, or terminating on the BT network.[37] We also gathered information from smaller mobile providers using our statutory powers under section 135 of the Act. In the information requests, we asked each company:

- to list the mobile number ranges it is currently using for mobile call services, distinguishing between those allocated to them by Ofcom (including transfers from another company) and any other mobile number ranges that have been allocated to another mobile provider by Ofcom but where their use has been authorised by that other mobile provider (the 'relevant number ranges');
- for information regarding the mobile provider's business, namely, the different services it offers (including but not limited to the services offered over the number ranges held), the total number of its customers which are active customers and its total revenues for the last financial year (2015-16);
- for details on the MTRs it charges in relation to the relevant number ranges (in ppm), including any time-of-day and weekend variations and any variations by interconnecting CPs, and the total revenues received by the mobile provider which are associated with the MTR on the relevant number ranges;
- for details on the total number of minutes of inbound voice calls to the relevant number ranges, disaggregated between on-net and off-net minutes, and the total number of outbound minutes of voice calls from the relevant number ranges, over the most recent complete financial year;
- to list the CPs which the named mobile provider interconnected with; and
- if they did not currently provide MCT services to their customers, to confirm whether they have any future plans to launch such services before March 2021.

A8.2 As a large majority of smaller mobile providers interconnect with BT, in our formal information request to BT, we asked for information on the MTRs BT charges on behalf of the smaller mobile providers that interconnect with BT, and the volume of minutes (for calls) that BT terminated to those mobile providers.

A8.3 Below we outline the analysis regarding the mobile providers we propose to designate as having SMP, in light of the latest available information. Before

[36] The relevant markets we propose include any mobile provider which has requested transfers of relevant UK mobile numbers and offers (or plans to offer) MCT.
[37] Available at http://www.companieshouse.gov.uk/ and https://www.btwholesale.com/pages/static/help-and-support/pricing/carrier-price-lists.htm respectively.

publication of our Final Statement, we intend to request an update from companies who do not currently offer MCT to confirm if they have plans or are undecided about offering MCT before March 2021. In addition, for any company that acquires a mobile number range between the publication of the consultation and the Final Statement, we will issue a formal information request and update our analysis accordingly. Our proposal is that we would designate any mobile provider which is in receipt of a relevant Ofcom number allocation and providing (or planning to provide) MCT at the time of our Statement in March 2018.

Companies excluded from our market analysis

A8.4 We have provisionally excluded from our proposed market analysis MCT providers which:

- had been allocated UK mobile numbers but are now in liquidation,[38] or have been dissolved;
- have informed us that they have returned, or intend to return their numbers to Ofcom;[39]
- have informed us that they are not providing MCT services on any of their mobile number ranges and have no plans to do so before March 2018 or during the market review period (April 2018 – March 2021), and we have no evidence to show otherwise;[40] or
- have informed us they do not offer MCT services on their own number ranges but host another MCP's number ranges on their network.[41]

A8.5 Two mobile providers have been allocated numbers by Ofcom, but have informed us that they do not offer mobile services and we have no reason to believe that these numbers are being used for mobile services. In coming to this view, we have checked BT's CPL and utilised other sources of information available to us. Therefore, we have no basis for the provisional view that these number ranges are being used for MCT services and so we propose to exclude these companies from our market analysis. [42]

[38] Cheers International Sales Limited (appointed voluntary liquidator on 31 January 2017), Fogg Mobile AB, Limitless Mobile Limited (appointed voluntary liquidator on 29 November 2016), Premium O Limited (appointed voluntary liquidator on 9 February 2016), Switch Services Limited (appointed voluntary liquidator on 9 November 2016), Titanium Limited (appointed voluntary liquidator on 2 August 2016).
[39] These MCPs are: Fonix Mobile Limited, Proton Telecom Limited, Rexcom Tech Limited, Vortex Telecom Limited
[40] These mobile providers are: Esendex Limited, IV Response Limited, Lanonyx Telecom Limited, Lleidanetworks Serveis Telematics Limited, Mbox Limited, Spacetel UK Limited, Telesign Mobile Limited, UK Broadband Limited, Voicetec Systems Limited.
[41] Teleware informed us that they offer MCT services only on the number ranges they host for Teleena UK.
[42] These providers are Icron Network Limited and SMSRelay AG. If we were to find that they were using relevant numbers to provide MCT, or planning to, our proposal is that we would add these providers to our list of designated MCT providers with SMP.

Companies included in our market analysis

A8.6 We propose to include in our market analysis those mobile providers who submitted that they are currently providing MCT services.

A8.7 Additionally, in our 2015 MCT Statement we noted that some smaller providers do not operate their own access networks and choose to purchase some or all of the network elements required to physically terminate the call from other companies ('hosting CPs'). We stated that, where a mobile provider has a hosting provider terminating calls on the mobile provider's number ranges, the underlying control of wholesale call termination remains with the controller/owner of the number ranges. The intervention of a hosting provider can only occur with the authorisation of the number range holder, and therefore wholesale call termination cannot occur without the involvement of the number range holder.[43]

A8.8 On that basis, we concluded in 2015 that control of the number range, rather than hosting of the termination service, was key to controlling the process. We are minded to maintain this view and therefore propose also to include in our market analysis those mobile providers who rely on hosting providers to offer MCT services.

A8.9 In their response to our information requests, some of the smaller mobile providers who provide MCT services on the numbers allocated to them either stated they did not provide MCT services or did not respond to further attempts to contact them. Having checked these mobile providers with their hosting providers, and having also checked if the number ranges allocated to them were listed on BT's CPL, we have found number ranges allocated to the providers below to be active:

- Legend Tel LLC[44]
- Global Reach Networks[45]
- Ace Call Limited[46]
- Alliance Technologies LLC[47]

[43] See Ofcom 2015 Mobile Call Termination statement, paragraph 3.24, https://www.ofcom.org.uk/__data/assets/pdf_file/0029/76385/mct_final_statement.pdf

[44] The mobile number range allocated to Legend Tel LLC is still listed on BT's CPL Part no. B1.02 against Telecom2 Limited (who we understand to be the hosting provider). Telecom2 Limited confirmed that it hosts this number range and that the range is active.

[45] The mobile number range allocated to Global Reach Networks is still listed on BT's CPL Part no. B1.02 against Magrathea Telecommunications Limited (who we understand to be the hosting provider). Magrathea Telecommunications Limited confirmed that it hosts this number range and that the range is active.

[46] The mobile number range allocated to Ace Call Limited is still listed on BT's CPL Part no. B1.02 against Core Telecom Limited (who we understand to be the hosting provider). Core Telecom Limited confirmed that it hosts this number range and that the range is active.

[47] The mobile number range allocated to Alliance Technologies LLC is still listed on BT's CPL Part no. B1.02 against Core Telecom Limited (who we understand to be the hosting provider). Core Telecom Limited confirmed that it hosts this number range and that the range is active.

- Euro Thai Exchange Process Company Limited (Yim Siam Telecom)[48]

A8.10 Based on the above[✂REDACTED✂], we propose to include these providers in our market analysis.

A8.11 It is also possible that some companies provide MCT notwithstanding what they told us in their responses to information requests under section 135 of the Act. For example, where they have been allocated UK mobile numbers to which it is possible to make calls. Where there is evidence suggesting a mobile provider provides MCT in these circumstances, we are minded to include them in our market analysis.[49] [50]

A8.12 We also propose to include smaller mobile providers who said that they do not currently provide MCT services on the number ranges allocated to them, but who either plan to or are considering offering these services before March 2021.[51] As noted above, we will follow up with these mobile providers to confirm this before publication of our Final Statement.

A8.13 One mobile provider did not respond to our formal information request or any further attempts to contact it. As we have no evidence that this provider is not offering mobile call termination, we propose to provisionally include it in our analysis.[52] This case is currently being considered by Ofcom's numbering team and we will take into consideration their findings before the publication of our Final Statement.

A8.14 We also propose to include in our market analysis any mobile provider which has requested the transfer of mobile number ranges[53] and offers (or plans to offer) MCT.[54] Likewise, we propose to include any other mobile provider in receipt of a relevant Ofcom number allocation and providing (or planning to provide) MCT when we publish our Statement.

A8.15 Nine smaller mobile providers are registered in the Channel Islands or the Isle of Man and are licensed to provide mobile services in their place of registration.[55] In

[48] The mobile number range allocated to Euro Thai Exchange Process (Yim Siam Telecom Limited) is still listed on BT's CPL Part no. B1.02 against Core Telecom Limited (who we understand to be the hosting provider). Core Telecom Limited confirmed that it hosts this number range and that the range is active.

[49] Sound Advertising Limited stated in its response to our information request that it did not provide MCT services; however, dialling a small sample of their Mobile Number Range (MNR) resulted in these numbers being interconnected, therefore leading us to reasonably believe that these numbers remain active and are being interconnected. Telecom North America Mobile Inc. and Test2Date B.V. also replied to our information request, stating they did not offer MCT services; however, further communication with their hosting providers (Magrathea Telecommunications and Core Telecom respectively) suggested that they do host their MNRs and that both mobile providers do offer MCT services.

[50] Any mobile provider which does not comply with the requirements of a notice served under section 135 of the Act is liable to face enforcement action by Ofcom.

[51] These providers are: AMS UK, BT OnePhone Limited, Compatel Limited, Globecom International, Hanhaa Limited, Hay Systems, IPV6 Limited, Nodemax Limited, Mobile FX Services Ltd, Mobiweb Telecom Limited, Premium Routing GmbH, Synectiv Limited, TalkTalk Communications Limited, Telecom Cloud Networks, Wavecrest (UK) Limited

[52] This provider is 09 Mobile Ltd.

[53] This is without prejudice to the question of whether the request should be granted.

[54] This currently only applies to one provider: Globetouch AB.

[55] These mobile providers are: Guernsey Airtel Limited, Jersey Airtel Limited, Jersey Telecom, JT Guernsey, Manx Telecom, Marathon Telecom Limited, Sure (Guernsey) Limited, Sure (Isle of Man) Limited, Sure (Jersey) Limited.

our market definition, we propose to include calls to UK mobile numbers held by MCT providers in any foreign countries and non-UK territories, unless regulated by another competent authority. Therefore, we propose to include these MCPs in our market analysis.

A8.16 In addition, we propose to include both the Home Office and the National Cyber Security Centre (in the form of their respective Secretaries of State) in our market definition. Both organisations now hold mobile number ranges provided by Ofcom and use them for emergency services and testing of next generation networks, respectively. As public sector institutions, we do not expect them to have any incentive to price excessively for MCT. We acknowledge the possibility, however, that either organisation could provide these number ranges to a commercial mobile provider in the future, who would then have the incentive and the ability to charge an excessively high MTR, who would be able to do so by being in control of the mobile number range

Annex 9

MCT cost model approach and design

Introduction

A9.1 This annex provides further information on the approach we propose to take in updating the MCT cost model and explains its functionality. The proposals in this consultation are informed by the '2017 MCT model', which is published alongside this consultation and is based on the 2015 MCT model.

A9.2 The 2017 MCT model uses a bottom-up approach to estimate the costs of MCT for an average efficient national mobile provider.

A9.3 This annex consists of two parts: we first explain how we have approached the modelling and the analysis we have undertaken to inform this; and second, recap the structure and workings of the model, which would be unchanged relative to the 2015 MCT model.

A9.4 Further details in relation to the Weighted Average Cost of Capital (WACC) calculation are provided in Annex 10, and the results and sensitivities of the 2017 MCT model are presented in Annex 12.

Approach to updating the MCT model

The 2015 MCT model as the appropriate starting point

A9.5 In October 2013, Ofcom commissioned Analysys Mason to assist with the development of a new MCT model for the 2015 MCT review. The 2015 MCT market review involved an extensive modelling exercise to reflect developments since the previous review in 2011. This included major structural changes to incorporate a 4G network (including 4G voice, i.e. VoLTE technology), active infrastructure sharing and single-RAN deployment.

A9.6 The aim of the 2015 MCT model was not to model the costs of any specific mobile provider, but to estimate the costs of a representative average efficient mobile provider. In that regard the model was hypothetical, but by using inputs (e.g. equipment capacities, equipment unit costs and spectrum holdings) sourced from the national MCT providers and by using a careful calibration process to verify the model outputs against the national MCT provider networks (in terms of asset counts and accounting costs) the aim was to deliver a bottom-up model grounded in reality.

A9.7 As has been the case in previous MCT market reviews, we are minded to regard the model constructed for the previous charge control period as an appropriate starting point for our analysis of the next charge control period.

Approach to updates

A9.8 Taking the 2015 MCT model as the starting point, the question we have considered at the outset of this review is whether it continues to provide a reasonable approximation of reality for the period 1 April 2018 to 31 March 2021.

A9.9 To answer this question, we have identified the key inputs to the 2015 MCT model and investigated the likely impacts of updating them on the model results. We have done this first by adjusting individual parameters and then by considering the impact of those adjustments on a cumulative basis. We would be concerned if the cumulative impact of any adjustments were material as this might suggest that the 2015 MCT model was no longer a reasonable approximation of reality (even if the individual impact of a particular adjustment were material, it could be offset by other adjustments such that the cumulative impact of all of them were not). This reflects the fact that the 2015 MCT model contained an internally consistent set of inputs and hence we are wary of introducing inconsistency by changing some inputs in isolation.

A9.10 In performing this analysis we have also borne in mind the likely materiality of any impact on MTRs. Without attempting to provide a specific materiality threshold, we note that on the basis of current traffic volumes and MTR levels a 10% change in our projected MTR would only have a direct revenue impact of around £8.5m per annum to the industry as a whole.[56]

A9.11 To inform our testing we have collected data from the four largest MCT providers using our information gathering powers under section 135 of the Act. We sent information requests to the four largest MCT providers on 16 February 2017 requesting detailed information in relation to:

- Technology choice;
- Subscription information;
- Network traffic volumes; and
- Forecasts for traffic growth.

A9.12 We have also considered updates to unit equipment costs and the WACC, and in the following subsections discuss each of technology, volumes, equipment costs and WACC, before considering the impact of updates in the round.

Choice of technology

A9.13 In order to build a bottom-up network cost model, we need to decide which network technology or combination of technologies to model. Since we wish to select a combination of technologies that reflect the decisions that would be taken by an average efficient mobile provider our interest in network technology choice is a means to an end, not an end in itself.

A9.14 With regard to historical periods up to the present day, we have sought to model the technologies that an average efficient mobile provider would have used. We base these modelled technologies on the networks that the national MCT providers have deployed.

A9.15 Our proposed approach is based on the view that, in future periods, an average efficient mobile provider would only deploy new technologies if they are at least as efficient as the existing technologies, meaning that they are capable of delivering

[56] Based on annual net traffic volumes of 17.19bn (i.e. excluding mobile-to-mobile traffic flows) and a base case MTR of 0.433 ppm.

the same services at the same or lower cost. Our approach to modelling is to only include proven technologies (i.e. the technology of the day).

A9.16 In proposing which technologies to model we also take utmost account of the 2009 EC Recommendation, which explains that *"the cost model should be based on efficient technologies available in the timeframe considered by the model"*,[57] as we are required to do under Article 19(1) of the Framework Directive and section 4A of the Act.

A9.17 Since the construction of the 2015 MCT model there will have been incremental improvements in technology but there have not been the sort of significant technological or spectrum deployment changes that we needed to take into account in the 2015 MCT review. Nor do we anticipate that there will be significant technological or spectrum deployment changes during this market review period. In particular, the four largest MCT providers have confirmed in response to statutory information notices that:

- they have no plans to turn off their 2G networks;
- while 5G technology is being developed, it will not be deployed in this market review period to the extent that it would significantly affect MCT (as discussed in Section 2);
- although there has been some deployment of Voice over WiFi (VoWiFi) technology by some MCT providers, this is not currently material and it is unclear that it will be over the forthcoming market review period.

A9.18 Nevertheless, as a result of the uncertainty around VoWiFi we have tested the impact on the projected LRIC of MCT in 2020/21 of assuming some VoWiFi rollout. We would expect this to have the effect of reducing the blended LRIC of MCT because it takes traffic off the modelled radio network, but implementing this in the model would involve significant data gathering and further analysis.[58]

A9.19 Consequently, we have tested this using some simplifying assumptions. We first assume that VoWiFi traffic is terminated at zero cost. Although terminating calls using VoWiFi is not costless it does not involve the use of the RAN, which is a key contributor to the LRIC of MCT. As a consequence, this assumption will understate the cost of terminating calls using VoWiFi and hence overstate the impact on the LRIC of MCT.

A9.20 We also require an assumption for the extent of VoWiFi traffic in each year of the charge control. As noted above, the information gathered from the MCT providers under our statutory powers suggests that the extent of VoWiFi is currently low, but varies between MCT providers (between 0% and 4%). The extent to which it might grow is unclear however, and we have therefore tested a range of assumptions for this.

A9.21 On the basis of the actual range, our provisional view is that a forecast of 3% of termination traffic being on VoWiFi in 2020/21 is reasonable. However, we note that capturing the effect of VoWiFi in this way takes no account of the effect that the

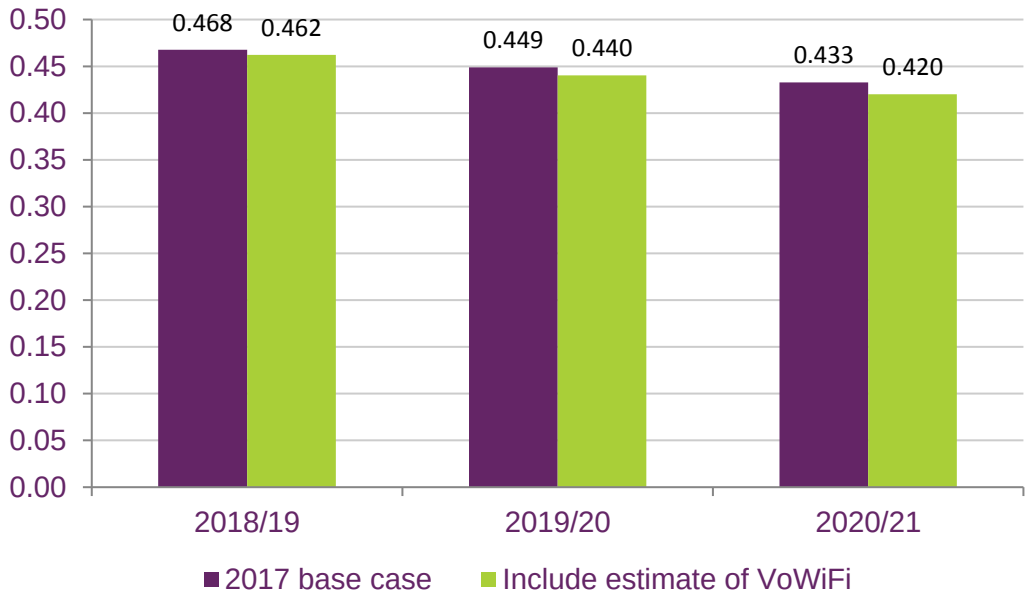
[57] 2009 EC Recommendation, point 4.

[58] For example, it would require us to include the cost of the Evolved Packet Gateway (ePG) and Authentication, Authorization, and Accounting (AAA) network function. These elements terminate the secured IP-based connection and update the subscriber data, respectively.

migrating traffic will have on the unit costs of termination on the 2G, 3G and 4G networks. Reducing the volume of traffic on each of these networks will act to increase their unit costs, moderating the reduction in the blended MTR resulting from the presence of VoWiFi at zero cost.

A9.22 We find that approximating the effect by assuming a cost of zero and 3% of total termination traffic on VoWiFi in 2020/21 would reduce the LRIC of MCT by around 2-3% compared to our updated base case,[59] as shown in Figure A9.1 below.

Figure A9.1: Impact of including VoWiFi estimate on the LRIC of MCT (ppm, 2015/16 prices)



Source: Calculations based on 2017 MCT model.

Traffic volumes

A9.23 The 2015 MCT model included forecasts of all types of traffic carried by mobile networks and we have tested the accuracy of the forecasts we made in the 2015 MCT model by comparing them to actual traffic volumes gathered using our statutory powers. In each case we have also tested the impact of updating the volumes in the model. To do this we have used actual data for the period Q3 2014 to Q4 2016 in place of the forecasts we made in 2015 and, in order to minimise any discontinuities this might create between the resulting extended series of actuals and subsequent forecasts, selecting the most appropriate of the 2015 model high case, base case or low case scenarios thereafter.[60]

A9.24 Although there are some issues with the compatibility of the data over time, we provisionally find that (at a high level) our traffic forecasts were reasonable, as explained in turn for different traffic types below.

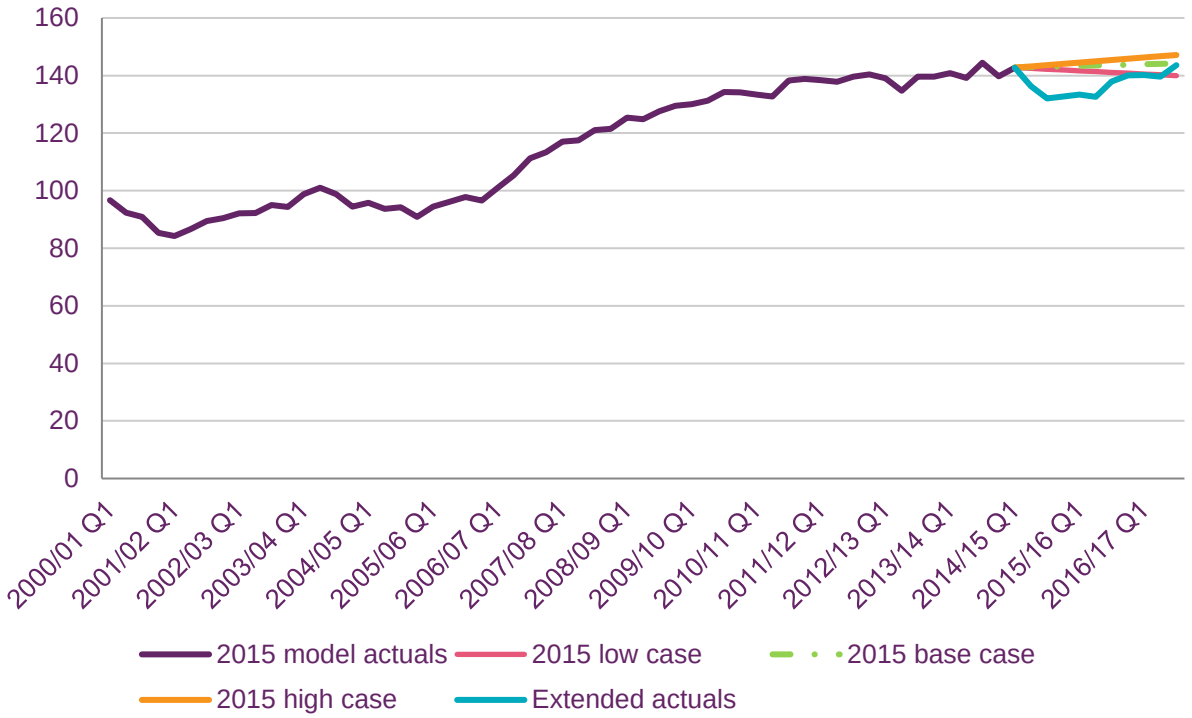
[59] The '2017 base case' represents the results of the 2015 MCT model for the years 2018/19 to 2020/21, updated so as to be expressed in 2015/16 prices

[60] For example, if (as is the case for voice minutes per subscriber) the extended series of actuals suggests that the most reasonable of our previous forecasts was the base case, we continue to use this in the test of the 2015 traffic forecasts.

