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# **Mobile Call Termination Market Review 2018-2021**

Draft Statement – Annexes 1 - 15

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# A1. Equality Impact Assessment

## Introduction

A1.1 Ofcom is required by statute to assess the potential impact of all our functions, policies, projects and practices on equality.<sup>1</sup> 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

A1.2 We have considered whether our 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 in 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 dependents. Our assessment is that they would not.

A1.3 We have set out our decisions on the regulation of mobile call termination (MCT) for the period 2018-21. We are imposing two of the four remedies previously imposed in respect of the period 2015 – 2018. We are imposing a network access obligation on 68 MCT providers and a charge control based on the Long Run Incremental Cost (LRIC) cost standard. We have decided that no undue discrimination and transparency obligations are no longer necessary to address risks of distortion to competition.

A1.4 We have concluded that our remedies will not have a material negative impact on the relevant groups.

A1.5 We have determined that requiring all MCT providers to give network access on reasonable request and subject to a charge control cap set at LRIC will promote effective competition. This will benefit all consumers, including those in equality groups who use a mobile phone to make calls. It will 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.

A1.6 On these bases, our assessment is that our remedies will benefit all consumers, rather than have a material adverse impact on any equality group. We have not carried 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 regulatory

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<sup>1</sup> 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.

intervention will 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 decision relating to calls outside the European Economic Area ('non-EEA calls')

- A1.7 We have decided to continue to set a charge control (based on the LRIC standard) on 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 decision could have a disproportionate impact on certain groups of consumers.
- A1.8 Some equality groups could be affected by the regulatory treatment of calls from non-EEA countries because a number of smaller mobile providers 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).
- A1.9 However, one of our reasons 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 in those countries).<sup>2</sup> Our approach will 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.
- A1.10 If MTRs in non-EEA countries were reduced as a result of differential regulation (in response to the threat of higher MTRs in the UK) consumers in the UK – including those identifying as BAME – might gain. However, for the reasons explained in Annex 6, we consider the most likely outcome of differential regulation is reciprocal high termination rates.
- A1.11 Our conclusion is that applying the charge control to MTRs for calls from outside the EEA will not have a material negative impact on the relevant equality groups.

## Conclusion

- A1.12 Considering the available evidence, we do not believe that our decisions will have a material negative impact on any of the relevant equality groups.

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<sup>2</sup> For further explanation on this, see Annex 6.

## A2. Regulatory Framework

### Introduction

- A2.1 This annex provides an overview of the market review process to give some additional context and understanding of the matters discussed in this Statement, including the draft legal instruments published at Annex 4.
- A2.2 Market review regulation is technical and complex, and requires us to apply legislation and take account of a number of relevant recommendations and guidelines. 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 decision on this market.

### Market review concept

- A2.3 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 we find that 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.
- A2.4 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.<sup>3</sup> 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<sup>4</sup> 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).
- A2.5 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.
- A2.6 Each market review normally involves three analytical stages, namely:

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<sup>3</sup> <http://www.legislation.gov.uk/ukpga/2003/21/contents>.

<sup>4</sup> 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 identification and definition of the relevant markets (the market definition procedure);
- 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).

A2.7 These stages are normally carried out together.

## Market definition procedure

A2.8 Section 79 of the Act provides that, before making a market power determination<sup>5</sup>, 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.

A2.9 Article 15 of the Framework Directive requires that NRAs shall, taking the utmost account of the 2014 EC Recommendation<sup>6</sup> and SMP Guidelines<sup>7</sup> 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.

A2.10 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.

A2.11 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.

A2.12 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

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<sup>5</sup> 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.

<sup>6</sup> 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).

<sup>7</sup> 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://eurlex.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).
- A2.13 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.
- A2.14 The relationship between the market definition(s) identified in this review and in the 2014 EC Recommendation is discussed in Section 3] of this statement.
- A2.15 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.<sup>8</sup> 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.
- A2.16 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.
- A2.17 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<sup>9</sup> (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<sup>10</sup> or the Enterprise Act 2002.<sup>11</sup>

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<sup>8</sup> 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.