Outgoing voice usage per subscriber

A9.25 The historical time series of voice minutes per subscriber per month is shown in Figure A9.2 below, along with the high case, base case and low case scenarios from the 2015 MCT model and the updated actual data given to us by MCT providers under section 135 of the Act.

Figure A9.2: Voice minutes per subscription per month



Source: Ofcom 2017 MCT model.

A9.26 Figure A9.2 shows that initially the outturn volumes fall below the 2015 MCT 'low case' but come back within the 2015 MCT forecast range more recently. We have investigated this and sought explanation from the mobile operators of the temporary fall in voice minutes per subscriber. They have explained that:

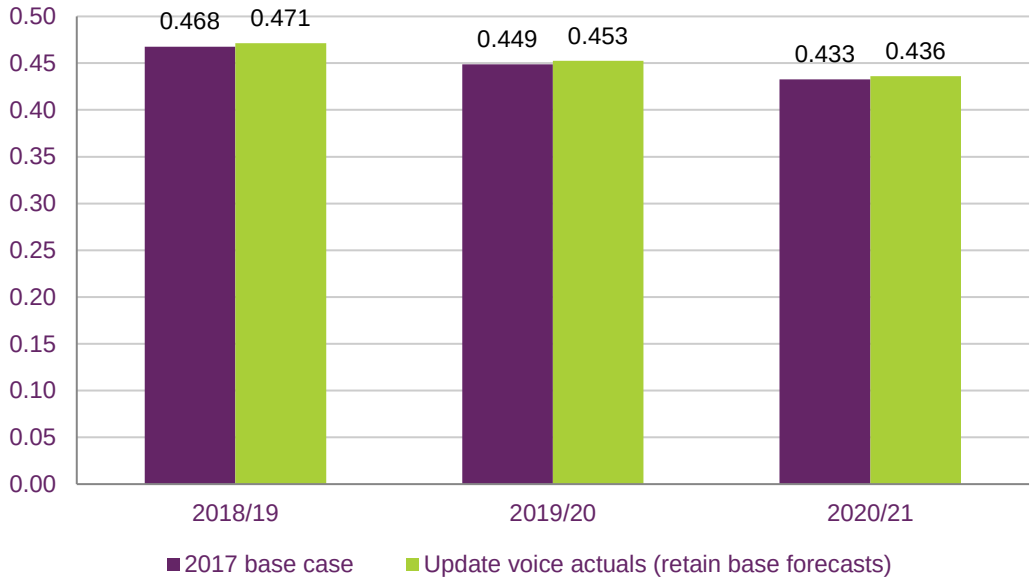
- [✂REDACTED✂][61];
- [✂REDACTED✂][62]; and
- [✂REDACTED✂][63]

A9.27 This suggests that the decline in voice minutes per subscriber per month was temporary and driven by anomalies and a lack of comparability in the data provided by the four largest MCT providers.

[61] Email sent on 31 March 2017.
[62] Email dated 31 March 2017.
[63] Email sent on 27 March 2017.

A9.28 We have tested the 2017 MCT Model using the updated series of actuals and retaining the existing base case forecasts thereafter. This produces a marginally higher LRIC of MCT (by just under 1%), as shown in Figure A9.3 below.

Figure A9.3: Voice minute impact on the LRIC of MCT (ppm, 2015/16 prices)

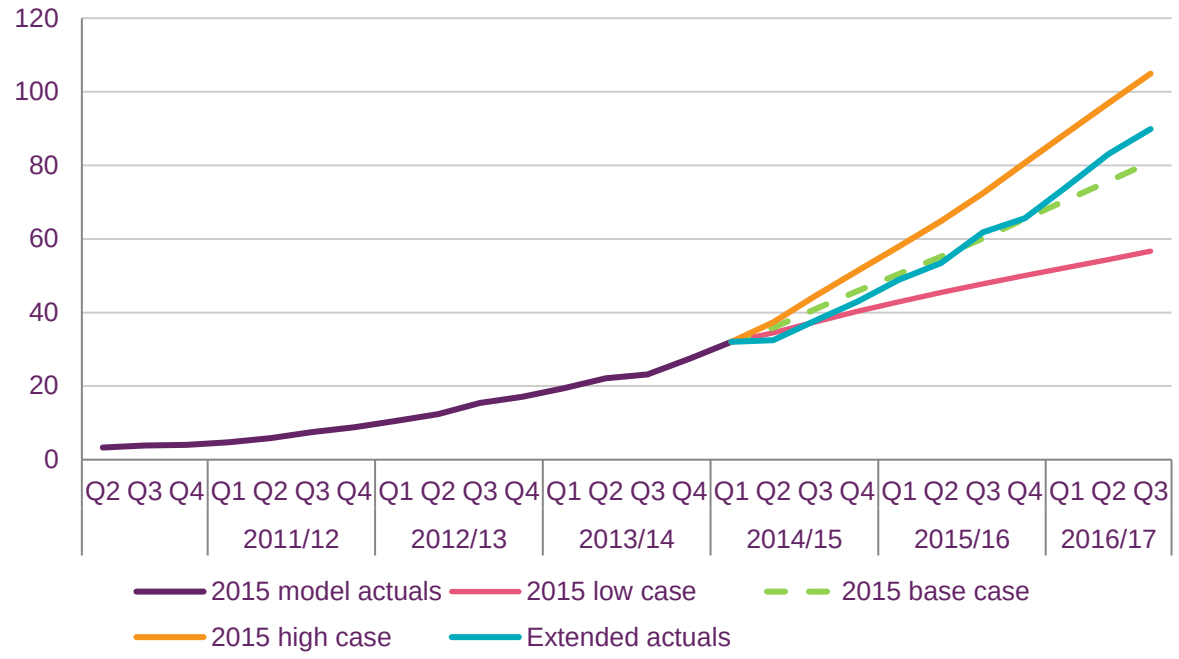


Source: Calculations based on 2017 MCT model.

Total data traffic

A9.29 Turning to data services we find that the outturn figures on total data traffic (i.e. 2G, 3G and 4G) indicate that our forecasts in the 2015 MCT model were reasonable, as shown in Figure A9.4 below. Initially the outturn data dip below the 2015 MCT low case, but quickly return within the range and on the basis of the most recent figures lie between the 2015 base and high cases.

Figure A9.4: Quarterly total data (petabytes per quarter)



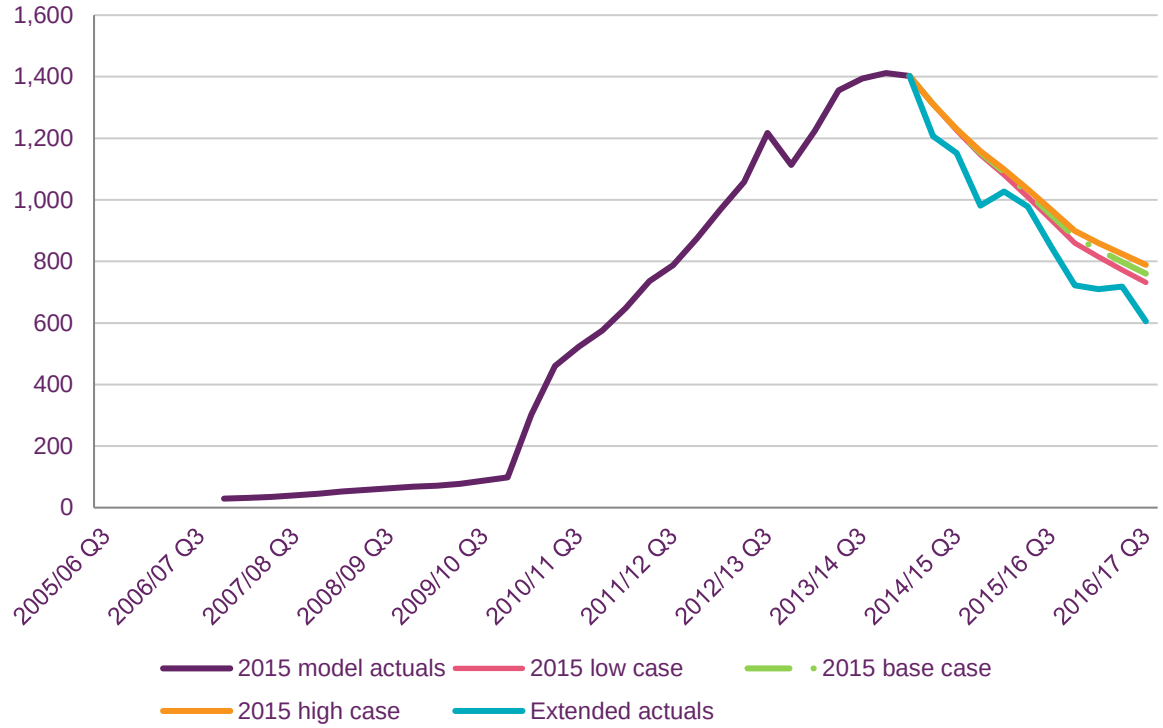
Source: Ofcom 2017 MCT model.

A9.30 In order to understand the impact of this in more detail we have broken this down by technology, as explained below.

2G data

A9.31 In the 2015 MCT model we forecast a decline in 2G traffic, and the uncertainty related to how rapidly this decline would occur. The updated actuals show a decline in 2G data volumes but at a level below our 2015 MCT forecast decline (including the fastest rate of forecast decline – the "2015 low case"), as shown in Figure A9.5 below.

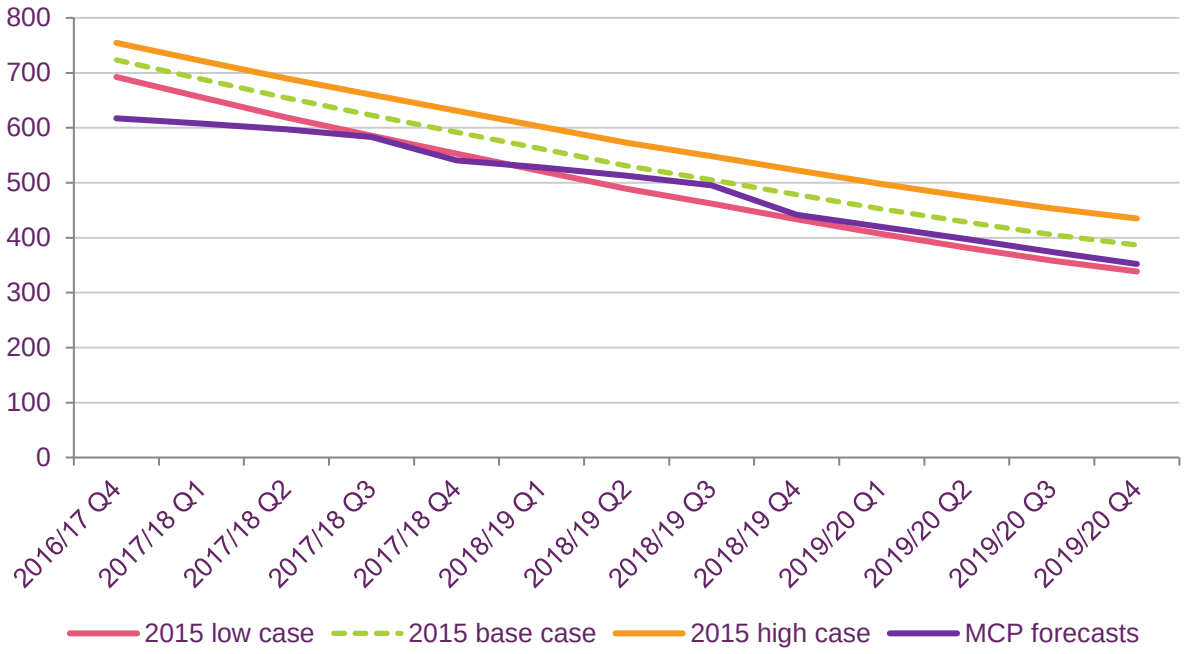
Figure A9.5: Quarterly total 2G handset data (TB)



Source: Ofcom 2017 MCT model.

A9.32 However, despite the outturn data indicating a more rapid decline in 2G data volumes than we had forecast, the MCT providers' latest forecasts provided under our statutory powers show that volumes come back within the 2015 MCT range throughout 2018/19 and 2019/20, as shown in Figure A9.6 below.

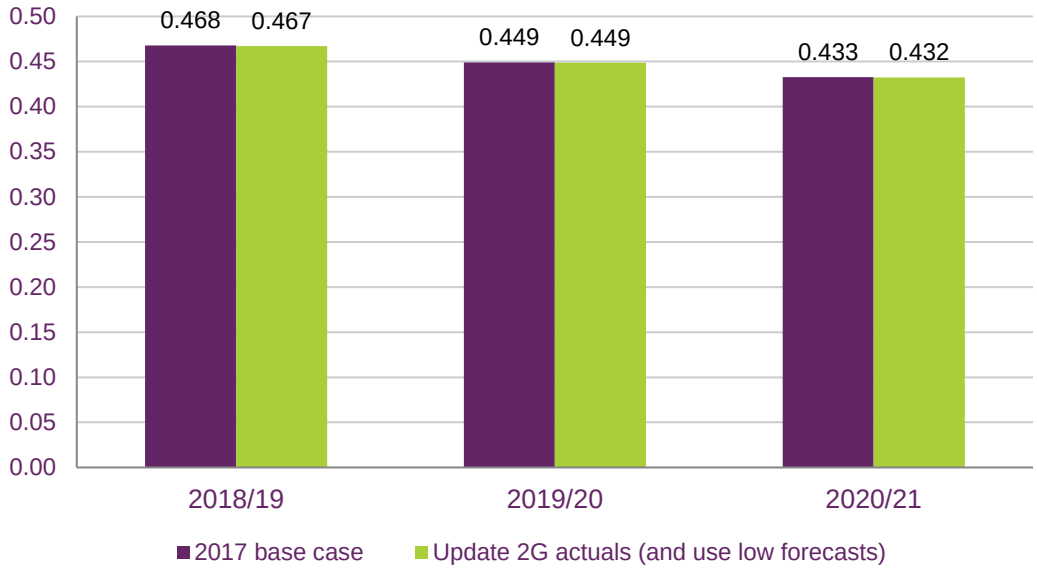
Figure A9.6: Quarterly 2G handset data forecast (TB)



Source: Ofcom 2017 MCT model.

A9.33 When we have tested the sensitivity of the LRIC of MCT to the updated time series of actuals for 2G data (and using the 2015 low case forecasts thereafter) we find that the results are not very sensitive, as shown in Figure A9.7 below.

Figure A9.7: Total 2G data impact on LRIC of MCT (ppm, 2015/16 prices)



Source: Calculations based on 2017 MCT model.

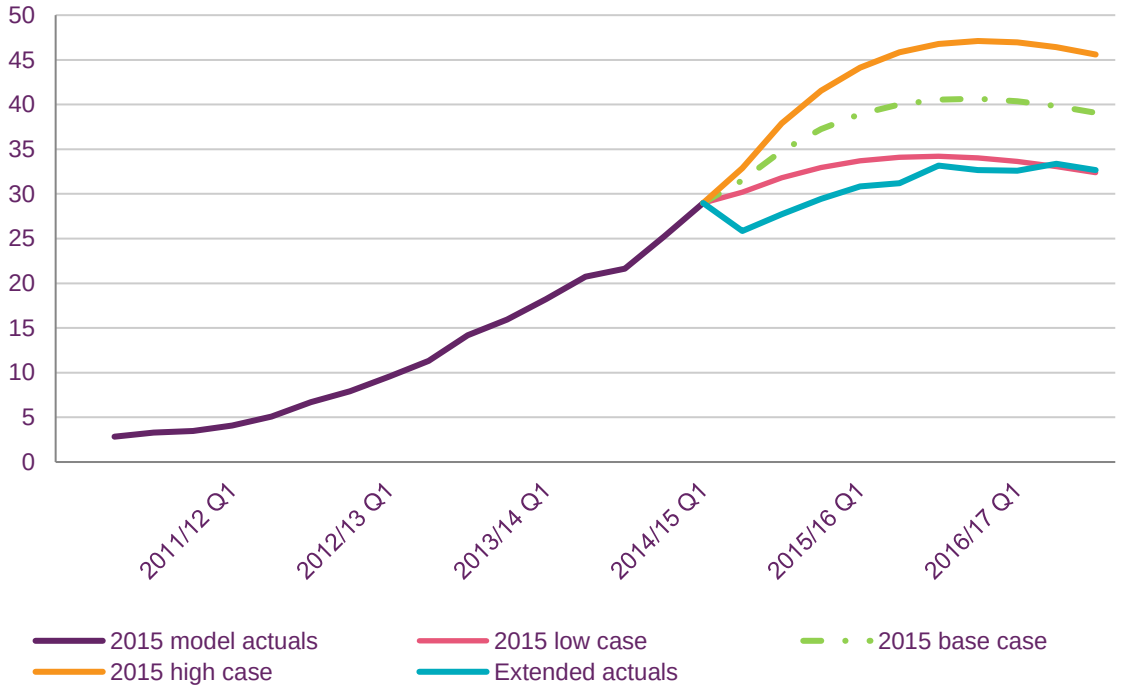
3G data

A9.34 In the 2015 MCT model we forecast a peak and then a decline in 3G data volumes during the charge control period, as data traffic was expected to migrate to 4G networks. The outturn data suggest that this was not unreasonable, but raise questions about the level and timing of the peak.

A9.35 As is shown in Figure A9.8 below, the outturn data for the previous review period were initially below the MCT 2015 'low case' but more recently come into line with it. We have investigated the step change between Q1 2014/15 and Q2 2014/15 and provisionally found that it is mainly [✂REDACTED✂].[64]

[64] Email sent on 26 March 2017.

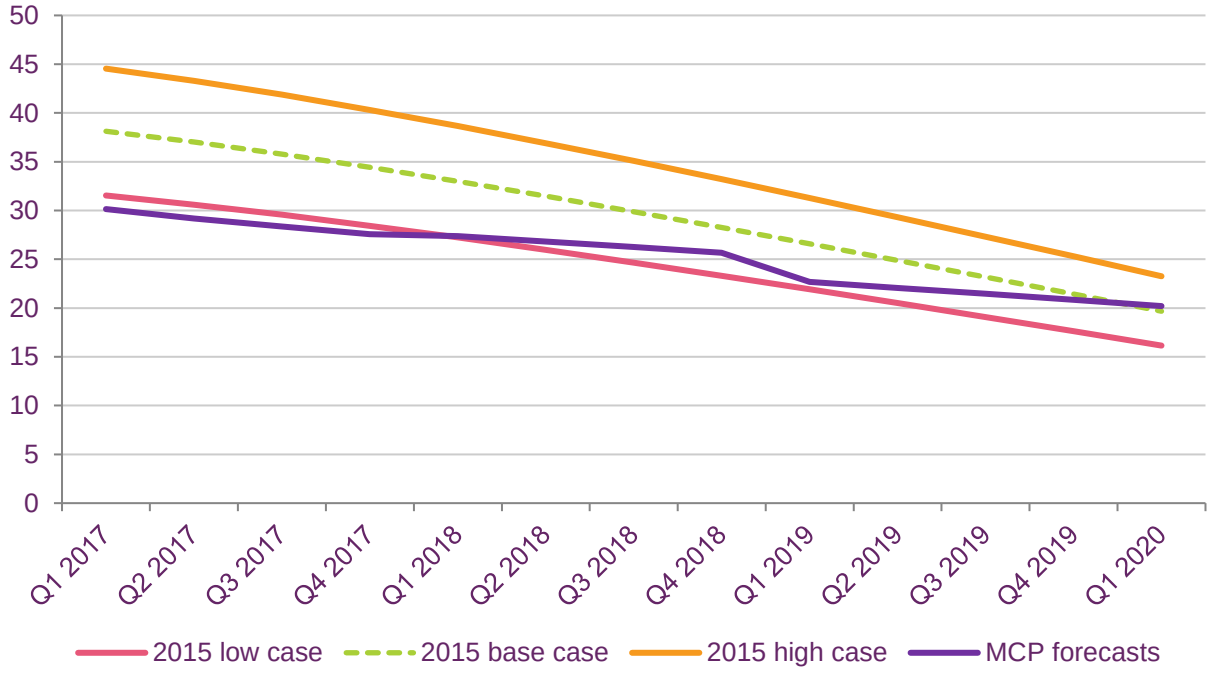
Figure A9.8: Quarterly total 3G data volumes (PB)



Source: Ofcom 2017 MCT model.

A9.36 As was the case for 2G data traffic volumes, however, the MCT providers' latest forecasts provided under statutory powers shows that 3G data volumes come back within the 2015 MCT range throughout 2018/19 and 2019/20. This is shown in Figure A9.9 below.

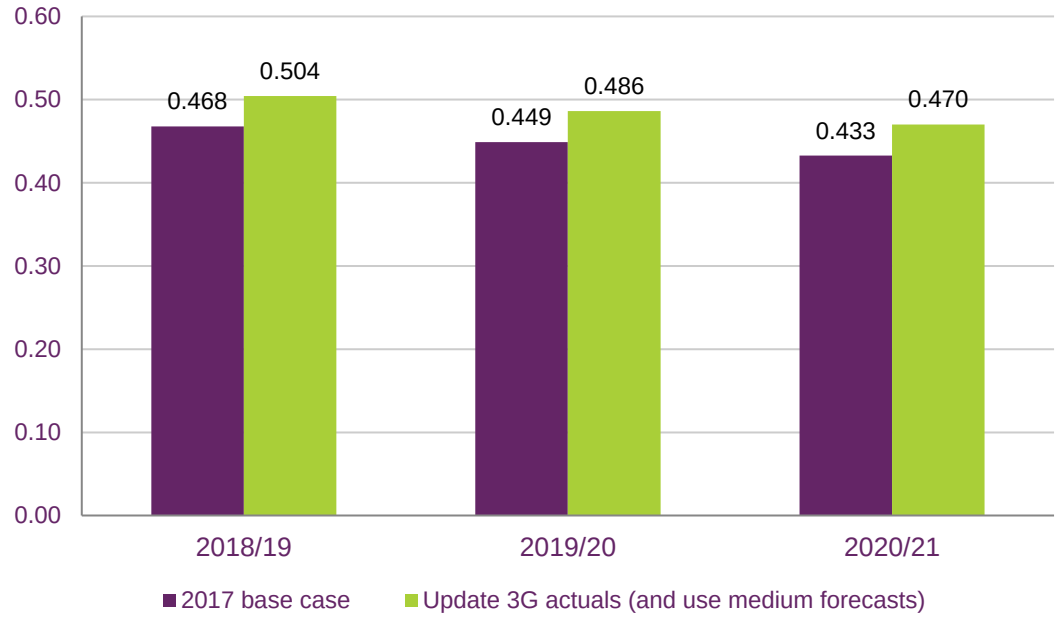
Figure A9.9: Quarterly 3G data forecast (PB)



Source: Ofcom 2017 MCT model.

A9.37 Testing the impact of the updated actuals for 3G data traffic in the model (but retaining the existing base case forecasts thereafter) produces a 2020/21 LRIC of MCT 9% above the 2017 base case, as shown in Figure A9.10 below.

Figure A9.10: Total 3G data impact on the LRIC of MCT (ppm, 2015/16 prices)



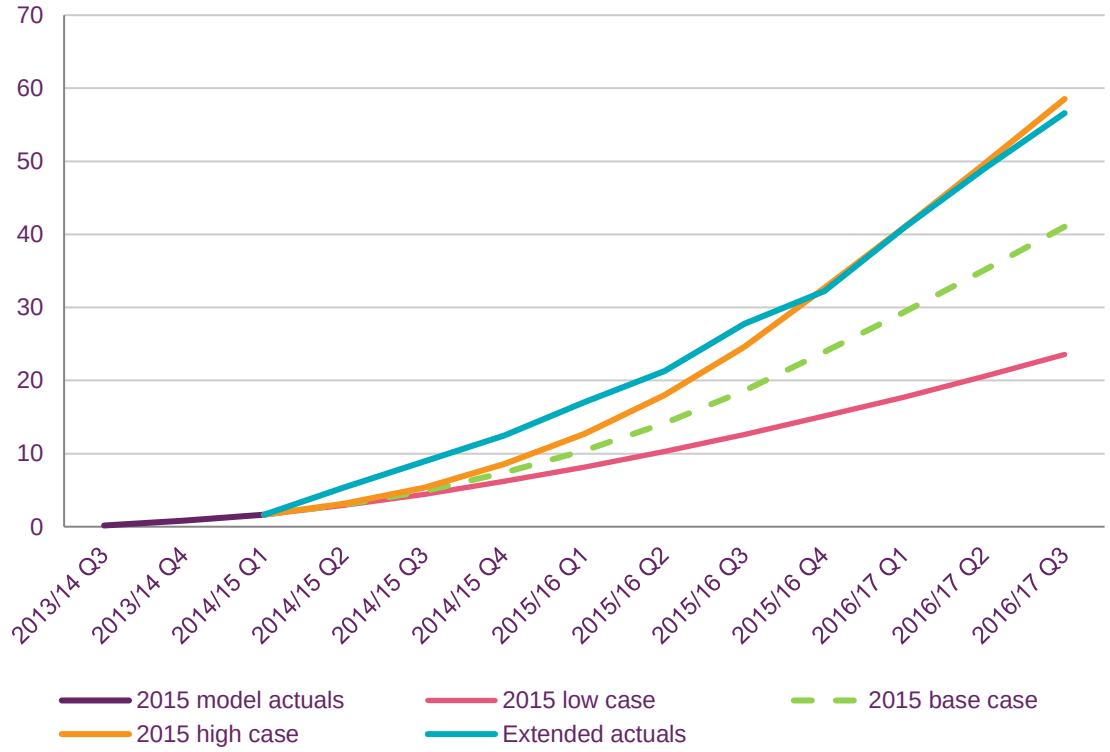
Source: Calculations based on 2017 MCT model.

A9.38 We might expect lower 3G data volumes to lead to an increase in the blended LRIC of MCT. This is because a less heavily utilised 3G network drives up the unit cost of voice termination on the 3G network, but the weight given to 3G termination in the blended LRIC of MCT is unchanged. However, the magnitude of this impact is initially surprising and investigation reveals that the change in 3G data volumes has the effect of increasing 2G, 3G and 4G voice termination costs. Investigation in the model suggests that this effect comes about because the reduction in 3G data traffic reduces the peak number of 3G cell sites, so more cell sites are then incremental to termination on the 2G and 4G networks.

4G data

A9.39 In the 2015 MCT model 4G data traffic was forecast to increase, but the rate of growth was uncertain. Comparison against outturn data for the previous review period indicates that actual volumes were initially above the forecasts in the 2015 MCT model, but more recently come into line with the MCT 2015 ‘high case’. This is shown in Figure A9.11 below.

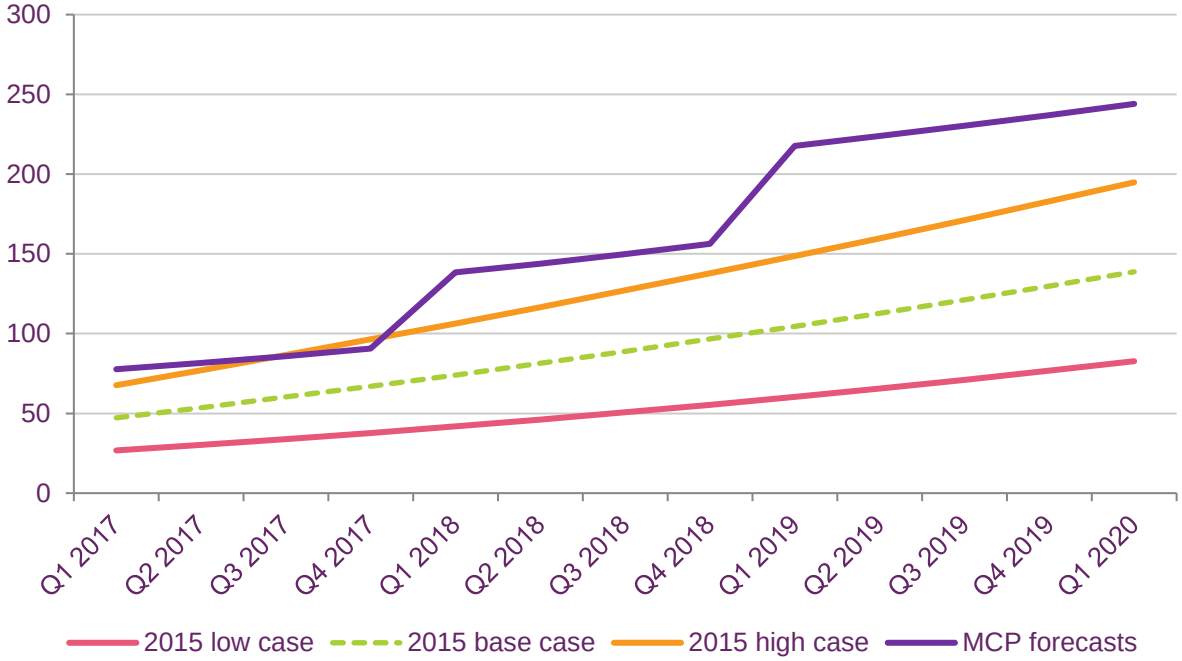
Figure A9.11: Quarterly total 4G data volumes (PB)



Source: Ofcom 2017 MCT model.

A9.40 However, we note that the latest MCT providers' forecasts of 4G data are in excess of the 2015 MCT 'high case', as shown in Figure A9.12 below.

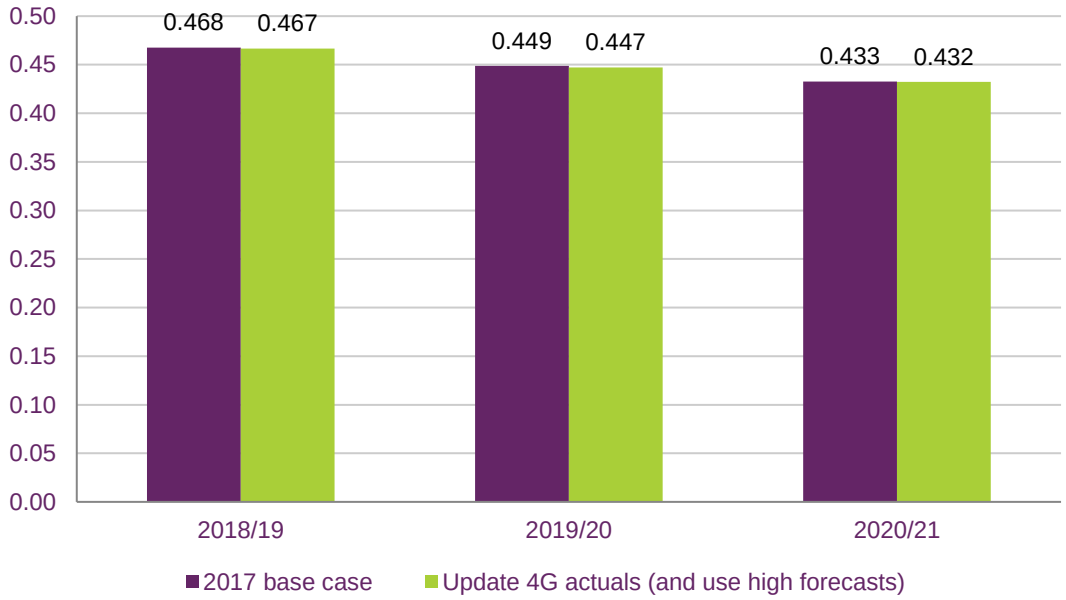
Figure A9.12: Quarterly 4G data forecast (PB)



Source: Ofcom 2017 MCT model.

A9.41 The impact of 4G data traffic volumes on the LRIC of MCT is very limited, as shown in Figure A9.13 below. If we were to update the model to use the higher than previously forecast recent actuals (and retain existing high case forecasts thereafter) this would reduce the 2020/21 LRIC of MCT by 0.1%.

Figure A9.13: Total 4G data impact on LRIC of MCT (ppm, 2015/16 prices)



Source: Calculations based on 2017 MCT model.

A9.42 We further note that, were we to reforecast 4G data volumes based on the latest MCT providers' data, we would likely use something higher than the previous high case scenario. This would reduce the unit costs of termination.

Overall impact of volume updates

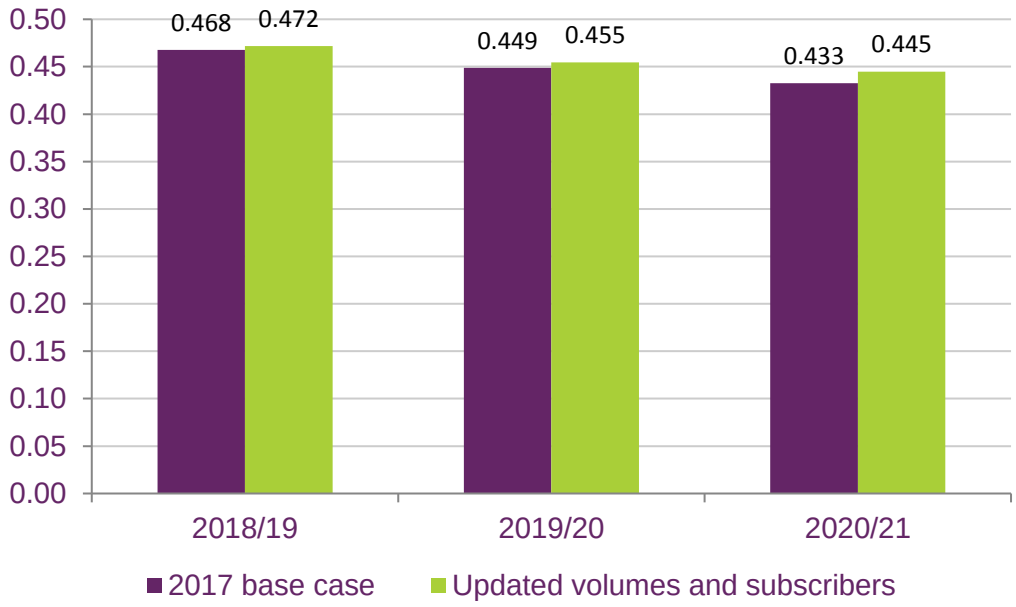
A9.43 In order to consider the overall impact of updates to traffic volumes, it is necessary to also consider updates to the mix of subscribers between technologies. In the 2015 MCT model a particular source of uncertainty was the proportion of traffic that would be terminated via Voice over LTE (VoLTE). We assumed 3% VoLTE traffic volume split in 2016/17 in our base case, with rapid growth thereafter. Evidence gathered under our section 135 powers broadly supports our assumption for 2016/17:

- [✂REDACTED✂] [65];
- [✂REDACTED✂][66];
- [✂REDACTED✂][67]; and
- [✂REDACTED✂].[68]

[65] Email sent on 7 March 2017.
[66] Email sent on 10 March 2017.
[67] Email sent on 3 March 2017.
[68] Email sent on 5 March 2017.

A9.44 Combining the adjustments to volumes of individual services explained above, and also updating the mix of subscribers between the different technologies, would result in a cumulative increase of less than 3% on the 2020/21 LRIC, as shown in Figure A9.14 below.

Figure A9.14: Cumulative impact of voice and data volumes on the LRIC of MCT (ppm, 2015/16 prices)



Source: Calculations based on 2017 MCT model.

Equipment unit costs

A9.45 The 2015 MCT model contained equipment unit costs and equipment unit cost trends based on MCT provider data and benchmark models. In considering whether to update these costs we have drawn comparisons for key assets with the MCT model recently published for consultation by the French regulator ARCEP which, like our 2015 MCT model, was developed with Analysys Mason.

A9.46 Collectively, three assets (cell sites, backhaul and core nodes) comprise 71% of the LRIC of MCT in the 2017 MCT model, and we can compare the (real) cost trends over the next charge control period against those from the French MCT model as shown in Table A9.1 below.

Table A9.1: Comparison of (real) cost trends for cell sites, backhaul and core nodes

	Cell sites		Backhaul		Core nodes	
	Ofcom	ARCEP	Ofcom	ARCEP	Ofcom	ARCEP
Capital expenditure	+1%	+1%	-3%	-2%	-3%	-10%
Operating expenditure	+0.5%	-5%	-2% or -1%	-5%	-1%	-5%

Source: Ofcom analysis.

A9.47 These comparisons are not entirely straightforward and in general ARCEP's model show more significant reductions in cost than those in the 2015 MCT model.

However, for cell sites or backhaul, which are the two main assets contributing to the LRIC of MCT, the cost trends for capital expenditure are almost identical.

A9.48 For operating expenditure ARCEP's model uses a blanket assumption of -5% per annum in perpetuity, and other differences seem to be driven by ARCEP's blanket assumptions which apply to a large number of assets in all years (e.g. core node capital expenditure). In addition, the ARECP MCT model trends do not show variation in recent years, and equipment capacities (which would drive additional changes in cost trends) do not appear to have changed significantly.

Cost of capital

A9.49 The 2015 MCT model used a pre-tax real WACC of 7.0% for an average efficient mobile provider. We have updated the analysis such that the market-wide parameters used in the calculation are consistent with those in the recent WLA consultation and reviewed the asset betas and debt premiums.

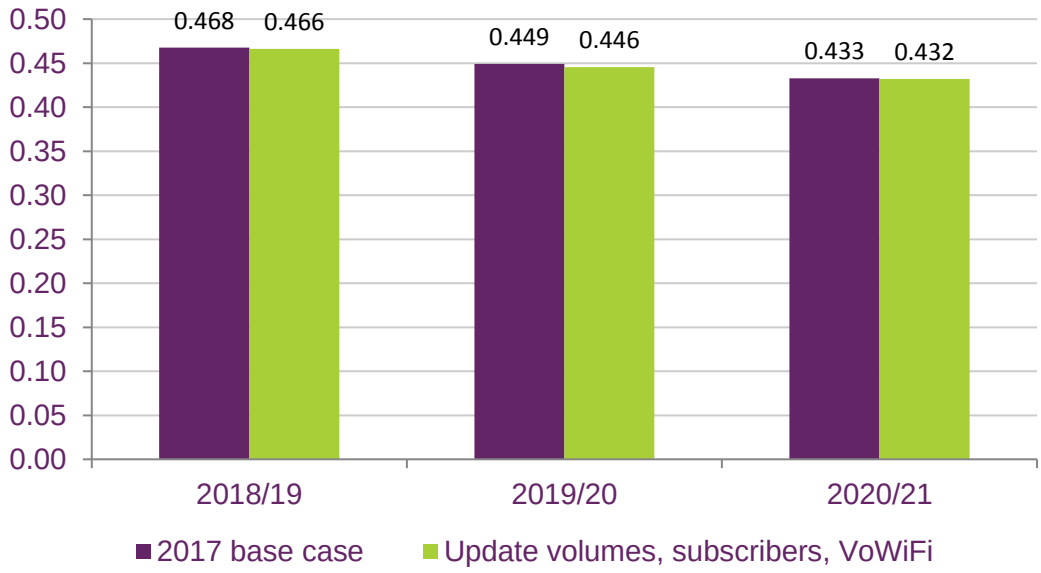
A9.50 This leads to a range of 6.1% to 7.8%. As explained further in Annex 10 we propose that, in light of this range, a WACC of 7.0% remains reasonable.

Proposal on updating the MCT model

A9.51 In considering how to model the costs of MCT for the next review period, our provisional view is that the 2015 MCT model provides the appropriate starting point. In particular, it appears to us that there have not been significant changes in technology that would require substantive work on the model structure.

A9.52 As outlined above, we have identified and investigated the key inputs and assumptions in the 2015 MCT model and considered whether and to what extent updating these inputs would affect the outputs. When we update voice and data traffic volumes, the blend of subscribers between 2G, 3G and 4G technologies and approximate the introduction of VoWiFi, the net effect on the 2020/21 LRIC of MCT is a decrease of 0.2%, as shown in Figure A9.15 below.

Figure A9.15: LRIC of MCT (pence per minute, 2015/16 prices)



Source: Calculations based on 2017 MCT model.

A9.53 As explained above, our provisional view is that the reduction in the blended cost resulting from our estimate of the impact of VoWiFi is likely to be overstated. However, were we to update our forecasts of 4G data traffic volumes, this would lead to a further reduction in the forecast LRIC of MCT of approximately 0.5% compared to the 2017 base case. To the extent that there might have been increases in equipment capacities, this would also have a modest downward impact on the updated result, although there are further uncertainties in equipment cost trends such as the future replacement cost (especially if sourced overseas and given the depreciation of sterling since the last review[69]).

A9.54 Consequently, we provisionally find that, while updating some parameters in isolation could have a small percentage impact on the LRIC of MCT, when considered in the round the changes would not have a material impact on the LRIC of MCT. As a result, we propose a 2017 MCT model that is updated from the 2015 MCT model only to the extent necessary for general price inflation. This means updating for actual CPI to present costs in 2015/16 prices (rather than 2012/13 prices), and updating the model so that the outputs focus on the forthcoming charge control period of 2018/19 to 2020/21.

Model structure and calculation

Model structure

A9.55 As outlined in Section 5, the 2017 MCT model 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:

- 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.

Model calculation

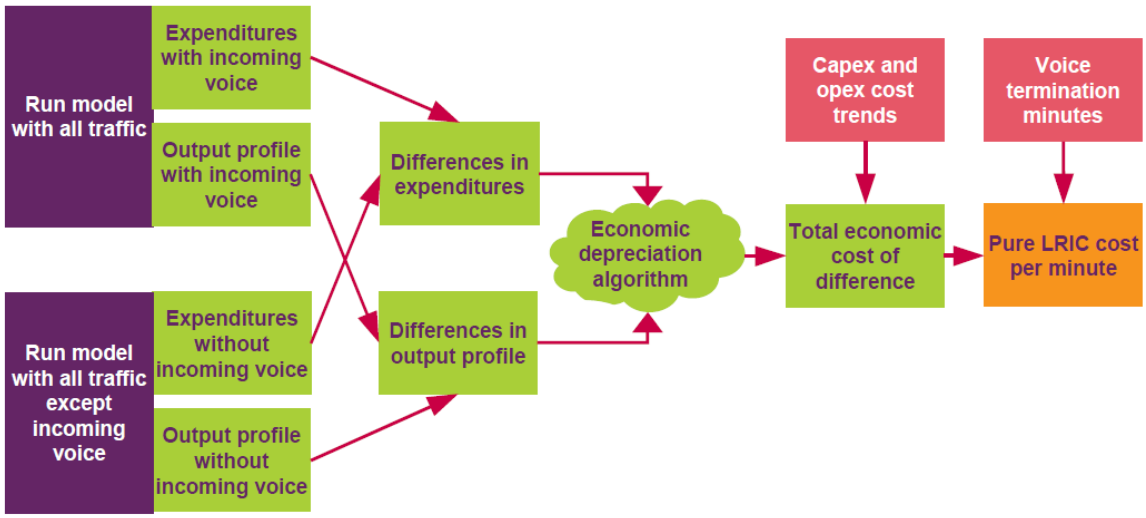
A9.56 The 2017 MCT model calculates the LRIC of MCT using a decremental approach. This calculation involves considering MCT as a 'final increment' with no common costs (such as the common costs of a 'coverage network') being allocated to MCT.

[69] We note for example that since the publication of the 2015 MCT Statement the pound is worth roughly 16% less against the dollar.

Our approach to calculating LRIC is consistent with the 2009 EC Recommendation and previous MCT models.

A9.57 The calculation flow used to determine LRIC is shown in Figure A9.16 below (with MCT referred to as 'incoming voice' in the flow chart).

Figure A9.16: How the LRIC of MCT is calculated



Source: Ofcom.

A9.58 The outputs of the 2017 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.

Scenario control module

A9.59 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.

A9.60 The *Outputs* worksheet contains the most important results from the model. The functionality of the scenario control module in the 2017 MCT model remain unchanged from that published in the 2015 MCT model, with changes only to update the scenarios.

Traffic module

A9.61 The traffic module of the 2017 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 2017 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.

A9.62 We also note that our traffic forecasts must be consistent with our assumptions concerning network technology and spectrum. The 2017 MCT model uses the technology of the day with no further developments in the future. This means that although in the short term the 2017 MCT model forecasts are based on data from

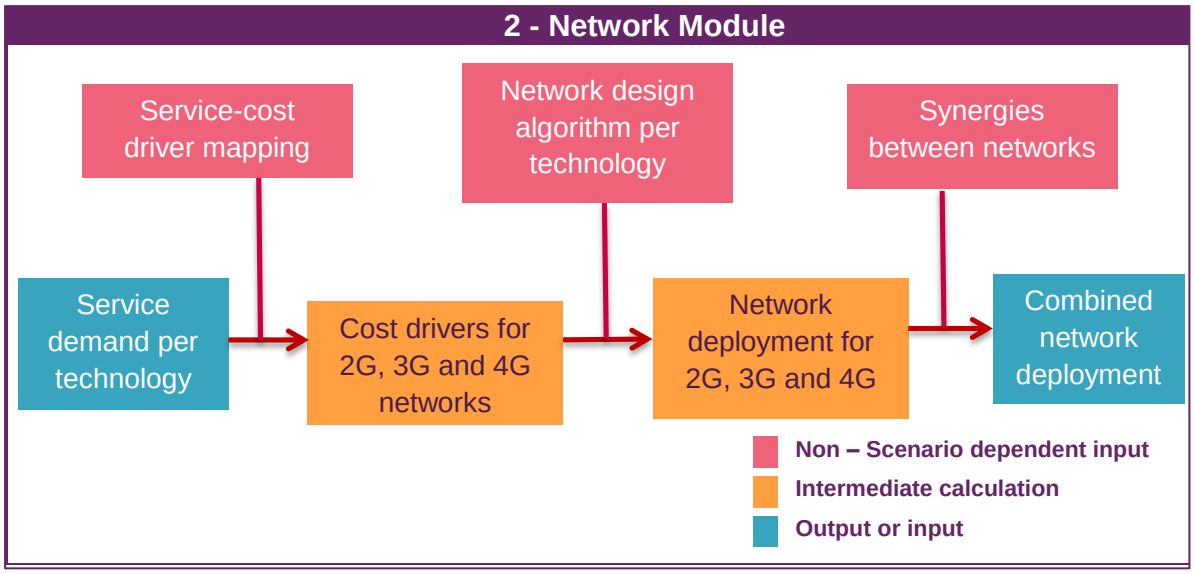
MCT providers, in the medium and longer term the forecasts are constrained by the technology and spectrum we are using.