<sup>9</sup> <http://www.legislation.gov.uk/ukpga/1998/41/contents>

<sup>10</sup> Previously Article 81 and Article 82 of the EC Treaty,  
<http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2010:083:FULL:EN:PDF>.

<sup>11</sup> <http://www.legislation.gov.uk/ukpga/2002/40/contents>

## Market analysis procedure

### Effective competition

A2.18 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 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.

A2.19 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”.*

A2.20 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.

A2.21 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<sup>12</sup>.

A2.22 A dominant position can derive from a combination of these criteria, which when taken separately may not necessarily be determinative.

## Sufficiency of competition law

A2.23 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.

A2.24 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.

A2.25 *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.

A2.26 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.

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<sup>12</sup> SMP Guidelines, paragraph 78.

## Remedies procedure

### Powers and legal tests

- A2.27 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.
- A2.28 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 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.
- A2.29 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 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.
- A2.30 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 communications provider 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.
- A2.31 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<sup>13</sup> that would make the network access unnecessary, the investment of the network operator who is required to provide access<sup>14</sup>, and the need to secure effective competition<sup>15</sup> in the long term.

A2.32 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 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 decision.

### **Ofcom's general duties – section 3 of the Act**

A2.33 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.

A2.34 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.

A2.35 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.

A2.36 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.

A2.37 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**

A2.38 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:

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<sup>13</sup> Including the viability of other network access products, whether provided by the dominant provider or another person.

<sup>14</sup> Taking account of any public investment made.

<sup>15</sup> Including, where it appears to us to be appropriate, economically efficient infrastructure-based competition.

- 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 (such purposes being the securing of 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.

A2.39 Our view is that our decisions in this market review are consistent with these specific objectives.

A2.40 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.

A2.41 Further, Article 3(3) of the Regulation establishing BEREC<sup>16</sup> requires NRAs to take utmost account of any opinion, recommendation, guidelines, advice or regulatory best practice adopted by BEREC.

A2.42 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

A2.43 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 our proposals would be likely to have a significant effect on businesses or the general public, or when there would be a major change in

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<sup>16</sup> 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://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:337:0001:0010:EN:PDF>.

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.<sup>17</sup>

- A2.44 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) would be secured or furthered by or in relation to the regulation we impose. In this market review, our consultation document comprised our impact assessment for the purposes of section 7 of the Act.
- A2.45 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 1.

## Regulated entity

- A2.46 The power in the Act to impose an SMP obligation by means of an SMP services condition provides that it is to be applied only to a 'person' whom we have determined to be a person having SMP in a specific market for electronic communications networks, electronic communications services or associated facilities (i.e. the 'services market').
- A2.47 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).<sup>18</sup>
- A2.48 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.
- A2.49 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."

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<sup>17</sup> 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](http://stakeholders.ofcom.org.uk/binaries/consultations/better-policy-making/Better_Policy_Making.pdf).

<sup>18</sup> Viho v Commission, Case C-73/95 P [1996] ECR I-5447,

<http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:61995CJ0073:EN:PDF>.

## A3. General approach to Market Definition and SMP analysis

### Introduction

A3.1 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

A3.2 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 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.

A3.3 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

A3.4 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.

A3.5 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:

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

A3.6 It is often practical to define the relevant product market before exploring the geographic dimension of the market.

A3.7 The market definition exercise is not an end in itself, but a means to assessing whether there is effective competition and thus whether there is a need for *ex ante* regulation. It is in this light that we have conducted our market definition exercises in this review.

## 2014 EC Recommendation and the three-criteria test

- A3.8 As explained in Annex 2, 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<sup>19</sup>, the accompanying explanatory note and the EC SMP Guidelines.<sup>20</sup>
- A3.9 As set out in Annex 2, 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.
- A3.10 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.<sup>21</sup>

## Sequencing of analysis

- A3.11 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, which are shown in Figure A3.1 below.
- A3.12 These steps are explained further in the following sub-sections.

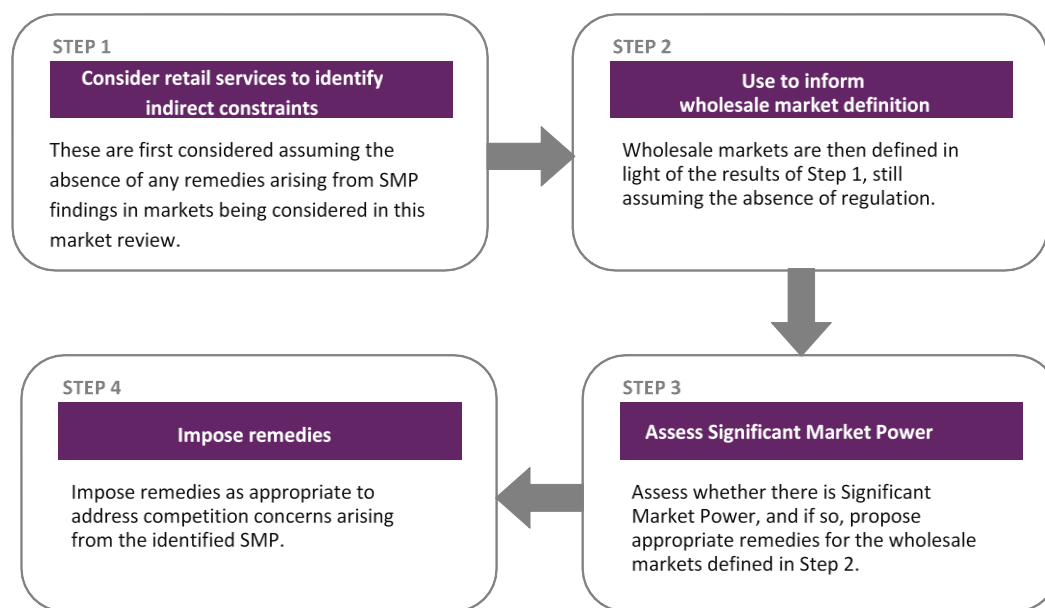
### Figure A3.1: Sequencing of market definition, SMP and remedies analysis

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<sup>19</sup> <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014H0710&from=EN>.

<sup>20</sup> Article 15(3) of the Framework Directive.

<sup>21</sup> See the Commission Explanatory Note accompanying the 2014 EC Recommendation.



Source: Ofcom

## Market definition

- A3.13 The starting point for identifying markets which may be susceptible to *ex ante* regulation is the consideration of retail markets from a forward-looking perspective. 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 then formally identified a relevant market).<sup>22</sup>
- A3.14 Consideration of retail markets is logically prior to wholesale market definition because the demand for the upstream wholesale service is a derived demand – meaning that the level of demand for the upstream input depends on the demand for the retail service.
- A3.15 This link between the retail and wholesale level means that the range of available substitutes at the downstream (retail) level will inform the likely range of competitive constraints acting at the upstream (wholesale) level. This is because a rise in the price of a wholesale service which is passed through to the price of retail services may cause retail customers to switch to substitute retail products, reducing demand for the wholesale input. We refer to this as an indirect constraint.
- A3.16 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

<sup>22</sup> See recital 5 and point 2 of the 2014 EC Recommendation.



markets in the UK where there may be a requirement for the imposition of *ex ante* regulation.<sup>23</sup>

## Demand-side and supply-side substitution

A3.17 The boundaries between markets are determined by identifying competitive constraints on the price setting behaviour of firms. There are two main constraints to consider:<sup>24</sup>

- i) 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
- ii) 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').

A3.18 The hypothetical monopolist test (HMT) is a tool which can be used to identify close demand-side and supply-side substitutes.<sup>25</sup> 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.