Network module

A9.63 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.

A9.64 The flow of the calculations in the proposed network module is illustrated in Figure A9.17.

Figure A9.17: Summary of Network Module calculations



Source: Ofcom.

A9.65 In order to dimension the modelled 2G, 3G and 4G networks on the basis of cost causation relationships, the 2017 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.

A9.66 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).

A9.67 The general approach taken for dimensioning the modelled 2G, 3G and 4G networks is the same as we proposed in the 2015 MCT Statement. Under this approach the radio network is dimensioned for coverage and capacity requirements

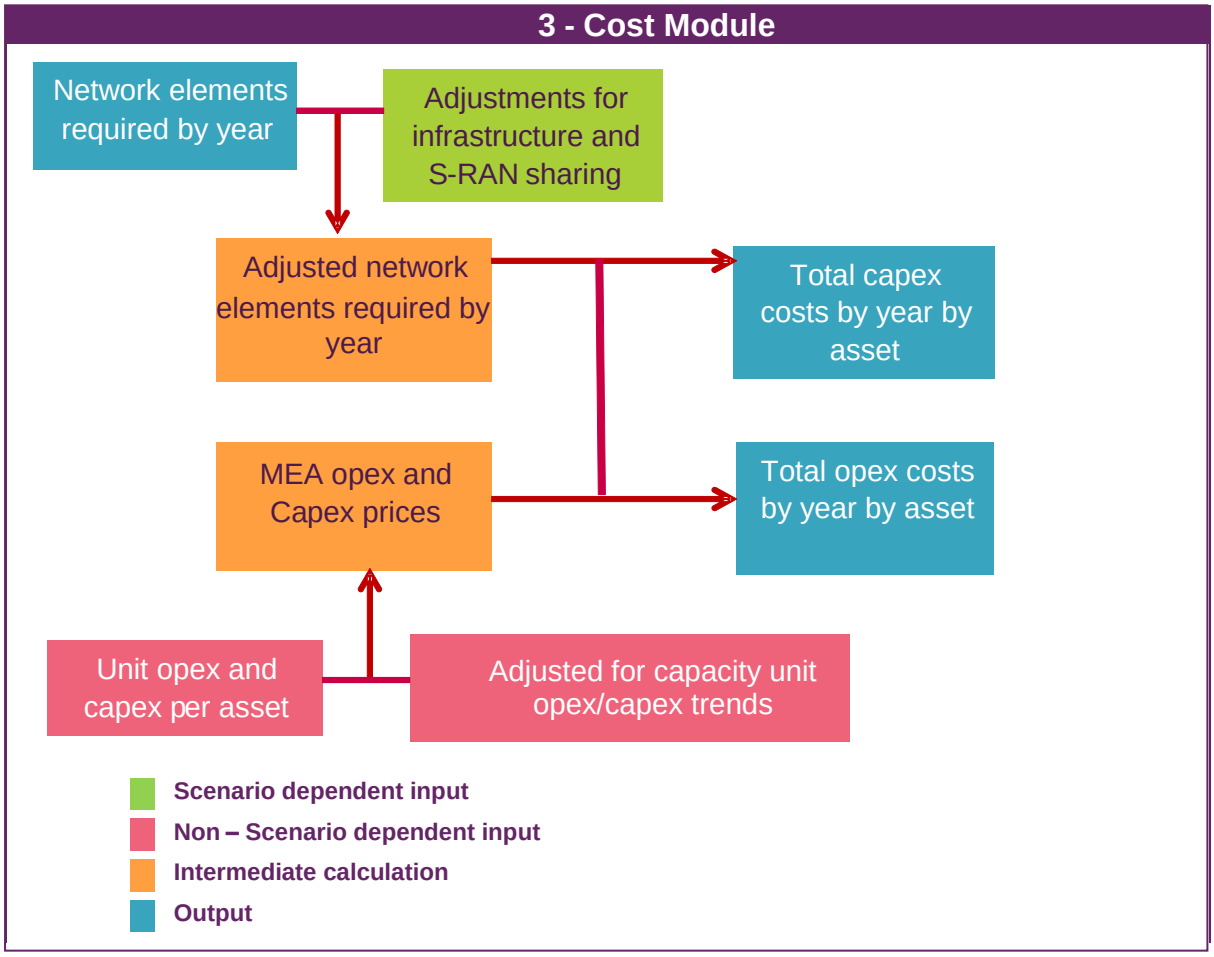
in each geotype. An important factor in determining radio equipment requirements are the assumptions made relating to the spectrum bandwidth and the spectrum holdings of the modelled mobile provider. The spectrum holdings and associated assumptions included in the 2017 MCT model are unchanged from the 2015 MCT model, as explained in Section 5.

Cost module

A9.68 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.

A9.69 A summary of the proposed workings of the module is shown in Figure A9.18 and explained below. The structure of the cost module is unchanged from that included in the 2015 MCT model.

Figure A9.18: Summary of Cost Module calculations



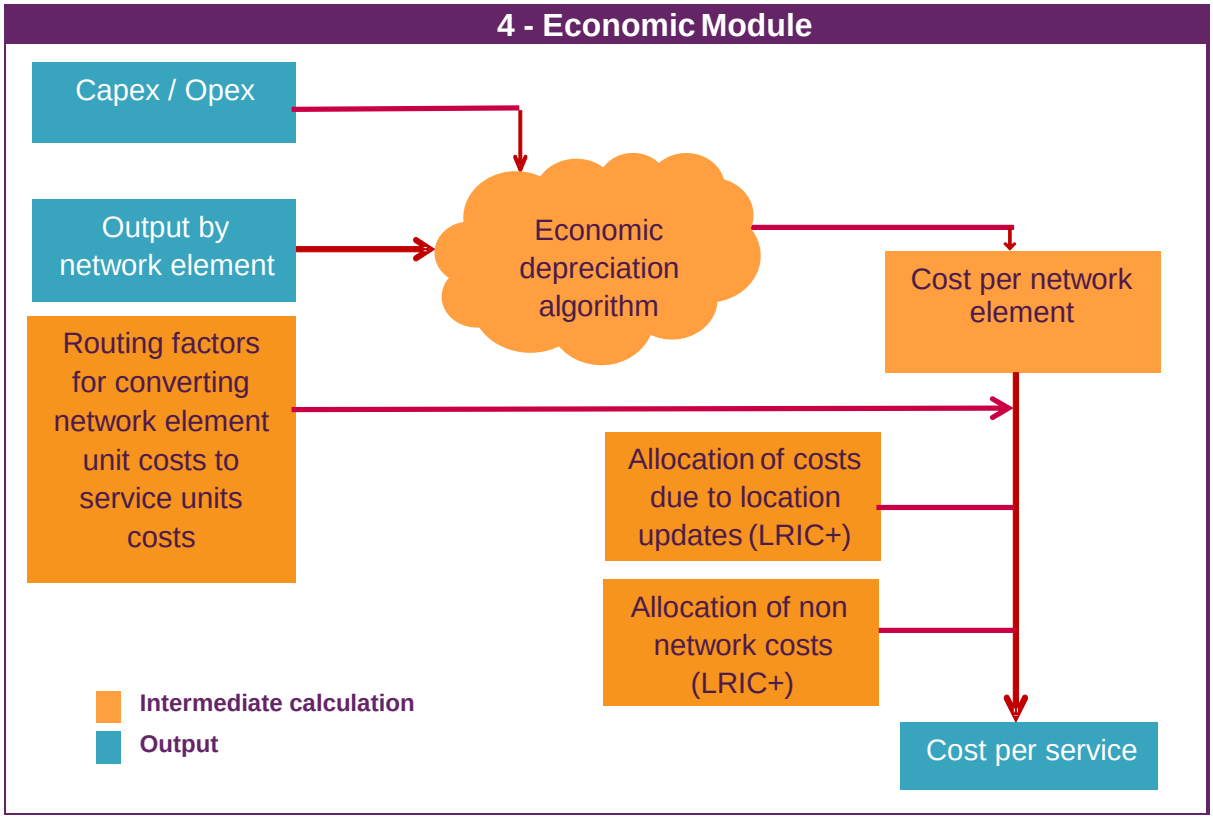
Source: Ofcom.

Economic module

A9.70 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.

A9.71 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 A9.19 below. This is unchanged from the 2015 MCT model.

Figure A9.19: Summary of Economic Module calculations



Source: Ofcom.

A9.72 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).

A9.73 In the 2017 MCT model we propose to use the form of economic depreciation known as Original Economic Depreciation (Original ED), consistent with our previous MCT models since 2005.

A9.74 We propose to 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 which states that "the recommended approach for asset depreciation is economic depreciation wherever feasible."[70]

[70] 2009 EC Recommendation, point 7.

A9.75 Our provisional view is that Original ED is a better depreciation approach to other forms of economic depreciation because it better mimics the outcomes that would be expected in a competitive market.

Annex 10

Cost of Capital

Introduction

A10.1 In this annex, we set out our provisional estimate of the of the WACC for an average efficient mobile provider. This WACC is used as the discount rate in the 2017 MCT model.

A10.2 The cost model is based on projections of costs in real terms with respect to CPI (the Consumer Price Index), without explicit modelling of tax. Therefore, we require a forecast of the pre-tax real WACC, with the WACC in real terms with respect to CPI.

A10.3 The WACC is the weighted average of the cost of funding from debt and equity with the weights determined by the level of gearing, i.e. the value of outstanding debt relative to total financing (i.e. value of debt and equity combined). For gearing, g, and corporate tax rate, t, the pre-tax WACC is defined as follows[71]:

$$WACC = \frac{Ke * (1 - g)}{1 - t} + Kd * g$$

A10.4 In this formula, we calculate the cost of equity, Ke, using the Capital Asset Pricing Model (CAPM), such that the cost of equity is a function of the risk-free rate (RFR), the expected return on the equity market above the risk-free rate (i.e. the equity risk premium, or ERP) and the systematic risk of the company (i.e. equity beta, βe):

$$Ke = RFR + ERP * \beta e$$

A10.5 Our approach to calculating the cost of debt combines the same RFR assumption as that used to estimate the cost of equity and adds to the RFR a debt premium (i.e. the corporate debt rate above benchmark risk-free assets), such that:

$$Kd = RFR + dp$$

A10.6 The pre-tax real WACC (with respect to CPI inflation) is obtained using the following formula:

$$Pre\ tax\ real\ WACC = \frac{1 + pre\ tax\ nominal\ WACC}{1 + forecast\ CPI\ inflation} - 1$$

A10.7 In the 2015 MCT Statement we used a pre-tax real WACC for an average efficient UK mobile provider of 7.0%. For the purposes of this consultation, we have considered whether a pre-tax real WACC of 7.0% remains reasonable in light of:

- the market parameters recently consulted on as part of the 2017 WLA Consultation; and

[71] Debt finance benefits from a tax shield whereas equity does not

- updated estimates of other WACC parameters such as the asset beta, gearing and debt premium for an average efficient mobile provider.

A10.8 As shown in Table A10.1, our provisional view is that the pre-tax real WACC for an average efficient mobile provider would lie between 6.1% and 7.8%[72], with the midpoint of this range rounding to the 7.0% pre-tax real WACC used in the 2015 MCT Statement. On this basis, we propose to continue to apply a pre-tax real WACC of 7.0% in in this consultation.

Table A10.1: WACC range for an average efficient mobile provider

WACC component	Low	High	Source
Real RFR	0.5%	0.5%	2017 WLA Consultation
RPI inflation	3.3%	3.3%	Ofcom estimate
Nominal RFR	3.8%	3.8%	= (1+ RFR)*(1 + RPI) – 1
Real ERP	5.5%	5.5%	2017 WLA Consultation
Nominal ERP	5.7%	5.7%	= (ERP*(1 + RPI)
Debt beta (βd)	0.10	0.10	Ofcom estimate
Asset beta (βa)	0.55	0.75	Ofcom estimate
Gearing (forward looking) (g)	35%	35%	Ofcom estimate
Equity Beta (βe)	0.79	1.10	=(βa - βd*g)/(1-g)
Cost of equity (post-tax) (Ke)	8.3%	10.1%	= Nominal RFR + ERP *βe
Cost of equity (pre-tax)	10.0%	12.2%	= Ke / (1-t)
Debt premium (dp)	1.0%	2.0%	Ofcom estimate
Corporate tax rate (t)	17%	17%	HMRC
Cost of debt (pre-tax) (Kd)	4.8%	5.8%	= Nominal RFR + dp
WACC (pre-tax nominal)	8.2%	10.0%	=(Ke*(1-g))/(1-t)+(Kd*g)
CPI	2.0%	2.0%	Bank of England
WACC (pre-tax real)	6.1%	7.8%	= (1 + pre-tax nominal WACC)/ (1+ CPI inflation) -1
Proposed pre-tax real WACC	7.0%		

Market parameters consulted on as part of the 2017 WLA review

A10.9 Several parameters are required to estimate the WACC. Some of these parameters reflect economy-wide factors that affect all firms. We recently considered these economy-wide factors as part of the 2017 WLA Consultation. For the purposes of this consultation, we have adopted the same values for these economy-wide parameters as in the 2017 WLA Consultation given that this was published only three months ago. Specifically, we assume:

- **Real risk-free rate (RFR) of 0.5%**: In the 2017 WLA Consultation we proposed to reduce our estimate of the real RFR from 1.0% to 0.5%.[73] We said that in setting the real RFR we consider information on longer term average yields on index-linked gilts as well as recognising the low yields on those gilts observed in

[72] As explained below, we have estimated a range for the asset beta and debt premium for an average efficient MCP and these drive the pre-tax real WACC range shown in the table.
[73] Paragraphs A16.25, 2017 WLA Consultation.

recent years.[74] Combined with our RPI inflation forecast for this consultation of 3.3% (see next sub-section), the nominal RFR would be 3.8%.[75]

- **Real equity risk premium (ERP) of 5.5%**: In the 2017 WLA Consultation we proposed to increase the real ERP from 5.1% to 5.5%.[76] Combined with our RPI inflation forecast for this consultation of 3.3%, the nominal ERP would be 5.7%.

- **Corporate tax rate of 17%**: HM Treasury states that "[…] At Budget 2016, the government announced a further reduction to the Corporation Tax main rate (for all profits except ring fenced profits) for the year starting 1 April 2020, setting the rate at 17%".[77] We propose to use a corporate tax rate of 17% since this represents the best estimate of what the tax rate will be on a forward-looking basis. This is consistent with the 17% tax rate proposed in the 2017 WLA Consultation.[78]

Other WACC parameters

RPI inflation

A10.10 Given the long-run horizon of the 2017 MCT model, we propose to use a long-run forecast for the CPI inflation rate when estimating the WACC. We have therefore used the Bank of England's target CPI inflation rate of 2% in our provisional calculation of the real (CPI-deflated) WACC. However, we still need a long run estimate of RPI inflation as well as CPI inflation.

A10.11 We propose to use a forecast RPI rate of 3.3%. This is derived by adding the Bank of England's long-run estimated difference between RPI and CPI to the Bank of England's CPI target of 2%. In its 2014 Inflation Report the Bank of England published a 'long run' estimate of the wedge between RPI and CPI of 1.3%.[79] This implies an RPI forecast of around 3.3% based on long-run expectations.[80]

Equity beta

A10.12 A company's equity beta measures the returns to shareholders relative to returns from the equity market as a whole. We propose to derive a forward-looking equity beta by estimating the following:

- First, the asset beta for an average efficient mobile provider.

- Second, the forward-looking gearing for an average efficient mobile provider.

Asset beta

[74] Paragraphs A16.22, 2017 WLA Consultation.
[75] Using the Fisher equation where the nominal RFR = ((1+RPI) x (1+ real RFR))-1.
[76] Paragraph A16.75, 2017 WLA Consultation.
[77] https://www.gov.uk/government/publications/rates-and-allowances-corporation-tax/rates-and-allowances-corporation-tax.
[78] Paragraph A16.102, 2017 WLA Consultation.
[79] Page 34, Bank of England, Inflation Report, February 2014. http://www.bankofengland.co.uk/publications/Documents/inflationreport/2014/ir14feb.pdf
[80] This is the same long run RPI estimate as used in the 2015 MCT Statement. See paragraphs A10.86 to A10.94 of that statement.

A10.13 Since our objective is to estimate the asset beta for an average efficient mobile provider in the UK, we have first considered the parent companies of the UK mobile providers, i.e. Vodafone, Telefónica (O2), BT Group (EE) and CK Hutchison H3G). Of these, only Vodafone and Telefónica are predominantly active in mobile,[81] although their UK operations form a relatively small part of their business.[82] BT Group's mobile operations represent around 20% of its revenue. Given that CK Hutchison, the owner of H3G, is a diversified conglomerate operating across several sectors, including retail, ports and telecoms, we do not consider that its asset beta would convey useful information about an average efficient UK mobile provider.

A10.14 Using data to 31 December 2016[83], Table A10.2 shows the 2-year asset betas for BT Group, Vodafone and Telefónica against three different market indices; the FTSE All Share, All World and All Europe.[84] Asset betas have been calculated assuming a debt beta of 0.10 and average gearing over the preceding two years.[85,]

Table A10.2: 2-year asset betas and gearing for UK mobile providers

	FTSE All Share	FTSE All World	FTSE All Europe	2-year average gearing	Mobile revenue % in last financial year
BT Group	0.76	0.81	0.64	27%	20%
Vodafone	0.57	0.53	0.41	46%	78%
Telefónica Spain	n/a	0.77	0.60	54%	50%

Source: BT Group asset betas come from Table A16.18 of the 2017 WLA Consultation and the BT gearing is the average of the 22% and 32% estimates explained in paragraph A16.88 of that consultation. Vodafone and Telefónica information has been estimated by Ofcom using data from Bloomberg. We have not included an estimate of Telefónica's asset beta measured against the FTSE All Share since it is not a UK-listed company.

A10.15 In the 2017 WLA Consultation we proposed to disaggregate the BT Group asset beta into three categories; Openreach copper access, Other UK telecoms and the Rest of BT.[86] The Other UK telecoms asset beta captured BT's mobile activities and we proposed that a reasonable range for the asset beta for BT's Other UK telecoms

[81] Table A10.2 shows that the percentage of revenue generated by mobile is 78% and 50% for Vodafone and Telefónica respectively.
[82] Approximately 10% of Vodafone's 2017 revenue comes from its UK mobile operations. Similarly, around 13% of Telefónica's 2016 revenue comes from its UK mobile operations.
[83] This is consistent with the data period used to estimate asset beta in the 2017 WLA Consultation.
[84] Consistent with previous reviews we propose to place most weight on betas calculated over a 2-year period of daily returns on the basis that it would provide the most appropriate balance between a short enough estimation period to remain relevant on a forward-looking basis whilst having enough data points to be sufficiently statistically robust.
[85] We used a debt beta of 0.10 in the 2015 MCT Statement, the 2016 BCMR Statement and have proposed a debt beta of 0.10 in the 2017 WLA Consultation. We would associate a higher debt beta with relatively higher debt premiums and gearing levels, and vice versa. Our provisional view is that the gearing and debt premium assumptions proposed in this consultation are similar to those used in recent decisions and therefore it remains reasonable to use a debt beta of 0.10. Asset betas are calculated using the following formula:

$$\beta\ asset = Gearing * \beta\ debt + (1 - Gearing) * \beta\ equity$$

[86] Paragraph A16.6, 2017 WLA Consultation.

activities was 0.55 to 0.75.[87] We proposed to set the asset beta for Openreach copper access at 0.55.[88]

A10.16 An asset beta range of 0.55 to 0.75 would be broadly consistent with the two-year asset betas for Vodafone (0.53) and Telefónica (0.77), as measured by reference to the FTSE All World Index. On this basis, it may be appropriate to apply this range to an average efficient mobile provider, but we have also considered additional benchmarks.

A10.17 Table A10.2 above shows that asset betas measured against the FTSE All Share and FTSE All World are similar for BT Group and Vodafone. However, the asset betas measured against the FTSE All World are notably higher than those measured against the FTSE All Europe for all three companies. Given our objective to estimate the asset beta for an average efficient mobile provider in the UK we would normally place most weight on betas calculated against the FTSE All Share index because it reflects what might be termed the 'home bias' of investors towards domestically listed companies.

A10.18 To further assess whether an asset beta range of 0.55 to 0.75 would be appropriate to apply to an average efficient mobile provider, we have considered evidence from eight European mobile providers.[89] For consistency of comparison, we have estimated asset betas against two "market" indices – the FTSE All World and FTSE All Europe. Given the similarity of the asset betas for Vodafone and BT Group (the only two UK-listed mobile providers) against the FTSE All Share and FTSE All World, we place more weight on the asset betas for European mobile providers measured against the FTSE All World.[90]

A10.19 Table A10.3 shows the 2-year asset betas measured against the FTSE All World and FTSE All Europe as at 31 December 2016. Asset betas against the FTSE All World range from 0.39 to 0.80 with an average of 0.66 while against the FTSE All Europe they range from 0.27 to 0.64, with an average of 0.50.

Table A10.3: 2-year asset betas and gearing for European mobile providers

	All World Asset Beta	All Europe Asset Beta	2-year average gearing	Mobile revenue % in last financial year
Deutsche Telekom	0.73	0.48	45%	60%
Telenor	0.69	0.54	25%	81%
Tele 2	0.80	0.64	22%	77%

[87] See Paragraphs A16.128 to A16.132, 2017 WLA Consultation. This was supported by a report from NERA which concluded, after considering qualitative and quantitative indicators of differences in systematic risk, that "at present, we do not find evidence of differences in systematic risk between fixed and mobile telecoms operators". NERA's report can be found in Annex 21 of the 2017 WLA Consultation.

[88] Paragraph A16.122, 2017 WLA Consultation.