A3.19 We must first therefore address the issue of which product(s) should form the starting point for the application of the HMT. This starting point can be referred to as the 'focal product'<sup>26</sup>, and typically starts from the narrowest potential market definition.<sup>27</sup>

A3.20 Having considered demand-side substitution we then, where relevant, 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.

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<sup>23</sup> 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 44 of the SMP Guidelines.

<sup>24</sup> 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.

<sup>25</sup> See paragraph 41 of the SMP Guidelines.

<sup>26</sup> This reflects the terminology used by the OFT (OFT, Market definition, December 2004, OFT403, [www.of.gov.uk/shared\\_of/business\\_leaflets/ca98\\_guidelines/of403.pdf](http://www.of.gov.uk/shared_of/business_leaflets/ca98_guidelines/of403.pdf)).

<sup>27</sup> 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'.

A3.21 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 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. 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

A3.22 When we conduct our analysis we use the modified Greenfield approach.<sup>28</sup> This requires us to assess whether markets are effectively competitive from a forward-looking perspective in the absence of any regulation that would result from a finding of SMP. To do otherwise would be circular.

A3.23 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

A3.24 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.<sup>29</sup>

A3.25 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

A3.26 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.

## Homogeneity of competitive conditions

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<sup>28</sup> See also section 2.5 of the Explanatory Note to the 2014 EC Recommendation.

<sup>29</sup> See section 3.2 of the Explanatory Note to the 2014 EC Recommendation.

- A3.27 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, the provision of which is subject to homogeneous competitive conditions.
- A3.28 However, combining products and services based on homogenous competitive conditions is - by definition - only appropriate where this would not substantively alter any subsequent findings of SMP (relative to defining those markets separately).
- A3.29 Our approach also takes into account the SMP Guidelines. In particular, in the context of geographic market analysis, the SMP Guidelines state that:
- “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...”<sup>30</sup>*
- A3.30 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

- A3.31 Another factor that is sometimes considered in setting market boundaries is whether there exist common pricing constraints across customers, services or geographic areas (for example, areas in which a firm voluntarily offers its services at a 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 substitution is limited (or absent). Failure to consider the existence of a common pricing constraint could lead to unduly narrow markets being defined.

### Geographic market

- A3.32 In addition to the product(s) to be included within a market, market definition requires us to specify the geographic extent of the market in which conditions of competition are sufficiently similar.
- A3.33 One approach would be to begin with a narrowly-defined geographic area and then consider whether a price increase by a hypothetical monopolist in that 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.

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<sup>30</sup> See paragraph 56 of the SMP Guidelines.

- A3.34 We recognise that in certain communications (product) markets, there may be different competitive conditions in different geographic areas. In this case, we therefore have to consider whether it is 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.
- A3.35 An alternative approach is to define geographic markets in a broader sense. This involves defining and remedying a single geographic market but recognising that this single market has local geographic characteristics. That is to say, recognising that within the single market there are geographic areas where competition is more developed 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

- A3.36 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 says:

*“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.”*

- A3.37 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.”*

- A3.38 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.
- A3.39 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

- A3.40 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.<sup>31</sup>
- A3.41 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.<sup>32</sup> A dominant position can derive from a 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.
- A3.42 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 on the basis of an earlier analysis, must be revoked.

## Market shares

- A3.43 In the SMP Guidelines, the EC discusses market shares as being an indicator of (although not sufficient 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*

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<sup>31</sup> See, for example, paragraphs 19 and 20, and the opening words of paragraph 75, of the SMP Guidelines.

<sup>32</sup> 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 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.

*in exceptional circumstances, evidence of the existence of a dominant position...’’<sup>33</sup>*

- A3.44 Market shares and market share trends provide an indication of how competitive a market has been in the past. If a firm has a 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 a 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.<sup>34</sup>

## **Barriers to entry and expansion**

- A3.45 Entry barriers are important in the assessment of potential competition.<sup>35</sup> 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 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.
- A3.46 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)**

- A3.47 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.

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<sup>33</sup> Paragraph 75 of the SMP Guidelines.

<sup>34</sup> Ibid.

<sup>35</sup> Paragraph 80 of the SMP Guidelines.

## Excessive pricing and profitability

- A3.48 In a competitive market, individual firms should not be able to persistently raise prices above costs and sustain excess profits.
- A3.49 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.<sup>36</sup> 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.
- A3.50 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 existing regulation rather than a reflection of the underlying competitive conditions.

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<sup>36</sup> Paragraph 73 of the SMP Guidelines.

## A4. SMP Conditions

### Draft legal instrument

#### PART I – NOTIFICATION OF PROPOSALS UNDER SECTION 48B AND 80B 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

- A4.1 On 17 March 2015, Ofcom published a statement concerning the provision of wholesale mobile voice call termination (the “**2015 MCT Statement**”)<sup>37</sup> 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.
- A4.2 On 27 June 2017, Ofcom published a consultation document entitled *Mobile call termination 2018-21* (the “**June 2017 Consultation**”)<sup>38</sup> 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. Annex 7 of the June 2017 Consultation set out the notification under section 48A(3) and 80(A)(3) of the Communications Act 2003 (the “**Act**”) in which Ofcom set out its proposals for domestic consultation. Ofcom invited responses to the June 2017 Consultation by 5 September 2017. On 17 November 2017, Ofcom published a further consultation, which was updated on 12 December 2017 (the “**November 2017 Consultation**”)<sup>39</sup>, in which Ofcom proposed to designate additional providers as having SMP<sup>40</sup> and to impose remedies on them. The November 2017 Consultation included a notification to that effect under sections 48A(3) and 80A(3) of the Act. On 23 January 2018, we published a further statutory notification, again under sections 48A(3) and 80A(3) of the Act, proposing to designate one further provider with SMP<sup>41</sup> (the “**January 2018 Notification**”).
- A4.3 Copies of the June 2017 Consultation and the November 2017 Consultation, including the relevant notifications (together, the “**2017 Consultations**”), as well as the January 2018 Notification, were also sent to the Secretary of State in accordance with sections 48C(1) and 81(1) of the Act.

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<sup>37</sup> <https://www.ofcom.org.uk/consultations-and-statements/category-1/mobile-call-termination-14>

<sup>38</sup> <https://www.ofcom.org.uk/consultations-and-statements/category-1/mobile-call-termination-market-review>

<sup>39</sup> <https://www.ofcom.org.uk/consultations-and-statements/category-3/further-consultation-mobile-call-termination-market-review>

<sup>40</sup> As well as removing a small number of those we previously proposed to designate.

<sup>41</sup> [https://www.ofcom.org.uk/\\_data/assets/pdf\\_file/0027/109791/legal-instrument-telet.research.pdf](https://www.ofcom.org.uk/_data/assets/pdf_file/0027/109791/legal-instrument-telet.research.pdf)



- A4.4 Ofcom received several responses to its proposals set out in the 2017 Consultations, and it has considered every such representation. The Secretary of State has not notified Ofcom of any international obligation on the United Kingdom for the purposes of sections 48A(6)(b) or 80A(9)(b) of the Act.
- A4.5 The proposals set out in the June 2017 Consultation contained proposals of EU significance for the purposes of the Act. Therefore, after making such modifications of the proposals that appeared to Ofcom to be appropriate following domestic consultation, on 23 February 2018 Ofcom sent a copy of them, and of a draft of the statement accompanying this notification setting out the reasons for them, to the European Commission, BEREC and the regulatory authorities of every other member State for EU consultation, in accordance with sections 48B(2) and 80B(2) of the Act.