[89] We selected operators using Bloomberg's 'equity screening' (EQS) function where the country of domicile was Western Europe, the industry classification (using BICS) was 'wireless telecom services' and annual revenue was greater than £1bn. Using annual reports, we estimated the proportion of revenue that came from mobile activities and refined our comparator selection by only including those companies that generated more than 50% of revenue from mobile. Vodafone and Telefónica Spain were excluded from this list since they are included in Table A10.2

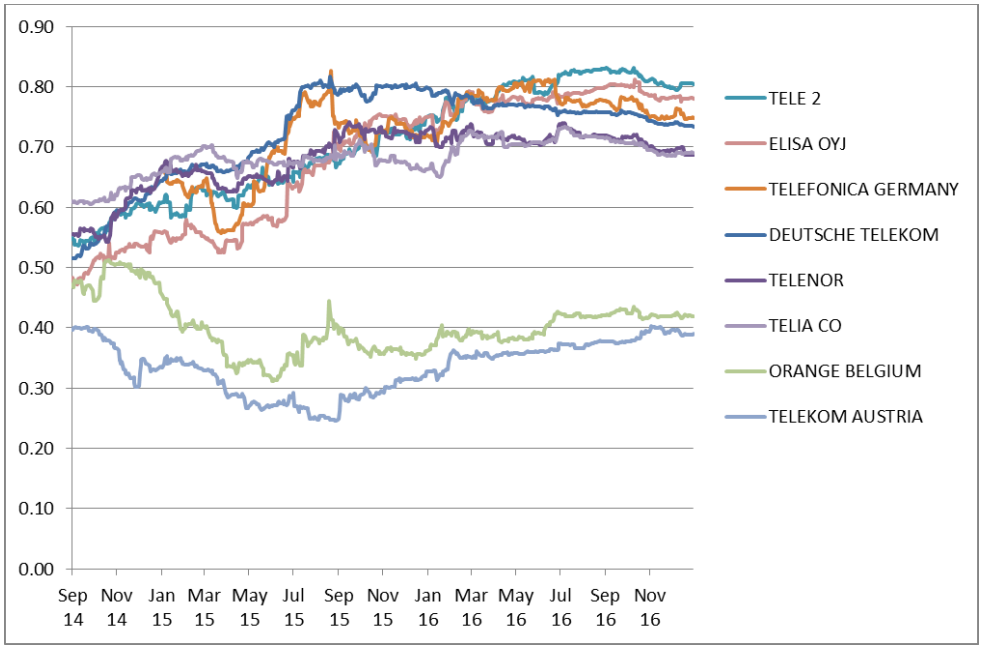
[90] This is consistent with our approach in the 2017 WLA Consultation where we considered the asset betas of European telecoms operators against the FTSE All World for consistency of comparison with UK telcos. See paragraph A16.131 of that consultation.

Telefónica Germany	0.75	0.52	14%	87%
Telekom Austria	0.39	0.27	47%	100%
Elisa OYJ	0.78	0.64	17%	62%
Orange Belgium	0.42	0.37	28%	93%
Telia Co	0.69	0.55	34%	55%
Minimum	0.39	0.27	14%	55%
Maximum	0.80	0.64	47%	100%
Average	0.66	0.50	29%	77%

Source: Bloomberg, Ofcom analysis. Data to 31 December 2016.

A10.20 Figure A10.1 below shows that, while there is some variability, many of the asset betas measured against the FTSE All World currently lie above the average of 0.66, approximately between 0.70 and 0.80.

Figure A10.1: 2-year asset betas against the FTSE All World for European mobile providers



Source: Bloomberg, Ofcom analysis. Data to 31 December 2016.

A10.21 As noted above, an asset beta range of 0.55 to 0.75 would broadly reflect the asset betas measured against the FTSE All World for Vodafone and Telefónica; the only two listed UK operators which are predominantly engaged in mobile activities. The range also has a midpoint of 0.65 which is close to the average asset beta for the parent companies of European telcos measured against the FTSE All World (0.66).

A10.22 While arguments could be made for a wider range than this, reflecting the uncertainty in asset beta estimates reported in the parent company betas above, we propose that the estimates recently used in the WLA consultation for UK fixed telecoms services also provide useful benchmarks. For example, we would not expect the mobile asset beta to be more utility like – and hence lower – than that for Openreach copper access (0.55). Similarly, we would not expect mobile services to

be risker than other telephony usage services in the UK – i.e. no higher than for Other UK telecoms (0.75) in the recent WLA consultation.

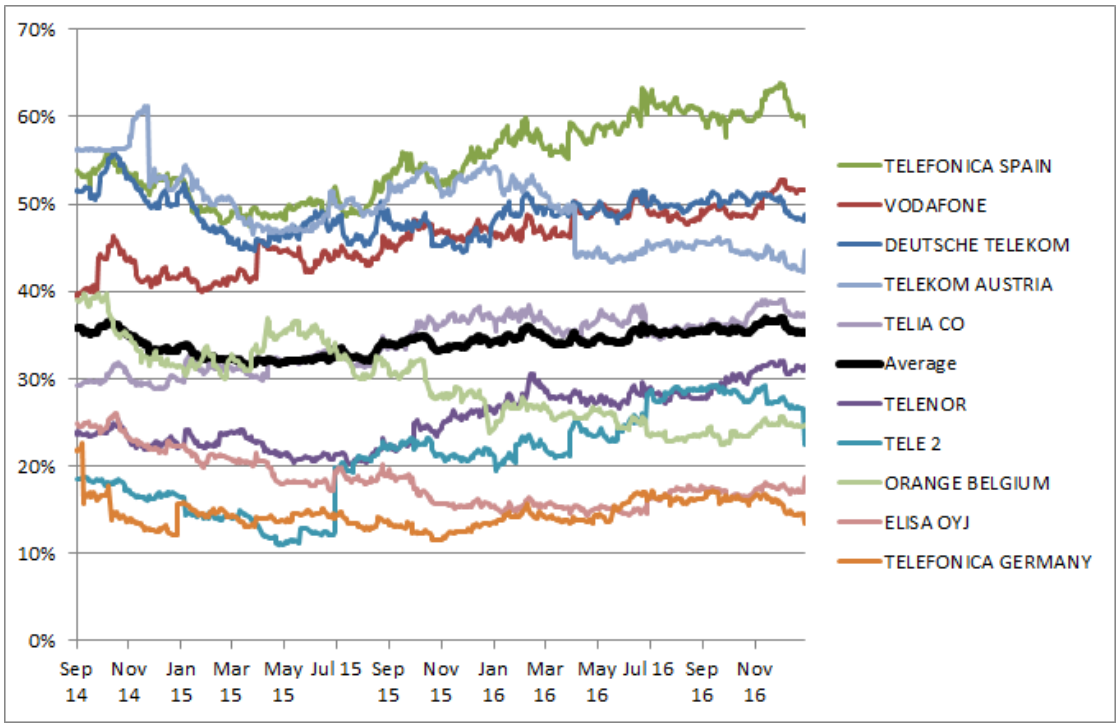
A10.23 Therefore, based on the available evidence and benchmarks we propose that 0.55 to 0.75 is a reasonable range for the asset beta of an average efficient UK mobile provider.

Forward-looking gearing

A10.24 To estimate the forward-looking equity beta from this asset beta, we need to estimate the forward-looking gearing for an average efficient mobile provider.

A10.25 As shown in Tables A10.2 and A10.3, the average 2-year gearing for European mobile providers in the last two years is 29%, while for Vodafone and Telefónica Spain (the only two listed UK providers which are predominantly engaged in mobile activities) it is slightly higher at 46% and 54% respectively.[91] Across all of these UK and European mobile providers, the average 2-year gearing is 33%. Figure A10.2 below shows that while the daily gearing of individual UK and European mobile providers can vary significantly (from a low of around 15% to a high of around 60%) the daily average has been reasonably stable at around 35%, similar to the average gearing over the last two years (33%).

Figure A10.2: Daily gearing of UK and European mobile providers



Source: Bloomberg, Ofcom analysis. Note the above chart displays the daily gearing while Tables A10.2 and A10.3 show the average gearing over a 2-year period.

[91] In the 2017 WLA Consultation we took account of BT's pension deficit when estimating gearing (see paragraph A16.88 and A16.92 to A16.95). The mobile operators we have considered in this consultation do not have significant pension deficits so we have not undertaken further analysis in relation to the impact of pension deficits on mobile asset betas.

A10.26 Therefore, we propose to use a forward-looking gearing of 35% for an average efficient mobile provider.

Estimate of forward-looking equity beta

A10.27 Combining an asset beta range of 0.55 to 0.75, a forward-looking gearing of 35% and a debt beta of 0.1 we derive a forward-looking equity beta for an average efficient mobile provider of 0.79 to 1.10.

Debt premium

A10.28 In estimating the nominal cost of debt for an average efficient mobile provider, our proposed approach involves summing together two parameters:

- the nominal RFR; and
- the debt premium.

A10.29 The debt premium represents the extra return that investors require as a reward for investing in the particular corporate debt in question rather than a risk-free asset.

A10.30 To estimate the debt premium, we have considered the credit rating of UK and European mobile providers and the average maturity of outstanding debt. Table A10.4 shows that, as at December 2016, five of the seven mobile providers rated by S&P have a rating around BBB (i.e. either BBB or BBB+) and the average maturity of debt is around 8 years, although the average debt maturity for individual mobile providers varies from around 4 to 19 years.

Table A10.4: Credit rating and average debt maturity for UK and European mobile providers

	Credit rating	Average debt maturity
Telenor	A	3.5
Telia Co	A-	18.6
Deutsche Telekom	BBB+	7.4
Vodafone	BBB+	8.1
Elisa OYJ	BBB+	5.0
Telefónica Spain	BBB	6.7
Telekom Austria	BBB	11.2
Tele 2	n/a	5.0
Telefónica Germany	n/a	6.7
Orange Belgium	n/a	8.5
Average		8.1

Source: S&P, Bloomberg, Ofcom analysis.

A10.31 To reflect the credit rating and debt maturity of UK and European mobile providers we have considered the spreads on an index of BBB bonds with maturities of between 5 and 10 years. In the 2017 WLA Consultation, we said that in 2016 the debt premium on 5-year BBB bonds ranged from 1.0% to 2.1% with an interquartile

range of 1.1% to 1.5% and the debt premium on 10-year BBB bonds was 1.1% to 2.4% with an interquartile range of 1.2% to 1.7%.[92]

A10.32 Given the uncertainly around the exact credit rating and debt profile of an average efficient mobile provider, we propose that the evidence from spreads on 5 and 10-year BBB bonds would support a debt premium range of 1.0% to 2.0%.

A10.33 To assess whether a debt premium range of 1.0% to 2.0% is appropriate to apply to an average efficient mobile provider, we have further considered the spreads on a sample of sterling debt held by the UK mobile providers from Table A10.2 with a similar average debt maturity to the mobile providers from Table A10.4 (i.e. 8 years).

A10.34 Table A10.5 shows that the debt premiums on such debt fall within our proposed range of 1.0% to 2.0%.

Table A10.5: Debt maturity and spread on a sample of sterling debt for UK mobile providers

Company and debt maturity	Debt maturity in years as at December 2016	Debt premium
Vodafone 2025	9	1.6%
Telefónica Spain 2022	6	1.6%
Telefónica Spain 2026	10	1.7%
BT Group 2028	12	1.3%

Source: Bloomberg, Ofcom analysis. Debt premium is the average spread during 2016.

Provisional WACC estimate

A10.35 Table A10.6 sets out our range of estimates of the pre-tax real WACC for an average efficient mobile provider. On the basis of these estimates, we propose to apply a pre-tax real WACC of 7.0%.

Table A10.6: Range of WACC estimates for an average efficient UK mobile provider

	Low	High
WACC (pre-tax nominal)	8.2%	10.0%
WACC (pre-tax real using CPI deflation)	6.1%	7.8%

Source: Ofcom analysis.

[92] Paragraph A16.37, 2017 WLA Consultation.

Annex 11

Application of the charge control to non-EEA originated calls

Introduction and summary

A11.1 UK MTRs are currently capped at LRIC regardless of where or from what type of network the call originates. Within the EEA[93], termination rates are cost-orientated and apply to traffic originated domestically or elsewhere within the EEA. In contrast, termination rates in some, but not all, countries outside the EEA are significantly above those in the UK. EEA national regulatory authorities have adopted different approaches to regulation of calls from outside the EEA. Some UK MCPs have argued that we should adopt such a differential approach in the UK, because they are currently experiencing net revenue outflows to some non-EEA countries.

A11.2 The view underpinning MTR regulation in the UK to date (as elsewhere) has been that MCT providers with SMP have the incentive and ability to charge high MTRs, and that the promotion of competition, efficiency, and consumers' interests, are better served by (lower) regulated rates at incremental cost (LRIC). That is also our provisional view in the present consultation. Adopting differential regulation for calls from outside the EEA would require us to believe that the reasons for adopting this view did not hold in relation to such calls. We would, therefore, need a strong basis for believing that UK consumers' interests would be best served by taking such a step.

A11.3 While there may in principle be some benefits from differential regulation, these depend on where rates would settle and whether any benefits are passed from mobile providers to consumers. In particular, for the benefits to be material, it requires either:

a) high termination rates in other countries being reduced through negotiation and strong pass-through of these cost reductions to UK retail call prices; or

b) a waterbed effect whereby higher wholesale revenues for UK mobile providers are used to reduce retail prices for UK consumers or to invest more in UK mobile networks to the benefit of consumers.

A11.4 Our assessment at this stage is that these benefits are either unlikely to materialise or would be small. In addition, there are risks that allowing UK mobile providers to set higher MTRs could have negative consequences for consumers, particularly if it led to a 'race-to-the-top' in setting MTRs, or contagion to countries where there are currently reciprocal low rates. A likely increase in UK MTRs, owing to differential regulation, is liable cause a reduction in calls to UK consumers from outside the EEA.

A11.5 We therefore propose to apply the same charge controlled rate to all mobile calls terminated in the UK regardless of origin. This would be consistent with our efficiency objectives and more likely to further consumers' interests in line with our principal duty under section 3 of the Act.

[93] The EEA consists of the European Union, Iceland, Liechtenstein and Norway.

Stakeholders' views

A11.6 EE[94] and H3G[95] have told us they are concerned that high termination rates in countries outside the EEA lead them to experience net revenue outflows. They argue that if they had the ability to set their MTRs for non-EEA originated calls above the present cap, they may be able to negotiate down the termination rates they pay and that the resulting savings could be used to reduce retail prices or increase investment in the UK. In contrast, Verizon considers that all calls to UK mobiles, regardless of origin, should be subject to the same MTR charge control.[96]

Regulatory treatment to date of Non-EEA originated calls

Narrowband Market Review Consultation

A11.7 The 2016 Narrowband Market Review Consultation proposed applying a single LRIC-based charge control on fixed termination rates to all calls, regardless of origin (i.e. no differential regulation). We said that while there may be theoretical arguments to support excluding the termination of calls originated outside the EEA from the wholesale (fixed) call termination charge control, we thought that the benefits to UK consumers would be limited in practice and there could be undesirable offsetting effects.[97]

Other EEA NRAs

A11.8 In other EEA countries, NRAs have adopted varying approaches to the treatment of termination rates for calls originated outside the EEA:

- Some NRAs have included calls from outside the EEA within the defined market and applied their MCT charge control to these calls (as is currently the case in the UK).
- Some NRAs have excluded calls from outside the EEA from the definition of the relevant market for MCT.
- Some NRAs, while including calls from outside the EEA within the relevant markets, have either:
    - Excluded the termination of non-EEA originated calls from the MCT charge control; or
    - Applied some form of 'reciprocity' condition for non-EEA originated calls.

A11.9 The approach taken by each NRA is shown in Table A11.1 below:

[94] EE email to Ofcom, 18 November 2016.
[95] H3G email to Ofcom, 26 January 2017.
[96] Verizon, *Verizon Submission regarding Mobile Call Termination Rates to the Ofcom Mobile Call Termination Market Review*, May 2017.
[97] Ofcom, *Narrowband Market Review*, *Consultation on the proposed markets, market power determinations and remedies for wholesale call termination, wholesale call origination and wholesale narrowband access markets,* paragraph 13.116, page 285.

Table A11.1: Approaches to regulation of calls originated outside the EEA

Single MTR cap for all calls[98]	Calls from outside the EEA excluded from Market Definition and, therefore, the Charge Control	Calls from outside the EEA exempted from the Charge Control	'Reciprocity'
Romania	Estonia	Czech Republic	France
Spain	Denmark	Croatia	Germany
Ireland	Luxembourg	Slovenia	Netherlands
Slovakia	Poland	Hungary	Austria
Sweden		Portugal	
UK		Italy	
		Belgium	
		Greece	
		Norway	

Source: Ofcom questionnaire to EEA NRAs supplemented by Cullen International analysis of mobile termination rates and MCT cost model.

A11.10 The precise workings of the reciprocity arrangements vary between countries. For example:

- French providers can set their termination rates up to, but not exceeding, the rates set by the counterparty non-EEA provider. [✂REDACTED✂]
- German providers are only allowed exemption from the charge control on a country-by-country basis. They are required to apply to BNetzA and provide evidence that they are charged asymmetric tariffs by providers in the respective countries. [✂REDACTED✂]

A11.11 Based on information provided by other NRAs, we observe that:

- In other EU member states where differential regulation has been applied, providers have increased MTRs for non-EEA originated calls. In many cases, a single increased MTR has been applied to all such calls.
- In [✂REDACTED✂] increases in MTRs for calls originating from non-EEA countries were followed by increases in termination rates in those other countries, although it is not possible to say with current information whether or not the former caused the latter.

A11.12 A UK MCT provider highlighted [✂REDACTED✂] EEA providers [✂REDACTED✂] that were able to agree reduced MTRs in a single country outside the EEA. [✂REDACTED✂] We note, however, that the commercial conditions in this instance are unlikely to be representative of the general relationship and scope for negotiations between UK providers and their non-EEA counterparts. We are not aware of any similar cases in the UK.

[98] We note that all those NRAs which impose a single MTR cap for all calls are reviewing the market within the next two years and so their approaches may change.

Scale of traffic with non-EEA countries

Call volumes

A11.13 Table A11.2 below shows the volumes of calls made to, and received from, countries outside the EEA by UK mobile consumers per annum (including calls to and from businesses). In aggregate, UK consumers receive more calls from countries outside the EEA than they make to them.

Table A11.2: Annual call flows (minutes) between UK MCT providers and countries outside the EEA

	Calls made	Calls received
Volume of call minutes to/from countries outside the EEA[99]	800 million (approx.)	1 billion (approx.)
Proportion of total off-net calls made/received	1.0%	1.5%

Source: Ofcom analysis of data provided by the four large MCT providers for 2016.

Net revenue outflows

A11.14 We estimate that the UK MCT providers' total gross termination and transit payments for calls to outside the EEA are approximately £40m per annum, and their gross termination revenues for calls from outside the EEA are approximately £4m per annum, leading to net termination and transit flows of approximately £36m per annum across all MCT providers. This is relatively large compared to UK provider net termination revenues of £85m, but is small in relation to total sector revenues of over £15.3bn per annum, and EBITDA and EBIT of around £4bn and £1bn respectively.[100]

A11.15 There are reasons to think that this £36 million estimate is likely to overstate the true net outflow from UK MCT providers to non-EEA providers as a result of high termination rates. This is because the figure includes payments for:

- International transit, because in responding to our data request UK mobile providers were unable to separate transit charges from termination charges. International transit payments are unlikely to be directly affected by the regulatory regime pertaining to termination rates; and
- Calls to and from non-EEA providers within the same corporate group as the UK provider. In these cases the termination payments will be retained within the wider corporate entity (i.e. they do not represent a true outflow).

A11.16 We have limited information on the net revenue outflows experienced in EEA countries which have adopted differential regulation for calls originating outside the

[99] The outbound volumes figure is an approximation as we received two different volumes figures from [✂REDACTED✂]. The inbound volumes figure is an approximation as it relies on estimating the inbound volumes to two large MCT providers [✂REDACTED✂], as these were unable to disaggregate inbound international volumes based on country of origin.

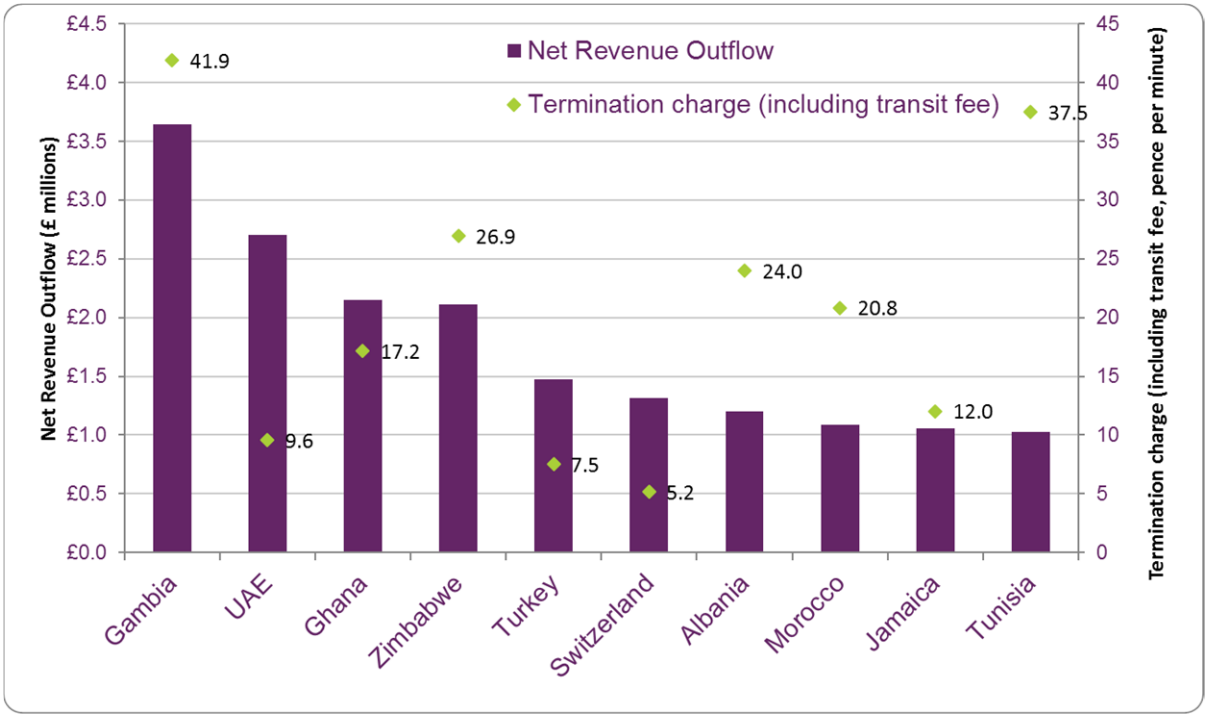
[100] Approximate figures based on Ofcom analysis of data provided by the four large MCT providers for the calendar year 2016. This may not capture net revenue outflows of all small MCT providers or all payments for fixed call termination in non-EEA countries. However, these omissions are likely to be small relative to the net flows.

EEA. However, the Italian regulator (AGCOM) estimated revenue outflows from Italy to countries outside the EEA at €400m in 2014, i.e. far in excess of what we have estimated for UK provider out payments.[101]

A11.17 We asked the four large UK MCT providers to provide information on countries with which they experienced net revenue outflows in excess of £50,000 in 2016:

- 60 countries were cited by at least one MCT provider as having a net revenue outflow in excess of £50,000.
- Around half of the total net revenue outflow arises from just ten countries, in each of which UK MCT providers as a whole face a net revenue outflow of over £1 million on that route.[102] These are shown in Figure A11.1 below.

Figure A11.1: Non-EEA countries with industry-wide net revenue outflows of over £1 million[103]



Source: Ofcom analysis of data provided by the four large MCT providers for 2016.

[101] Autorità per le Garanzie nelle Comunicazioni, Delibera N. 45/17/Cons, 2016, page 68 https://www.agcom.it/documents/10179/2732740/Delibera+497-15-CONS/c0dc0d62-f3e7-4179-9b73-c015c115db8d?version=1.0.

[102] Source: Ofcom analysis of data from the four large UK MCT providers.