### Proposals for service market identifications and market power determinations

- A4.6 Ofcom is proposing to identify 68 separate markets as described below for the purpose of making a market power determination.
- A4.7 The markets that Ofcom has identified are the markets for call termination services that are provided by each of those 68 persons named in Schedule 1 to this notification to another communications provider, for the termination of voice calls to UK mobile numbers 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**”).
- A4.8 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 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.
- A4.9 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 draft statement accompanying this notification.

### Proposals to set and revoke SMP service conditions

- A4.10 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.
- A4.11 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.
- A4.12 Unless otherwise stated in Schedule 1 to this notification, the SMP conditions that Ofcom is proposing shall take effect from **1 April 2018** and shall have effect until the publication of a notification under section 48(1) of the Act revoking such conditions.

- A4.13 Ofcom is proposing to revoke the SMP conditions set out at Annex 1 to the 2015 MCT Statement with effect from **1 April 2018**. 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.
- A4.14 The effect of, and Ofcom's reasons for making, the proposals referred to above are set out in the draft statement accompanying this notification.

### **Ofcom's duties and legal tests**

- A4.15 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.
- A4.16 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.
- A4.17 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.

### **Interpretation**

- A4.18 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.
- A4.19 The schedules to this notification shall form part of this notification.

Signed

A handwritten signature in black ink, appearing to read 'Brian Potterill', with a long horizontal flourish extending to the right.

Brian Potterill

Competition Policy Director

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

23 February 2018

## 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 (or which would fall within that definition were it applied), 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. **24 Seven Communications Ltd**, whose registered company number is 04468566 and registered address is c/o Novis & Co Chartered Accountants, 1 Victoria Court Bank Square, Morley, Leeds, West Yorkshire, LS27 9SE, United Kingdom.
4. **Ace Call Ltd**, whose registered company number is 06729339 and registered address is 11 Hatton Garden, Liverpool, Merseyside, L3 2HA, United Kingdom.
5. **Airwave Solutions Ltd**, whose registered company number is 03985643 and registered address is Nova South, 160 Victoria Street, London, SW1E 5LB, United Kingdom.
6. **Andrews & Arnold Ltd**, whose registered company number is 03342760 and registered address is Enterprise Court, Downmill Road, Bracknell, Berkshire, RG12 1QS, United Kingdom.
7. **Anywhere Sim Ltd**, whose registered company number is 09615065 and registered address is Grindleton Business Centre, Grindleton, Clitheroe, BB7 4DH, United Kingdom.
8. **AQL Wholesale Ltd**, whose registered company number is 05134355 and registered address is 11-15 Hunslet Road, Leeds, LS10 1JQ, United Kingdom.
9. **Bellingham Telecommunications Ltd**, whose registered company number is 07038166 and registered address is Unit 7, 2 Exchange Court, London, WC2R 0PP, United Kingdom.
10. **BT OnePhone Ltd**, whose registered company number is 08043734 and registered address is 81 Newgate Street, London, EC1A 7AJ, United Kingdom.
11. **CFL Communications Ltd**, whose registered company number is 04419749 and registered address is Abbey House, 25 Clarendon Road, Redhill, Surrey, RH1 1QZ, United Kingdom.
12. **Citrus Telecommunications Ltd**, whose registered company number is 03517870 and registered address is Second Floor, 99 Holdenhurst Road, Bournemouth, Dorset, BH8 8DY, United Kingdom.
13. **Cloud9 Mobile Communications Ltd**, whose registered company number is 05474679 and registered address is Horizon Honey Lane, Hurley, Maidenhead, England, SL6 6RJ, United Kingdom.
14. **Compatel Ltd**, whose registered company number is 07456831 and registered address is 26-28 Bedford Row, London, WC1R 4HE, United Kingdom.

15. **Confabulate Ltd**, whose registered company number is 05605939 and registered address is 9 Market Row, Saffron Walden, Essex, CB10 1HB, United Kingdom.
16. **Core Communication Services Ltd**, whose registered company number is 05467282 and registered address is 11 York Road, London, SE1 7NX, United Kingdom.
17. **Core Telecom Ltd**, whose registered company number is 05332008 and registered address is Mazhar House, 48 Bradford Road, Stanningley, Leeds, West Yorkshire, LS28 6DD, United Kingdom.
18. **EE Ltd**, whose registered company number is 02382161 and registered address is Trident Place, Mosquito Way, Hatfield, Hertfordshire, AL10 9BW, United Kingdom.
19. **Esendex Ltd**, whose registered company number is 04217280 and registered address is 20 Wollaton Street, Nottingham, NG1 5FW, United Kingdom.
20. **Flextel Ltd**, whose registered company number is 02772380 and registered address is Griffins Court, 24-32 London Road, Newbury, Berkshire, RG14 1JX, United Kingdom.
21. **Gamma Telecom Holdings Ltd**, whose registered company number is 04287779 and registered address is 5 Fleet Place, London, EC4M 7RD, United Kingdom.
22. **Global Reach Networks Ltd**, whose registered company number is 04349826 and registered address is 1 Sydney Street, Brighton, BN1 4EN, United Kingdom.
23. **Globecom International Ltd**, whose registered company number is 08825524 and registered address is 20-22 Wenlock Road, London, N1 7GU.
24. **Globetouch AB**, whose registered organisation number is 5569992-0902 and registered address is Engelbrektsgatan 9-11, 114 32 Stockholm, Sweden.
25. **Hanhaa Ltd**, whose registered company number is 09097664 and registered address is Tobacco Dock, The Dock, Tobacco Quay, Wapping Lane, E1W 2SF, United Kingdom.
26. **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.
27. **IPV6 Ltd**, whose registered company number is 06711525 and registered address is Berrycentre, Chiltern Drive, Surbiton, Surrey, KT5 8LS, United Kingdom.
28. **IV Response Ltd**, whose registered company number is 04318927 and registered address is 57-61 Mortimer Street, London, W1W 8HS, United Kingdom.
29. **JT (Jersey) Ltd**, whose registered company number is 83487 and registered address is No 1 The Forum, Grenville Street, St Helier, Jersey, JE4 8PB.
30. **Lanonyx Telecom Ltd**, whose registered company number is 07658086 and registered address is Office 8, 19 Lever Street, Manchester, Greater Manchester, M1 1AN.
31. **Lycamobile UK Ltd**, whose registered company number is 05903820 and registered address is 3rd Floor Walbrook Building, 195 Marsh Wall, London, E14 9SG, United Kingdom.

32. **Magrathea Telecommunications Ltd**, whose registered company number is 04260485 and registered address is Unit 5, Commerce Park, Brunel Road, Theale, Reading, RG7 4AB, United Kingdom.
33. **Mars Communications Ltd**, whose registered company number is 06478834 and registered address is Forest House, Forest Road, Ilford, Essex, IG6 3HJ, United Kingdom.
34. **Mobile FX Services Ltd**, whose registered company number is 06028074 and registered address is 49 Greek Street, London, W1D 4EG, United Kingdom.
35. **Mobiweb Telecom Ltd**, whose registered company number is 08851141 and registered address is Third Floor, 207 Regent Street, London, W1B 3HH, United Kingdom.
36. **Nationwide Telephone Assistance Ltd**, whose registered company number is 04315226 and registered address is Ivy Lodge Farm, 179 Shepherds Hill, Harold Wood, Romford, Essex, RM3 0NR, United Kingdom.
37. **Nodemax Ltd**, whose registered company number is 06127089 and registered address is 75 Springfield Road, Chelmsford, Essex, CM2 6JB, United Kingdom.
38. **Premium Routing GmbH**, whose registered company number is CHE-113.847.561 and registered address is Steinackerstrasse 2, CH-8302, Kloten, Switzerland.
39. **QX Telecom Ltd**, whose registered company number is 03820728 and registered address is 2 Glenmore Close, Thatcham, Berkshire, RG19 3XR, United Kingdom.
40. **Resilient Plc**, whose registered company number is 01403177 and registered address is 25/27 Shaftesbury Avenue, London, W1D 7EQ, United Kingdom.
41. **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.
42. **Secretary of State for the Home Office**, whose address is 6<sup>th</sup> Floor, Fry Building, 2 Marsham Street, London, SW1P 4DF, United Kingdom.
43. **Simwood eSMS Ltd**, whose registered company number is 03379831 and registered address is Simwood House, Cube M4 Business Park, Old Gloucester Road, Bristol, BS16 1FX, United Kingdom.
44. **Sky UK Ltd**, whose registered company number is 029606991 and registered address is Grant Way, Isleworth, Middlesex, TW7 5QD, United Kingdom.
45. **Sound Advertising Ltd**, whose registered company number is 03218628 and registered address is Aston House, Cornwall Avenue, London, N3 1LF, United Kingdom.
46. **Spacotel UK Ltd**, whose registered company number is 03036383 and registered address is 790 Uxbridge Road, Hayes, Middlesex, UB4 0RS, United Kingdom.
47. **Stour Marine Ltd**, whose registered company number is 05914603 and registered address is Good Easter House, Good Easter, Chelmsford, Essex, CM1 4RS, United Kingdom.