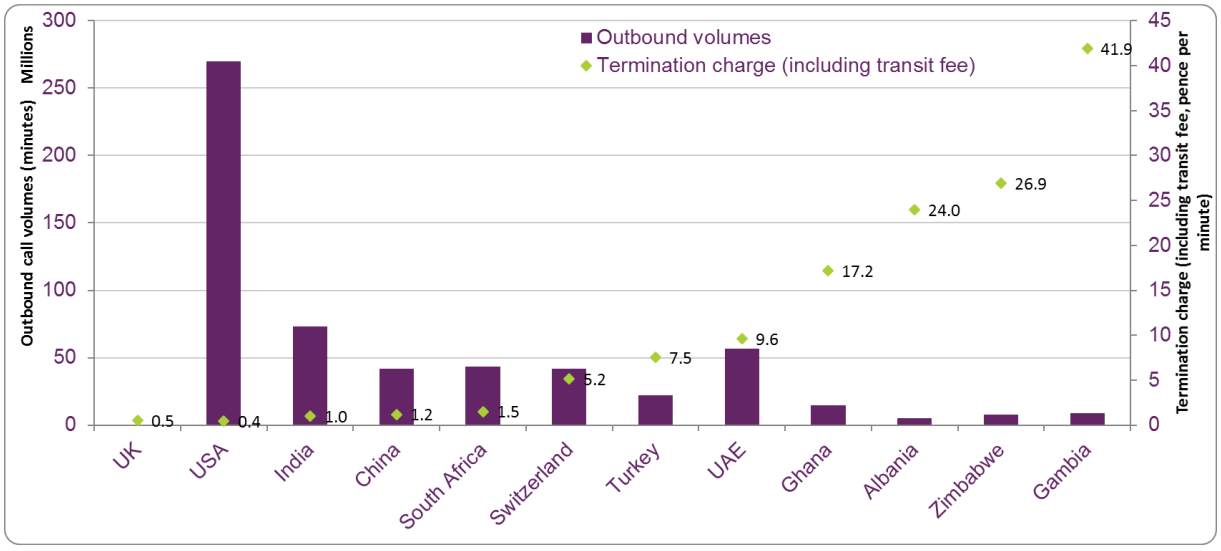
[103] Note this does not refer to the full net revenue outflow for these countries, as some large MCT providers did not experience a net revenue outflow above the threshold with respect to these countries. However, any net revenue outflow not captured would be relatively small (i.e. less than £50,000 per large MCT provider). It is also possible that some large MCT providers experienced a net revenue inflow with the country in question, which would not be captured in these figures.

Termination rates and regulation

A11.18 As seen in Figure A11.2 below, there is significant variation in the rates charged by operators in countries outside the EEA:

- Many countries outside the EEA have relatively low termination and transit charges. This includes some countries with high call volumes such as the USA, India, China and South Africa, where rates are similar to those charged by UK and EEA providers.
- On the other hand, in other countries, such as Gambia, Zimbabwe, Albania and Ghana, termination rates are very high.[104]

Figure A11.2: Termination charges (including transit fees outside the UK) and outbound volumes for selected non-EEA countries[105]



Source: Ofcom analysis of data provided by the four large MCT providers for 2016.

A11.19 In terms of regulation of termination rates, some non-EEA countries impose relatively low termination caps (e.g. India and South Africa[106]). In contrast, some

[104] Provider data suggests that Japan, Niger, Nigeria, Thailand, Australia, Pakistan, Bangladesh and Malaysia all currently charge rates below 5ppm, which, while still relatively high, are closer to the UK and EEA regulated rate (and since the reported rates include transit charges, the true termination rate will be lower still). Many of these countries also terminate large volumes of calls from the UK. Furthermore, there is a selection bias arising from the fact that we only requested termination payment data for those countries where UK providers experienced net revenue outflows in excess of £50,000. To the extent that this is driven by the charges faced in non-EEA countries, low termination charge countries will be under-represented in the data we received.

[105] This graph includes estimates of the outbound volumes of calls to these non-EEA countries for those large MCT providers who did not provide the outbound volumes for calls to the country in question as they did not face a net revenue outflow in excess of £50,000 with respect to that country.

[106] Telecom Regulatory Authority of India, 23 February 2015, *Information Note to the Press (Press Release No.13/2015*), p.2., http://trai.gov.in/sites/default/files/PR-13-2015.pdf; Independent Communications Authority of South Africa, 29 September 2014, *"Call Termination Regulations, 2014*", p.6 and 9. https://www.icasa.org.za/Portals/0/Regulations/Regulations/Call%20Termination/Regulations/FinalCallTerm29Sept.pdf

countries operate price floors on termination rates. The OECD has highlighted the use of surcharges on international incoming traffic mandated by regulators or legislation in 15 African countries and notes that this has increased in recent years.[107] For example, legislation in Ghana sets a minimum price of $0.19 per minute for termination of international calls.[108]

A11.20 Both Figure A11.1 and Figure A11.2 above highlight that net revenue outflows can be driven by either a high net volume of calls from the UK to the non-EEA country, a high termination rate in the recipient non-EEA country, or a combination of the two.

Options for consideration

A11.21 We consider below three options for the treatment of MTRs from calls originating outside the EEA. We do not propose to exclude non-EEA originated calls from the market definition. This is because the service provided by the terminating provider is the same irrespective of the location of the CP that seeks to buy the termination.

Option 1: No differential regulation (i.e. maintain the status quo)

A11.22 This option would maintain the current approach and apply the same charge controlled MTR to all calls terminated in the UK regardless of origin.

Option 2: Exclude the termination of non-EEA originated calls from the MCT charge control

A11.23 This option would remove the charge control cap for non-EEA originated calls, giving UK MCT providers freedom in setting MTRs for non-EEA originated calls. This could be implemented, for example, by limiting the scope of the charge control obligation to apply to UK and EEA originated calls only.

Option 3: A reciprocity condition for non-EEA originated calls

A11.24 This option would require that any negotiated rate must be reciprocal, that is, it is not higher than the termination rate offered by a non-EEA provider or, if higher, the UK regulated cap. This could be implemented in a variety of ways including, for example, as a condition within the charge control itself or via the fair and reasonable network access condition.

Assessment of options

A11.25 To assess these options, and consider whether consumers' interests may be furthered by differential regulation, we take as our starting point our provisional assessment that termination rates should be capped at LRIC. We look at:

[107] OECD (2014), *International Traffic Termination,* http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=DSTI/ICCP/CISP(2013)9/FINAL&docLanguage=En; See also GSMA (2014), *Surtaxes on International Incoming Traffic in Africa,* https://www.gsma.com/publicpolicy/wp-content/uploads/2012/03/Surtaxes_on_International_Incoming_Traffic_in_Africa_FULL-REPORT_WEB.pdf

[108] Parliament of Ghana, Electronic Communications (Amendment) Act 2009 http://www.nca.org.gh/assets/Uploads/Ghana-Electronic-Communications-Amendment-Act-Act-787.pdf

- possible changes to the level of UK and international MTRs (for calls from the UK) under differential regulation;

- the likelihood of differential regulation leading to low termination rates overseas; and

- the possible effects of differential regulation, in particular on consumers.

A11.26 Throughout our assessment we generally consider both forms of differential regulation together but we discuss Options 2 and Option 3 separately as necessary.

Starting point

A11.27 We have set out in Section 4 of this consultation our provisional view that the capping of termination rates at LRIC would facilitate more effective competition and be to the benefit of end consumers. Likewise, we consider that such rates would be consistent with our efficiency objectives, would produce regulatory certainty and would be consistent with the 2009 EC Recommendation.

A11.28 Our further provisional assessment is that the capping of MTRs at LRIC in respect of calls originated outside the EEA would also be liable to secure the same outcomes.

A11.29 That being so, we then consider whether there are reasons why we might, nonetheless propose a different approach in respect of non-EEA originated calls.

Possible changes to the level of UK and international MTRs under differential regulation

A11.30 Differential regulation of UK MTRs (Options 2 and 3 above) could in principle lead to situations characterised as having either reciprocal low termination rates or reciprocal high termination rates.

- **Reciprocal low termination rates:** As noted in paragraph A11.6 above, EE and H3G have argued that they may be able to secure reciprocal low termination rates by using the threat of charging high MTRs to reduce the rates paid for terminating calls in non-EEA countries.

- **Reciprocal high termination rates:** This outcome could result if UK providers respond to differential regulation by increasing MTRs to providers in countries which have high termination rates, or if UK providers are unsuccessful in negotiating reciprocal low termination rates and subsequently raise their MTRs.

A11.31 In relation to the reciprocal high outcome, there could be a dynamic process by which this does not stop at the initial non-EEA rate. A 'race-to-the-top' in setting termination rates could occur if non-EEA providers respond to higher UK MTRs by raising their own termination rates,[109] possibly with further increases from UK MCT providers in response. As noted at paragraph A11.11 above, such an outcome may have occurred in [✂REDACTED✂]. Our provisional assessment is that a reciprocity condition (Option 3) would not necessarily prevent this.

[109] Perhaps with the motivation of maintaining their existing net termination revenue position, if they are not subject to a binding termination rate cap.

The likelihood of differential regulation leading to low termination rates

A11.32 The current regulation does not allow UK MCT providers to use the threat of increased MTRs to negotiate with their overseas counterparts. For differential regulation to lead to reciprocal low termination rates, UK MCT providers would need to have the ability and incentive to exert bargaining power, which includes making a credible threat to increase MTRs, and both sets of providers would need to prefer low rates to high rates.

A11.33 In our provisional assessment, the likelihood of differential regulation leading to low termination rates, where UK providers currently face high termination rates, is limited.

Comparison with bargaining over MTRs domestically

A11.34 In our SMP assessment, in Section 3, we propose to continue to find that UK providers do not have sufficient CBP in relation to each other for MCT. This may be indicative of the likely outcome where SMP regulation is relaxed for non-EEA originated calls. While there could be some differences between the situation in relation to domestic MCT providers compared to the situation between domestic providers and non-EEA providers, it is not clear that this would result in a situation of greater CBP for UK MCT providers vis-à-vis non-EEA providers. For example, negotiations are more arms-length and dependent on transit providers than for domestic traffic.

Outcomes without negotiation or after failed negotiation

A11.35 Where negotiations do not take place, and the starting rates from one side are high, we would expect high rates to prevail on both sides. In economic terms, the setting of termination rates for international calls is a two-way access pricing problem in the absence of competition for customers. Where charges are set non-cooperatively this leads to an outcome where each party uses its market power to set charges above cost (i.e. high termination rates will prevail).[110] The same outcome would occur if the two sides negotiated but failed to reach an agreement or if at least one-party preferred high rates.

Incentive and ability of MCT providers to negotiate and agree lower termination rates

A11.36 For UK providers to act on any incentives to negotiate MTRs they must be able to discriminate between originating providers and have sufficient bargaining power. This would require them to:

- Identify which country, and which provider within that country, traffic has originated from;
- For outbound traffic to that provider, identify the termination rate charged separately from any transit charge;
- Have a direct commercial relationship which could allow them to negotiate with the overseas provider levying the termination rate; and

[110] See Armstrong (2002), *The Theory of Access Pricing and Interconnection* in the Handbook of Telecommunications Economics, Section 4.1.1.

- Be capable of charging MTRs which vary depending on the origin of the call.

A11.37 The evidence we have gathered suggests that, currently, UK providers do not meet these requirements. For example:

- Large providers' responses to our s135 information requests indicate they have a limited ability to identify the country from which international traffic has originated. As they pay a charge which combines both termination rates and transit fees, no provider has been able to fully isolate and identify the termination rate they are paying.

- They also negotiate with international carriers, rather than directly with providers in non-EEA countries.[111]

A11.38 In paragraph A11.19, we highlighted that some countries effectively impose price floors on termination rates. Absent changes to regulation or legislation in those countries, UK providers would not be able to achieve lower termination rates via commercial negotiations.

A11.39 In relation to the incentive to negotiate lower rates, we note that the net revenue outflows from UK providers to individual countries are typically low and would be dispersed across multiple counterparties in each country. For UK providers, increasing MTRs may achieve much of the same improvement in net revenue outflow without the associated negotiation costs. This suggests that even if UK providers could negotiate, they may have limited incentive to do so.

A11.40 Moreover, data from UK providers indicates that currently they are net recipients of international traffic from non-EEA countries which would imply that, if the UK remained a net recipient, UK providers would be likely to prefer high reciprocal rates to low reciprocal rates, as this would increase their net revenue inflows.

Outcomes of differential regulation in other EU member states

A11.41 We noted at paragraph A11.11 that in other EU member states where differential regulation has been applied, domestic MTRs have increased, and some member states noted increases in the MTRs charged by non-EEA providers. This further suggests that reciprocal low rates may be unlikely to materialise from differential regulation.

Provisional view

A11.42 Our provisional assessment is that, if differential regulation were imposed (Option 2 or 3), it is more likely that reciprocal high termination rates would prevail.

Possible effects of differential regulation

A11.43 Table A11.3 summarises the three main potential effects on consumers of differential regulation.

[111] Although note the exception mentioned at paragraph A11.12.

Table A11.3: Summary of possible outcomes for termination rates under differential regulation

Effect	Type
Direct pass-through to UK international call prices	Benefit
Waterbed Effect	Benefit
Reduction in calls to UK consumers from outside the EEA	Cost

Source: Ofcom.

A11.44 After discussing the three effects in the table, we then consider other potential consequences arising from differential regulation.

Potential pass-through to UK international call prices

A11.45 The impact of a change in termination rates on retail prices will depend on the relative magnitude of the relevant termination rates and retail prices and how much retail prices change after a given change in termination rates (i.e. the 'pass-through rate').

Reduction in termination rates

A11.46 A reduction in non-EEA termination rates could reduce UK international call prices. If so, UK consumers would benefit from lower retail prices for international calls or increases in volumes, with the impact depending on the scale of the reduction of retail call prices. Consumers who make proportionally more calls to non-EEA countries would be the largest beneficiaries. As a secondary effect, lower costs could, in principle, also spur greater competition among mobile providers in the UK, if those providers responded to the lower prices from their domestic competitors by lowering their own prices.

A11.47 However, some evidence indicates that non-EEA termination rates are low in comparison to retail prices paid by consumers:

- The average retail price charged for these services is much higher than the average termination rate faced for these calls. This is highlighted by the fact that, combined, [✂REDACTED✂] receive retail revenue of approximately [✂REDACTED✂] million for calls to non-EEA providers where they face net wholesale charges of approximately [✂REDACTED✂] million (even when they include transit fees), i.e. a multiple of over 17 times the costs of non-EEA termination.[112]

- Additionally, providers typically set international call prices for groups of countries.[113] The termination rate for any single country in such a group, and thus

[112] These figures are based on data on outbound volumes, average retail prices and termination rates (including transit fee) for those countries where UK providers faced a net revenue outflow of at least £50,000. Only [✂REDACTED✂] were able to provide the requested data on the average retail price for making outbound calls to providers in these non-EEA countries.
[113] Retail tariff information for international calls taken from Pure Pricing Mobile Price Plan monthly update to Ofcom for January 2017. While there are some instances of MCT providers offering specific tariffs or packages with lower retail prices for calls to specific countries, this appears to be more prevalent for EEA countries and those non-EEA countries with very low termination rates.

the change achievable from any single negotiation, will account for only a limited proportion of overall termination costs of the group.

A11.48 This suggests that although direct pass-through is possible as the input costs for each group is lowered, compared to a situation in which termination rates accounted for a larger portion of the retail price there may be limited scope for a reduction in termination rates to significantly reduce UK international call prices and so limited scope for the consumer benefits described above to materialise.

Increase in termination rates

A11.49 If there were a 'race to the top', this would increase the termination rates faced by UK providers. The low share of retail prices accounted for by termination rates may mute the impact on retail prices, but termination rates would nonetheless account for an increasingly large share of retail prices as they increase. This means there will be scope for retail price increases, and if termination rates grow significantly then the impact on retail prices could also be significant.

A11.50 Therefore, there is a risk that differential regulation could adversely affect UK retail call prices and volumes from the perspective of UK consumers.

Potential impact on retail prices and investment via a waterbed effect

A11.51 UK MCT providers' net termination revenue outflows would reduce if the MCT revenues they receive rose. This would occur under the reciprocal high rates outcome outlined above, or if UK MCT providers charged higher MTRs to those providers outside the EEA which currently charge low MTRs.

A11.52 This saving would benefit consumers if it were used to either improve aspects of retail offers (i.e. a 'waterbed effect' on retail offers)[114] or to fund efficient investment which would not otherwise have occurred (i.e. a 'waterbed effect' on investment). Alternatively, these revenues could partially or completely pass-through to provider profits, which would not benefit consumers.

A11.53 An empirical study, using data up to 2011, indicates that, as fixed-to-mobile volumes declined, the previously observed waterbed effects from MTRs to prices diminished and there is no effect for investment.[115] This suggests that the waterbed effect is unlikely to have an appreciable impact on market outcomes for UK consumers.

A11.54 With the available data we cannot make a reliable quantitative assessment of the likely waterbed effect from an improvement in net termination outflows due to differential regulation. However, we note the potential sum available to contribute to a waterbed effect in this empirical study is significantly larger than net termination outflows associated with non-EEA calls. This suggests, in our provisional view, there is likely to be limited scope for differential regulation to create such a waterbed effect which would appreciably improve consumer outcomes.

[114] The direct effect on international call prices is covered under the previous effect, so this would be the effect on other aspects of retail offers such as subscription fees or domestic call prices.
[115] Genakos, C. and T. Valletti, 2015, *'Evaluating a decade of mobile termination rate regulation*', Economic Journal.

Potential reduction in calls to UK consumers from outside the EEA

A11.55 If UK MTRs increased under differential regulation this could pass-through to retail prices in non-EEA countries,[116] leading to fewer calls to UK consumers and businesses. This would harm UK consumers to the extent they benefitted from international calls and would receive fewer of them (i.e. there are call externalities for UK consumers).[117] The impact of reducing call volumes would likely be exacerbated as UK MTRs increased. It would also be larger if MTRs were raised for calls originating from countries which currently have low MTRs.

Other potential consequences of differential regulation

Risk of CLI manipulation and inefficient call routing

A11.56 If differential regulation led to higher MTRs for non-EEA originated calls, under Option 2 or 3 it could create an incentive for overseas providers to mask the origin of calls by manipulating or removing CLI, which would give rise to concerns, including in relation to nuisance calls.[118] Similarly, differential regulation might create incentives for inefficient call routing or other undesirable practices.

A11.57 We are not inclined to introduce regulation that incentivises inefficient routing or CLI manipulation as this could reduce the quality of service experienced by UK consumers in the form of lower quality connections and incorrect or missing caller information. There may also be higher resource costs in rerouting calls which, while not necessarily impairing quality, add to the marginal cost of the call, resulting in productive inefficiency.

Issues related to a reciprocity condition (Option 3)

A11.58 Our further provisional assessment, overall, is that a reciprocity condition (i.e. Option 3) would not in general be more effective than both of the other options in generating reciprocal low MTRs.

- Where UK MCT providers are currently charged high termination rates, the bargaining power afforded by Option 3 would be no better than excluding non-EEA calls from the charge control (Option 2). On that basis, Option 3 would be no more likely than Option 2 to bring about reduced termination rates in such a situation.

- Where UK MCT providers face low termination rates, Option 3 could, in principle, be more effective than Option 2 in preventing reciprocal high MTRs (including a 'race to the top'). But it would be less effective than Option 1 (i.e. maintaining the status quo) because a reciprocity condition is vulnerable to dynamic behaviour between UK and overseas providers. For example, this could be due to retaliation

[116] There is some price data suggests that in lower income countries retail prices for international calls are lower, meaning increases in the MTRs charged by UK MCT providers might be more likely to increase retail prices than in the UK. We are also aware of at least one instance (Ghana) where the retail prices of calls to the UK are below the termination rate charged for inbound international calls. For such a case, differential regulation which lead to reciprocal high rates would lead to UK termination rates exceeding existing retail prices, making price increases very likely in that country.
[117] If in response UK consumers instead originated some (or all) of these calls, there would be an associated price, and therefore detriment for them.
[118] Ofcom and ICO, *Tackling nuisance calls and messages: update on the Joint Action Plan*, December 2015, https://www.ofcom.org.uk/consultations-and-statements/category-2/silent-calls/jointaction-plan.

from an overseas provider with a high MTR further increasing its MTR, or a co-ordinated (tacit or otherwise) arrangement between a UK and an overseas provider to bring about a high reciprocal rates outcome (for example to support higher retail prices in each country).

- In a situation where the providers in the other country were subject to a reciprocity condition, Option 1 would be sufficient to secure reciprocal low MTRs - a reciprocity condition in the UK would be unnecessary (and risks being circular in allowing an escalation of MTRs).

A11.59 In addition, a significant number of agreements could fall under the reciprocity condition,[119] and there would likely be an associated regulatory burden (relating to compliance, monitoring and potential enforcement).

Provisional conclusion

A11.60 We have considered whether there is a basis for departing from our provisional assessment that capping termination rates at LRIC for all calls, including in respect of non-EEA originated calls, would facilitate more effective competition and be consistent with our objectives in relation to competition, efficiency and consumers. Having done so, we propose that there is not a strong basis for believing that UK consumers' interests would be best served by adopting differential regulation for calls from outside the EEA. It is unlikely that differential regulation would lead to low termination rates replacing currently high termination rates. This would mean:

- there would be no consumer benefit from a reduction in non-EEA termination rates passing through to UK international calls prices;

- there is a real risk of non-EEA providers responding to higher MTRs from UK providers by increasing their own termination rates (i.e. a 'race to the top'), which could lead to increases in UK international retail call prices; and

- there is also a risk that higher UK MTRs may increase non-EEA call prices for calls to the UK and reduce volumes of inbound calls from outside the EEA.

A11.61 While we note the potential impact on retail prices and investment via a waterbed effect working to the benefit of UK consumers if UK MTRs rose for non-EEA calls, there are costs associated with implementing (and enforcing compliance with) selective differential MTRs based on country of origin. Moreover, for the scale of revenues involved and from previous research, the extent of any potential waterbed effect is likely to be negligible.

A11.62 Bearing in mind these considerations, and the summary of our position set out at the beginning of this annex, we make the provisional regulatory judgment that the same controlled rate should apply to all mobile calls terminated in the UK and that this would be consistent with our efficiency objectives and more likely to further consumers' interests in line with our principal duty under section 3 of the Act.

[119] We estimate there to be over 160 non-EEA countries with potential routes, each of which may have multiple mobile or fixed providers.

Annex 12

Model outputs and sensitivities

Introduction

A12.1 We use the 2017 MCT model to calculate the unit cost of MCT using a LRIC cost standard in order to inform the proposed charge control calculations. As explained in Section 5 and Annex 9, we do not make any changes to key inputs to the 2017 MCT model compared to those in the 2015 MCT model. Further details on the WACC calculation can be found in Annex 10.

A12.2 This annex summarises the results of the model under a base case scenario and under a range of alternative scenarios in order to provide a sensitivity analysis. We also construct high and low scenarios that show the range for the proposed benchmark efficient unit costs of MCT.

A12.3 This annex is structured as follows:

- We first describe the assumptions and inputs used in the base case scenario, and then present the corresponding base case results (the unit costs of incoming 2G, 3G and 4G voice calls);
- We examine the sensitivity of the results to changes in demand assumptions;
- We test the sensitivity of the model outputs to changes in the WACC and cost assumptions; and
- Finally we combine the various scenarios to create high cost and low cost scenarios.

A12.4 As explained in Annex 9, all of the results of the model are presented in real terms, expressed in 2015/16 prices.

Model base case

A12.5 The base case scenario of the 2017 MCT model uses the following key assumptions and inputs:[120]

- An average efficient national mobile provider deploying 2G, 3G and 4G networks, including VoLTE services;
- Our medium subscriber and traffic forecasts (as described in Annex 9);
- A long-term market share of 25%;
- Infrastructure sharing (for both “passive” and “active” assets[121]);

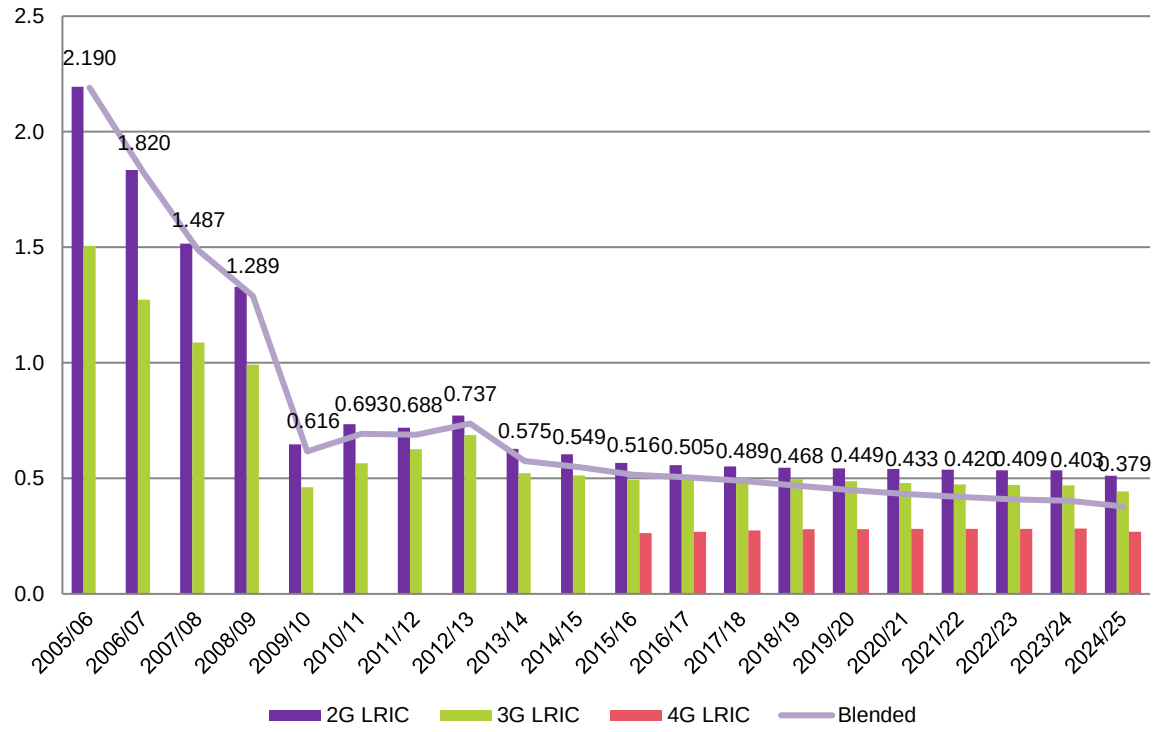
[120] A full list of the assumptions used in the base case can be found on the ‘Scenario’ sheet of the ‘Scenario Control’ module of the model.
[121] By passive assets we mean equipment such as masts and sites. By active assets we mean the electronics in the radio network – e.g. base station controllers. Our infrastructure sharing calculations are grounded in reality by taking account of the MBNL and Cornerstone agreements.

- Use of S-RAN technology;
- The spectrum allocations explained in Annex 9; and
- A real (CPI deflated) pre-tax WACC of 7.0%, as explained in Annex 10.

Results

A12.6 The base case LRIC unit costs of 2G, 3G, 4G and blended LRIC of MCT are shown in Figure A12.1 below. In 2020/21 the LRIC of MCT would be 0.540 ppm for 2G, 0.479 ppm for 3G and 0.281 ppm for 4G. The blended LRIC of MCT in 2020/21 would be 0.433 ppm.

Figure A12.1: LRIC of MCT (ppm, real 2015/16 prices)



Source: Ofcom 2017 MCT model.

A12.7 Figure A12.1 shows that the blended unit cost of MCT is generally declining over time and, as we would expect, would the pattern set by the 2015 MCT model.[122] This is partly due to reductions in the unit costs of 2G technology and 3G technology over time, and partly due to migration between technologies, towards the lower cost 3G and 4G technologies.

Sensitivity analysis

Introduction

A12.8 Below we report the results of a range of sensitivity tests, these show the impact on the results of the model of flexing model inputs such as the demand inputs, the

[122] See Section 12 and in particular Figure A12.1 of the 2015 MCT Statement.

WACC and cost trends. We also combined these sensitivities to produce overall high and low unit cost scenarios.

Demand assumptions

A12.9 As explained in Annex 9, we have tested the 2017 MCT model and the base case traffic volumes from the 2015 MCT model (and propose we would do so in the 2018 MCT Model). Nevertheless, we consider it appropriate to test and demonstrate the sensitivity of the model to changes in demand assumptions. For the demand assumptions we have used the low and high estimates for each of:

- **Handset penetration:** the percentage of the population using mobile voice services;
- **Voice usage:** the minutes of use per subscriber; and
- **Data usage:** the data usage per subscriber.

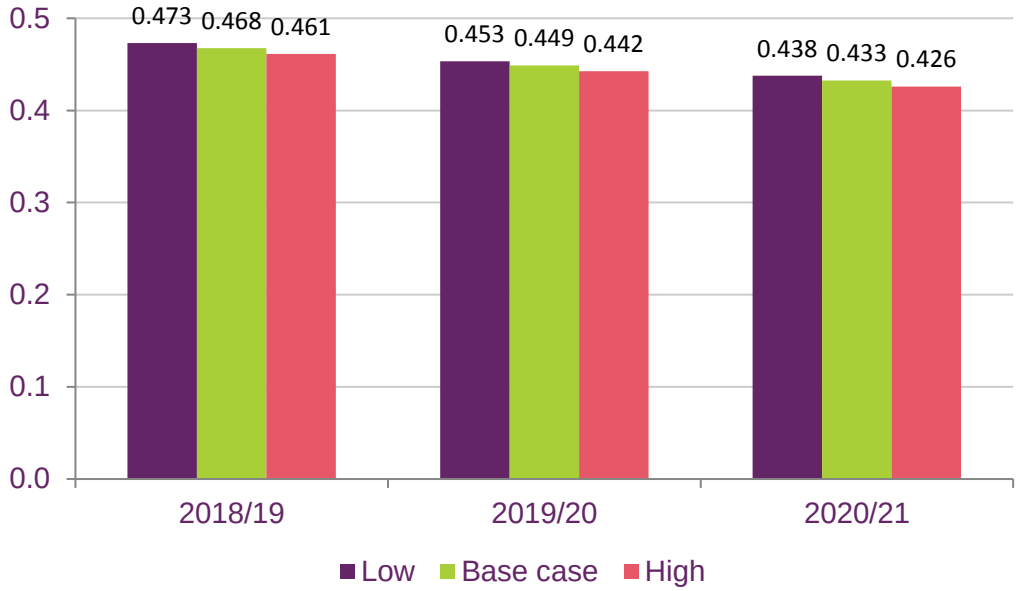
A12.10 In order to construct these scenarios we have drawn on the sensitivity analysis performed for the 2015 MCT Statement. Since we maintain the base case assumptions from the 2015 MCT model this effectively means shifting the point at which the low and high projections branch off from the base case from Q2 2014 to Q4 2016.

A12.11 These changes are first made on an individual basis and presented in the following sub-sections in comparison to the results in the model base case. We then merge the changes in the main demand parameters to create combined high and low demand scenarios.

Handset penetration

A12.12 The impact of varying our handset penetration assumption on the blended LRIC of MCT is shown in Figure A12.2 below. Compared to the base case blended LRIC results, a lower level of handset penetration would lead to a slightly higher LRIC and higher handset penetration to a slightly lower LRIC in each year of the charge control. A handset penetration assumption that is a little over 2% higher than that in the base case in 2020/21 produces a blended LRIC of MCT less than 2% lower than the base case, so the model is relatively insensitive to this assumption.

Figure A12.2: Sensitivity of handset penetration on the blended LRIC of MCT (ppm, 2015/16 prices)

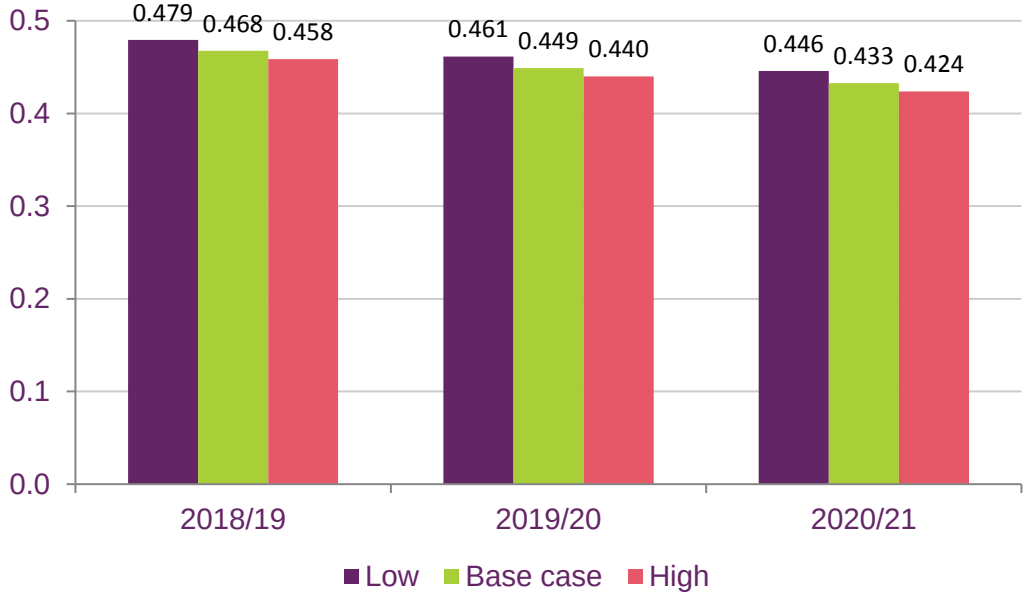


Source: Ofcom 2017 MCT model.

Voice usage

A12.13 The effect of varying voice usage assumptions on the blended LRIC of MCT is shown in Figure A12.3 below. Compared to the base case blended LRIC results, lower voice usage would lead to a slightly higher LRIC and higher voice usage to a slightly lower LRIC in each year of the charge control. A voice usage per subscriber assumption that is 6% higher than that in the base case in 2020/21 produces a blended LRIC of MCT only 2% lower than the base case, so the model is relatively insensitive to this assumption.

Figure A12.3: Sensitivity of voice usage on the blended LRIC of MCT (ppm, 2015/16 prices)

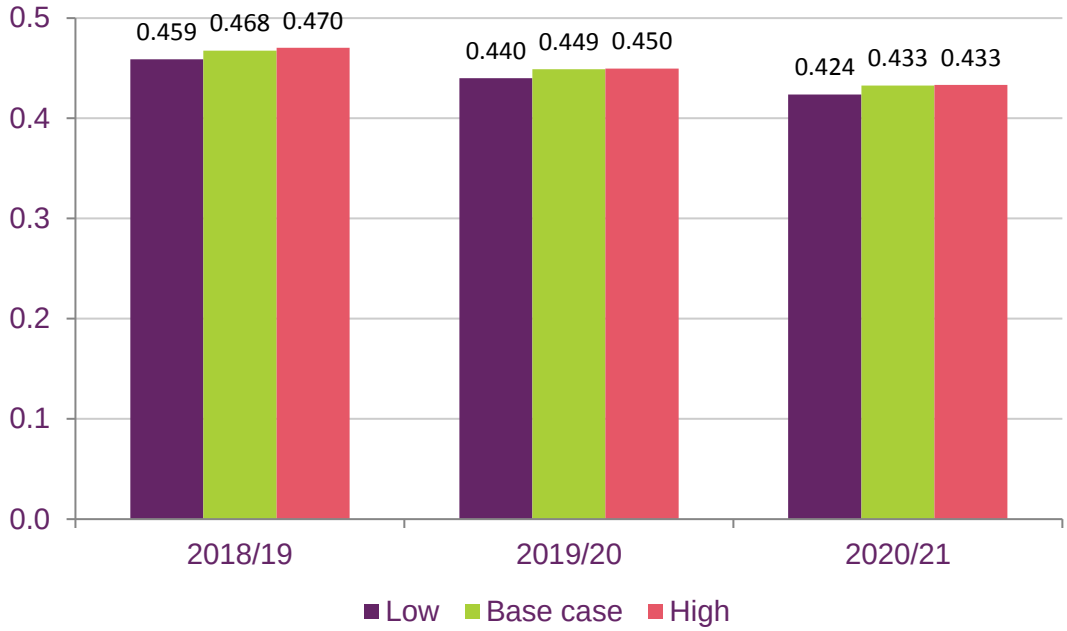


Source: Ofcom 2017 MCT model.

Data usage

A12.14 The impact of varying data usage assumptions on the LRIC of MCT is shown in Figure A12.4 below. Compared to the base case blended LRIC results, lower data usage would lead to a slightly LRIC and higher data usage to slightly higher LRIC in each year of the charge control.

Figure A12.4: Sensitivity of data usage on the blended LRIC of MCT (ppm, 2015/16 prices)



Source: Ofcom 2017 MCT model.

A12.15 This is a counterintuitive result and we have investigated its causes, which relate to the assets that are incremental to termination being negative. In common with previous MCT models, in this case it is primarily backhaul assets of different speeds and types that give rise to some assets having negative incremental asset counts and hence negative contributions to the LRIC of MCT. As noted in the 2015 MCT Statement[123] and the Competition Commission in its 2012 Determination,[124] calculating LRIC using a decremental approach and economic depreciation can result in seemingly counterintuitive unit cost effects.

A12.16 In terms of the sensitivity of the model, in this case the magnitude of the changes vary for different types of data traffic, but the high forecasts are between around 20% to 40% higher than those in the base case in 2020/21. Despite this the impact on the results is almost negligible, so the model is relatively insensitive to changes in this assumption.

Combined demand scenarios

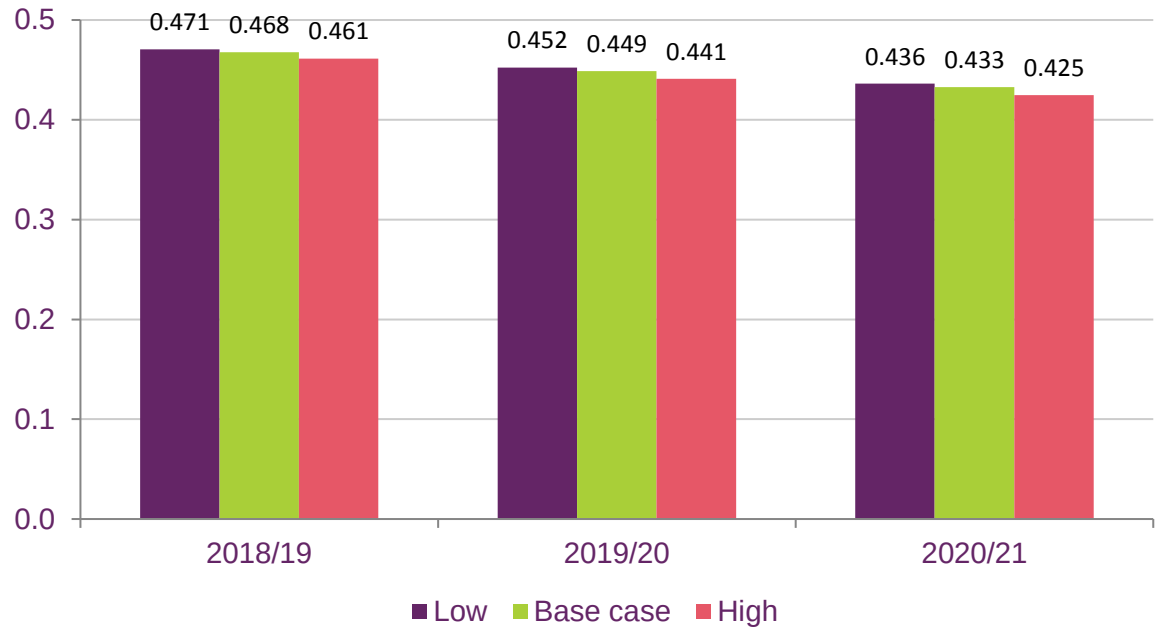
A12.17 The impact of varying the demand parameters above in a combined manner is shown in Figure A12.5 below. This shows that the impact of our combined low demand forecasts on the blended LRIC of MCT would be to increase it in all years

[123] See paragraphs A7.274 to A7.282.
[124] See paragraphs 3.439 to 3.450 of the 2012 CC Determination, http://www.catribunal.org.uk/files/1.1180-83_MCT_Determination_Excised_090212.pdf.

of the charge control, relative to the base case. The corresponding combined high demand forecasts have the effect of reducing the LRIC of MCT.

A12.18 Quantifying the sensitivity of the model when multiple parameters are being changed is challenging because the magnitude of the changes varies by traffic type. As explained above however, in some case the high scenario has 20% to 40% more traffic than the base case and yet produces a change in the LRIC of MCT of less than 2% lower than the base case. The LRIC of MCT is therefore relatively insensitive to changes in demand forecasts, as was also found in the sensitivity analysis of the 2015 MCT model and the 2011 MCT model.

Figure A12.5: Sensitivity of combined low and high demand forecasts on the blended LRIC (ppm, 2015/16 prices)



Source: Ofcom 2017 MCT model.

WACC and cost trend assumptions

A12.19 We next test the sensitivity of the model results to non-demand assumptions and inputs, as follows:

- **WACC:** we vary the value of the WACC ± 1 percentage point around the central estimate of 7.0% (pre-tax real).
- **Cost trends**: we vary the cost trend adjustments.

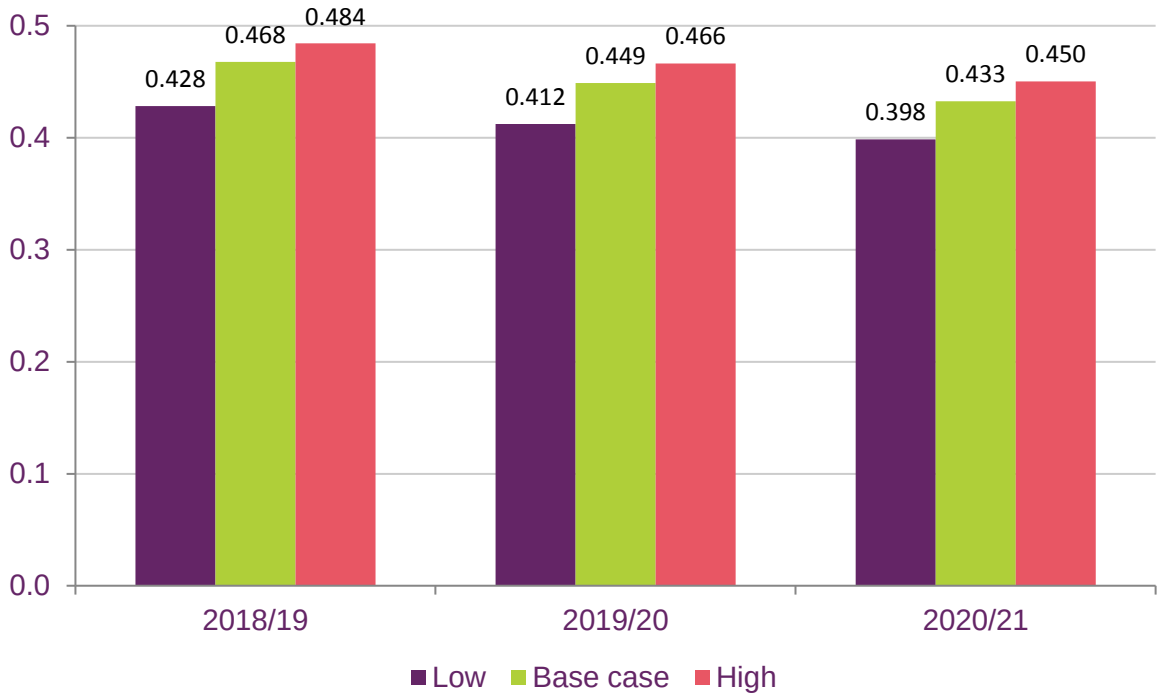
A12.20 As above, these changes are first made on an individual basis and presented in the following sub-sections in comparison to the results in the model base case. We then combine these sensitivities with the demand sensitivities to create combined scenarios.

WACC

A12.21 The impact on the blended LRIC results of varying the WACC is shown in Figure A12.6 below. Relative to the base case blended LRIC, which uses a pre-tax real WACC (CPI deflated) of 7.0% (as explained in Annex 10), our low WACC

assumption (6.0%) would lead to a lower blended LRIC in all years of the charge control, and the high WACC assumption (8.0%) produces a higher blended LRIC in all years of the charge control. Nevertheless, the model is relatively insensitive to the WACC because a one percentage point change in the WACC is equivalent to a 14% relative change (on the base value of 7.0%), yet the LRIC changes by less than 9% in 2020/21.

Figure A12.6: Sensitivity of changing the WACC on the blended LRIC of MCT (ppm, 2015/16 prices)



Source: Ofcom 2017 MCT model.

Cost trends

A12.22 In the 2015 MCT model we applied a general mark-up to historic asset price trends (during the period 2008/9 to 2011/12) for the purposes of calibrating the model.[125] We also used this functionality to test the sensitivity of the model to changes in unit cost assumptions and have repeated this test for the 2017 MCT model using the values shown in Table A12.1 below.

[125] The capital cost multiplier is referred to as the Gross Book Value (GBV) multiplier in the table. This approach was similar to that specified in the 2012 Competition Commission Determination.

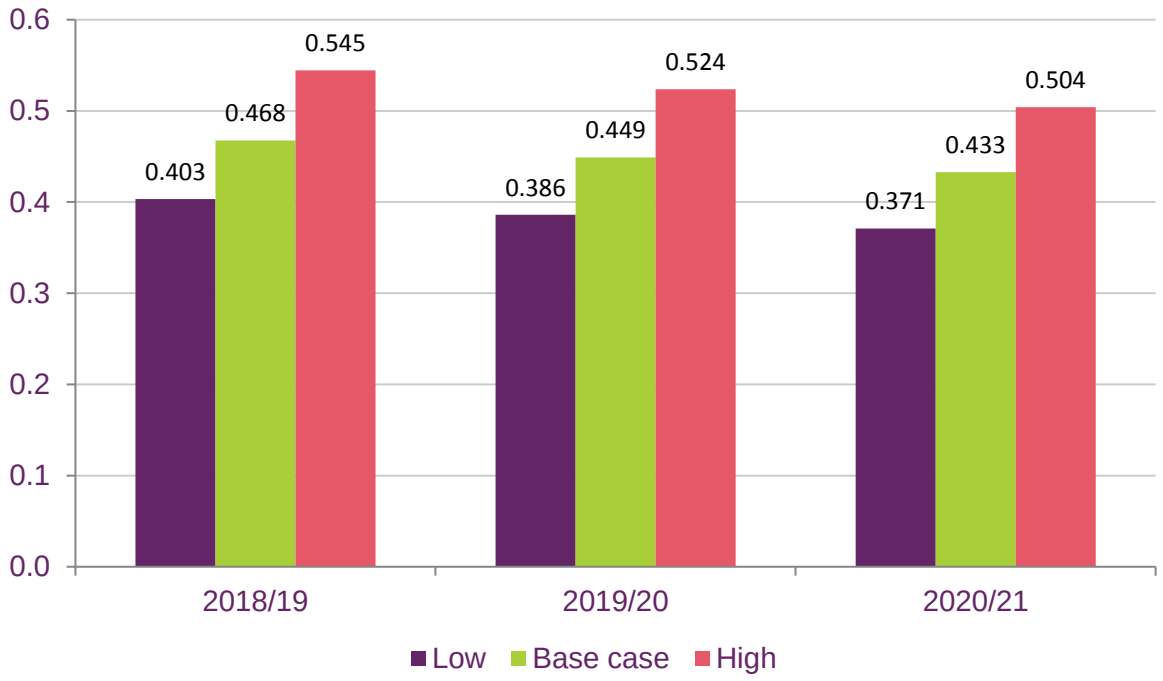
Table A12.1: Equipment cost trend sensitivity multipliers

		2008/09	2009/10	2010/11	2011/12
GBV multiplier	Low	1.20	1.20	1.20	1.20
	Base case	1.30	1.30	1.25	1.25
	High	1.35	1.35	1.35	1.35
Opex multiplier	Low	0.96	0.96	0.96	0.96
	Base case	0.98	0.98	0.98	0.98
	High	1.00	1.00	1.00	1.00

Source: 2017 MCT model.

A12.23 To give an example, compared to the base case the low case assumption results in a GBV (excluding 4G costs and spectrum) in 2020/21 that is 13% lower. The impact on the blended LRIC of varying the cost trends using the inputs in Table A12.1 is shown in Figure A12.7 below. It can be seen that the 2020/21 blended LRIC is 14% lower, so although the impact on the blended LRIC is larger than for the other changes explained above, the model is more sensitive to this set of changes than to some of the others we have tested.

Figure A12.7: Sensitivity analysis of changing equipment cost trends on the blended LRIC of MCT (ppm, 2015/16 prices)



Source: Ofcom 2017 MCT model.

Base, high and low scenario: Summary of outputs

A12.24 In order to show the sensitivity of the 2017 MCT model to further combinations of parameter changes we use the sensitivities explained above to create overall high

unit cost and low unit cost scenarios for the LRIC of MCT. These high and low estimates form the range on which we are consulting.

A12.25 The composition of these combined scenarios is shown in Table A12.2 below.

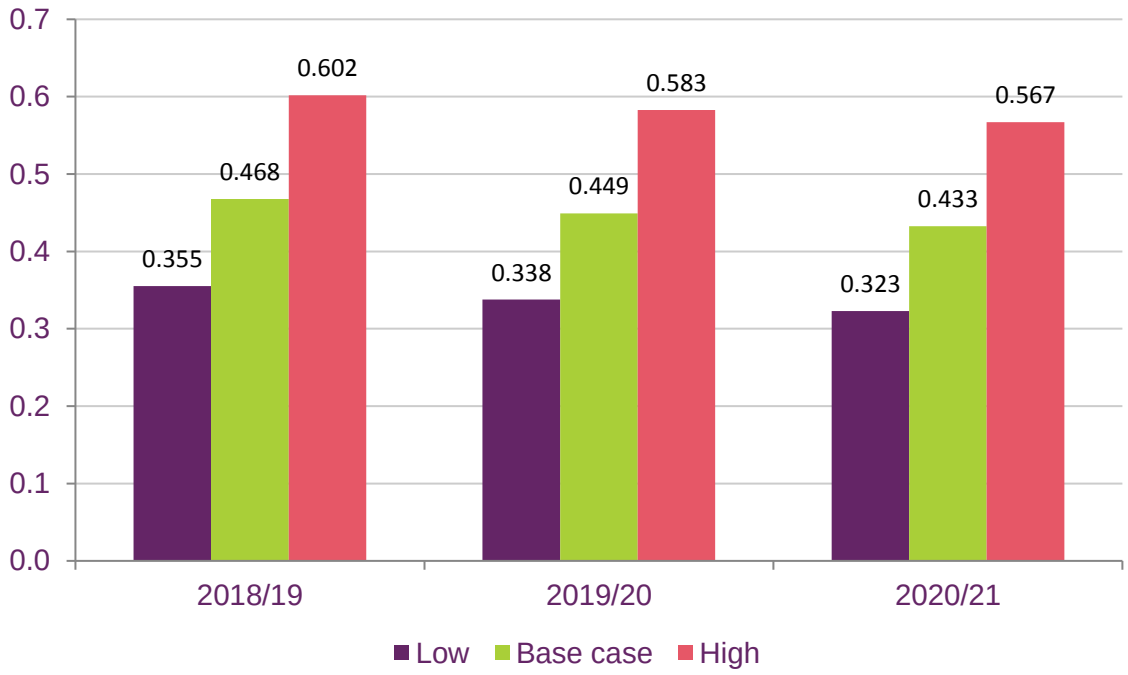
Table A12.2: Assumptions used in the base case, high equipment cost and low equipment cost scenarios

	Low unit cost scenario	Base case	High unit cost scenario
Combined demand	High	Medium	Low
WACC	6.0%	7.0%	8.0%
Cost trends	Low	Medium	High

Source: Ofcom.

A12.26 The resulting LRIC unit costs under these combined scenarios are shown in Figure A12.8 below.

Figure A12.8: Sensitivity analysis for combined low and high cost scenarios on the blended LRIC (ppm, 2015/16 prices)



Source: Ofcom 2017 MCT model.

Annex 13

Provisional list of MCT providers with SMP

Mobile Communications Provider	Mobile number range/s currently allocated	Designated with SMP
AQ Ltd	75207	Yes
08Direct Ltd	74068	Yes
09 Mobile Ltd	75710	Yes
24 Seven Communications Ltd	74066, 78931, 79112, 79118	Yes
Ace Call Ltd	74186	Yes
Airwave Solutions Ltd	74584, 77530	Yes
Alliance Technologies LLC	75718	Yes
AMS UK	73800	Future plans to offer MCT
Andrews & Arnold Ltd	74411	Yes
aql Wholesale Ltd	78224, 78226, 78938	Yes
Bellingham Telecommunications Ltd	74181	Yes
British Telecommunications Plc	7777(0-9)	Yes
BT OnePhone Ltd	75201	Yes
CFL Communications Ltd	75377	Yes
Citrus Telecommunications Ltd	78939, 78744	Yes
Cloud9 Communications Limited	79245	Yes
Cloud9 Mobile Communications Ltd	74409, 75588, 77000, 78722, 79782, 79783	Yes
Compatel Ltd	74653	Future plans to offer MCT
Confabulate Ltd	75595	Yes
Core Communication Services Ltd	75204, 7744(2-9), 7755(2-5)	Yes
Core Telecom Ltd	74418, 74172, 74179, 75597	Yes
Dynamic Mobile Billing Ltd	78229, 7589(1-3), 79786	Yes
Edge Telecom Ltd	78922	Yes
EE Ltd	Numbers in the 73, 74, 75, 77, 78 and 79 range	Yes
Euro Thai Exchange Process Company Ltd (Yim Siam Telecom)	78933, 75890	Yes
Flextel Ltd	78220, 78925	Yes
Gamma Telecom Holdings Ltd	74580, 74581	Yes
Global Reach Networks Ltd	74655	Yes
Globecom International Ltd	75593	Future plans to offer MCT
Globetouch AB	74880	Future plans to offer mobile services
Guernsey Airtel Ltd	7839(1-2), 78397	Yes, to the extent that calls are terminated in the UK
Hanhaa Ltd	73896	Future plans to offer MCT

Hay Systems Ltd	78920	Future plans to offer MCT
Hutchinson 3G UK Ltd	Numbers in the 73, 74, 75, 77, 78 and 79 ranges	Yes
Invomo Ltd	75209	Yes
IPV6 Ltd	75592	Future plans to offer MCT
Jersey Airtel Ltd	7829(7-9)	Yes, to the extent that calls are terminated in the UK
JT (Guernsey) Ltd	79111, 79117	Yes, to the extent that calls are terminated in the UK
JT (Jersey) Ltd	7509(0-7), 7797(7-9), 7937	Yes, to the extent that calls are terminated in the UK
LegendTel LLC	75591	Yes
Lycamobile UK Ltd	7404, 7405, 7417(3-5), 7424, 7438, 7440(0-7), 7448, 7459, 7466	Yes
Magrathea Telecommunications Ltd	78930	Yes
Manx Telecom Trading Limited	74184, 7452(0-6), 7924	Yes, to the extent that calls are terminated in the UK
Marathon Telecom Ltd	74572, 74585, 79110	Yes, to the extent that calls are terminated in the UK
Mars Communications Ltd	75590	Yes
Mobile FX Services Ltd	75580	Future plans to offer MCT
Mobiweb Telecom Ltd	75329	Future plans to offer MCT
Nationwide Telephone Assistance Ltd	77001	Yes
Nodemax Ltd	75598	Future plans to offer MCT
Premium Routing GmbH	74582	Future plans to offer MCT
QX Telecom Ltd	79781	Yes
Resilient Networks Plc	75599	Yes
Secretary of State for the Foreign and Commonwealth Office in respect of the National Cyber Security Centre	74881	Yes
Secretary of State for the Home Office	73900	Yes
Simwood eSMS Ltd	75200	Yes
Sky UK Limited	7488(2-3), 7368(2-3)	Yes
Sound Advertising Ltd	74410, 75376	Yes
Stour Marine Ltd	74413, 75371	Yes
Sure (Guernsey) Ltd	7781	Yes, to the extent that calls are terminated in the UK
Sure (Isle of Man) Ltd	74576	Yes, to the extent that calls are terminated in the UK

Sure (Jersey) Ltd	77003, 7700(7-8)	Yes, to the extent that calls are terminated in the UK
Swiftnet Ltd	78221, 75373	Yes
Synectiv Ltd	7441(5, 7)	Future plans to offer MCT
TalkTalk Communications Ltd	78222, 7389(2-5), 7439(0-3)	Future plans to offer MCT
Telecom North America Mobile Inc.	74185	Yes
Telecom2 Ltd	74065	Yes
Telecom Cloud Networks Ltd	74408	Future plans to offer MCT
Telecom 10 Ltd	78727	Yes
Teleena UK Ltd	73680, 7418(7, 9)	Yes
Telefónica UK Ltd	Numbers in the 71, 73, 74, 75, 77, 78 and 79 ranges	Yes
Test2date B.V	75898	Future plans to offer MCT
TGL Services (UK) Ltd	74067, 74182	Yes
Tismi BV	74183, 74414, 75206, 74512	Yes
Truphone Ltd	7408(0-2, 8-9), 74178, 75594, 79788	Yes
Vectone Mobile Ltd	75202, 7451(0-1), 7451(3-4), 7451(8-9), 7457(0-3), 74575, 7465(0-1), 7589(4-7), 78921	Yes
Virgin Mobile Telecoms Ltd	7305, 7306, 74583	Yes
Vodafone Ltd	Numbers in the 73, 74, 75, 77, 78 and 79 ranges	Yes
Voxbone SA	74419	Yes
Wavecrest (UK) Ltd	75370	Future plans to offer MCT
Ziron (UK) Ltd	74888	Yes

Annex 14

Glossary

2009 EC Recommendation: European Commission Recommendation (2009/396/EC) of 7 May 2009 on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU.

2012 CC Determination: Determination of the Competition Commission References under section 193 of the Communications Act 2003: British Telecommunications Plc v Office of Communications, Case 1180/3/3/11, Everything Everywhere Limited v Office of Communications Case 1182/3/3/11, Vodafone Limited v Office of Communications, Case 1183/3/3/11 and Telefónica UK Limited, 9 February 2012.

2014 EC Recommendation: 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 communication networks and services (2014/710/EU), which replaces the corresponding Commission Recommendation of 17 December 2007 (2007/879/EC).

'2015 MCT Model': the cost model Ofcom used to calculate the charge control for the period of the previous market review (2015-18).

'2017 MCT Model': the cost model Ofcom is proposing to use to calculate the charge control for the period of this market review (2018-21).

2G: Second generation of mobile telephony systems, including the GSM technology standard.

3G: Third generation of mobile telephony systems, including the UMTS technology standard.

4G: Fourth generation of mobile telephony systems, including the LTE technology standard.

5G: Fifth generation of mobile telephony systems, which is the next generation of wireless networks beyond 4G LTE mobile networks. 5G is expected to deliver faster data rates and better user experience. Technical standards are still under development and are likely to include both an evolution of existing and new radio technologies.

Access Directive: The European Commission's Directive 2002/19/EC on access to, and interconnection of, electronic communications networks and associated facilities.

Active customers: Customers with an active mobile telephony connection. A mobile connection can be considered active on a given day if it has not been cancelled by the user/subscriber or the network operator and has been used to send or receive a voice call or a text message within the preceding three months.

App: A self-contained computer program or software, commonly called an application or an app, which is usually intended for use on a smartphone or a tablet computer and designed to fulfil a particular purpose or provide a distinct service. Apps can be downloaded by a user to a mobile device.

Asset-light mobile provider: a mobile provider which provides MCT without operating the full technological infrastructure used by traditional mobile providers, such as the four largest

mobile providers. Asset-light MCPs would not operate, or directly incur the costs of operating, a radio access network.

Handover Point: The location where a call is handed over from the OCP to the TCP for the purposes of connecting the call to the end-user.

Backhaul: In mobile networks, a high capacity line which links the core network with the radio access network.

BAME: Black, Asian and Minority Ethnic.

BEREC: Body for European Regulators of Electronic Communications.

Bill and Keep (B&K): An approach to MCT pricing where communications providers make no payments to each other for mobile call termination (that is, MTRs are zero).

BT: British Telecommunications plc.

Calling Party Pays (CPP): The billing principle where retail charges for telephone calls are set in such a way that only the calling party (and not the called party) pays a charge when a call is made.

CBP: Countervailing Buyer Power is the restraint that a buyer is able to place on any attempt by the seller to set its prices above the competitive level

Charge control: A control which sets the maximum price that a communication provider can charge for a particular product or service. Most charge controls are imposed for a defined period.

Circuit-switched (CS) technology: Network technology where the end-to-end communication takes place over a dedicated physical circuit (which may include a dedicated radio channel).

Common costs: Costs which are shared by all the services supplied by a firm.

Common Regulatory Framework (CRF): The package of EC Directives which harmonise the framework for the regulation of electronic communications across the EU.

Communications Act or "the Act": the Communications Act 2003.

Consumer Price Index (CPI): The official measure of inflation of consumer prices in the United Kingdom.

Donor Conveyance Charges (DCCs): 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).

EBITDA: Earnings Before Interest, Taxation, Depreciation and Amortisation.

EC: The European Commission.

ECN: Electronic Communication Networks

ECS: Electronic Communications Services

EE: Everything Everywhere Ltd.

EEA: European Economic Area

ED: Economic depreciation.

End-to-end (E2E) connectivity: Connection across a group of networks which enables users on those networks to make calls and send data to each other across those networks.

End-user: The final consumer of a product or service.

ERG: European Regulators Group; replaced by BEREC in 2005.

EU: the European Union.

F2M: Fixed-to-mobile, used to refer to a call or traffic originated from a fixed geographic number and seeking to call a mobile number.

Femtocell: A low-power wireless access point that operates in licensed spectrum to connect standard mobile devices to a mobile operator's network, typically using a residential DSL or cable broadband connection.

Fixed Call Termination: The service provided by an FCP to allow an OCP to connect a caller with the intended call recipient on that FCP's network.

Fixed Termination Rate (FTR): The wholesale charge levied by FCPs for Fixed Call Termination services provided by them.

Fixed Narrowband Market Review (FNMR): The Ofcom Market Review relating to narrowband services.

'**Flip-flopping'**: the practice of MCT providers imposing regular and substantial changes in their MTRs to take advantage of the averaging method in the charge formula and thus increase their revenues beyond what was envisaged when the cap was set.

Four largest mobile providers: The four largest mobile providers are EE, H3G, O2 and Vodafone. These mobile provider operate a fully-deployed national mobile network, including both a radio access network and elements of core network; they have independent control of spectrum, and operate in both the wholesale and retail markets.

Framework Directive: Directive 2002/21/EC on a common regulatory framework for electronic communications networks and services.

Fully Allocated Cost (FAC): An accounting approach under which all the costs of the company are distributed between its various products and services. The fully allocated cost of a product or service may therefore include some common costs that are not directly attributable to the service.

Global System for Mobile Communications (GSM™): An established 2G mobile technology standard.

H3G: Hutchison 3G UK Ltd – trading as Three.

Home Location R**egister (HLR):** The main database of permanent subscribers for a mobile network, which is maintained by a network services provider.

IM: Instant message or instant messaging service.

Internet Protocol (IP): A packet data protocol used for the routing and carriage of data packets across the internet and similar data networks.

Long Run Incremental Costs (LRIC): LRIC is defined as the long run avoidable cost of an operator carrying a particular increment of traffic. The increment in question is treated as the final traffic increment on the network.

Long Run Incremental Costs Plus (LRIC+): The long run (average) incremental costs plus an equi-proportionate mark-up for the recovery of shared and common costs. LRIC+ should be taken to mean the same as LRAIC+ (a term used by some other NRAs).

Long Term Evolution (LTE™): A 4G mobile technology standardised by 3GPP. LTE is the predominant 4G technology used in the UK.

M2M: Mobile-to-mobile, used to refer to a call or traffic originated from a mobile number and terminating on another mobile number.

MNR: Mobile Number Range.

Mobile Call Termination (MCT): The wholesale service provided by an MCP to allow an OCP (Originating Communications Provider) to connect a caller with the intended mobile call recipient on that MCP's network.

Mobile Termination Rate (MTR): The wholesale charge levied by MCPs for MCT.

Mobile Virtual Network Operator (MVNO): A provider of mobile communications services which does not own a national network themselves, but instead provides all or part of their mobile phone services over network infrastructure owned by an MNO. For example: Tesco Mobile or Asda.

National mobile provider: a mobile provider that operates a fully-deployed national mobile network, including both a radio access network and elements of core network. A mobile provider has independent control of spectrum, and operates in both the wholesale and retail markets.

National Regulatory Authority (NRA): The relevant communications regulatory body for each country in the EU. Ofcom is the NRA for the United Kingdom.

Next Generation Network (NGN): A network that uses IP technology in the core and backhaul to provide multiple services over a single platform.

Non-EEA calls: mobile calls which originate outside the EEA.

NTNP: National Telephone Numbering Plan.

O2: Telefónica O2 UK Limited.

OECD: Organisation for Economic Co-operation and Development.

Off-net call: A call originated by customers of a network different from the one on which the call is being terminated.

On-net call: A call originated and received by customers of the same network.

Over-the-top (OTT) service: A type of service provided "over the top" of an existing data network connection such as a fixed or wireless broadband connection. Examples of OTT services include mobile VoIP calls over a 3G data network.

OTT bypass: A mechanism where calls which are initiated as voice calls to a mobile number are terminated by an OTT provider.

Packet-switched technology: A digital networking communications method that groups all transmitted data – regardless of content, type, or structure – into suitably-sized blocks, called *packets*.

PECS: Public Electronic Communications Service

Ported-in numbers: A mobile number that is not allocated to a particular MCP, used by an end-user who has since become a subscriber of that MCP (and where the subscriber has elected to use mobile number portability to retain their number).

Ported-out numbers: A mobile number that is allocated to a particular MCP, used by an end-user who has since become a subscriber of another MCP (and where the subscriber has elected to use mobile number portability to retain their number).

Post-pay: A payment arrangement whereby subscribers pay for the use of a service after its use. Billing and payment typically occur monthly.

Ppm: Pence per minute.

Pre-pay: A payment arrangement whereby subscribers purchase credit in advance of service use. The purchased credit is then used to pay for service use at the time of use.

Public Switched Telephony Network (PSTN): The telephony network used to provide telephone calls using (or emulating) circuit-switching and using telephone numbers to identify subscribers or called locations, allowing all customers connected to the network to call all other customers. A PSTN can be either a fixed or a mobile network.

Radio Access Network (RAN): The part of a mobile network which transfers signals between the core network and the user equipment (e.g. handsets) over the air-interface.

Refarming: the reutilisation, or reassigning, of electromagnetic spectrum for another technology or service.

Short Message Service (SMS): A globally accepted wireless service that enables the transmission of alphanumeric messages between mobile subscribers and external systems such as electronic mail, paging, and voice mail systems. 'Messaging services' is used in the text to refer collectively to SMS and MMS (multimedia messaging services). MMS can include pictures or other media content.

Smaller mobile provider: In this document, this refers to a mobile provider other than the four national mobile providers.

Session Initiation Protocol (SIP): a signalling protocol that is commonly used for calls over IP networks.

SMP: Significant market power.

SMP Guidelines: European Commission guidelines on market analysis and the assessment of SMP under the Community regulatory framework for electronic communications networks and services (2002/C165/03).

SSNIP: Small but Significant Non-transitory Increase in Price.

Telefónica: Telefónica O2 UK Limited.

Terminating mobile provider: The CP of the end-user receiving a call, i.e. the CP from which the call terminates.

Universal Mobile Telecommunications System (UMTS™): A 3G mobile technology standardised by 3GPP.

Virgin Media: Virgin Media Limited.

Vodafone: Vodafone Limited.

Voice over Internet Protocol (VoIP): A method of carrying voice calls on fixed and mobile networks by converting speech into data packets (and back) and carrying it using IP.

Voice over LTE (VoLTE): A technology that allows voice calls to be provided over an LTE network.

Voice over WiFi (VoWiFi): Voice over WiFi refers to a technology that allows a subscriber to originate or receive voice calls over a WiFi connection, instead of making use of the air interface of a cellular mobile network.

Weighted Average Cost of Capital (WACC): An estimated cost of capital for a hypothetical United Kingdom CP. For the purpose of this exercise, we use the Capital Asset Pricing Model (CAPM) to determine the WACC.

'Waterbed effect': an effect that can occur when constraining a firm's prices or revenues in one part of its operations will lead it to an increase in prices elsewhere.

WLA: Wholesale Local Access.

Wireless Fidelity (WiFi): Short-range wireless technology using any type of 802.11 standards such as 802.11b or 802.11a. These technologies allow an over-the-air connection between a wireless client and an access point, or between two wireless clients.

Worldwide Interoperability for Microwave Access (WiMAX): A type of wireless technology based on the IEEE 802.16 standard.