48. **Swiftnet Ltd**, whose registered company number is 02469394 and registered address is 1<sup>st</sup> Floor Olympia House, 1 Armitage Road, Golders Green, London, NW11 8RQ, United Kingdom.
49. **Synectiv Ltd**, whose registered company number is 03706138 and registered address is 2 Spring Villa Park, Spring Villa Road, Edgware, Middlesex, HA8 7EB, United Kingdom.
50. **Telecom2 Ltd**, whose registered company number is 06926334 and registered address is Cotswold Hse, 219 Marsh Wall, London, E14 9FJ, United Kingdom.
51. **Telecom 10 Ltd**, whose registered company number is 06974505 and registered address is 3a Station Road, Cippenham, Slough, SL1 6JJ, United Kingdom.
52. **Telecom Cloud Networks Ltd**, whose registered company number is 09071980 and registered address is 22 Studio F, Jordan Street, Liverpool, L1 0BP, United Kingdom.
53. **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.
54. **Teleena UK Ltd**, whose registered company number is 07069424 and registered address is New Derwent House, 69-73 Theobalds Road, London, WC1X 8TA, United Kingdom.
55. **Telefónica UK Ltd**, whose registered company number is 01743099 and registered address is 260 Bath Road, Slough, Berkshire, SL1 4DX, United Kingdom.
56. **Telet Research (N.I.) Ltd**, whose registered company number is NI642439 and registered address is Forsyth House, Cromac Square, Belfast, Antrim, Northern Ireland, BT2 8LA, United Kingdom.
57. **Test2date B.V**, whose registered company number is 30194024 and registered address is Ypelobrink 150, 7544 CG, Enschede, The Netherlands.
58. **TGL Services (UK) Ltd**, whose registered company number is 09293520 and registered address is 33 St. James's Street, London, SW1A 1HD, United Kingdom.
59. **Tismi BV**, whose registered company number is 32081827 and registered address is Catharijnesingel 30 G, 3511 GB, Utrecht, The Netherlands.
60. **Truphone Ltd**, whose registered company number is 04187081 and registered address is 25 Canada Square, Canary Wharf, London, E14 5LQ, United Kingdom.
61. **Vectone Mobile Ltd**, whose registered company number is 04553934 and registered address is 54 Marsh Wall, London, E14 9TP, United Kingdom
62. **Virgin Mobile Telecoms Ltd**, whose registered company number is 03707664 and registered address is Media House, Bartley Wood Business Park, Hook, Hampshire, RG27 9UP, United Kingdom.
63. **Vodafone Ltd**, whose registered company number is 01471587 and registered address is Vodafone House, The Connection, Newbury, Berkshire, RG14 2FN, United Kingdom.
64. **Voicetec Systems Ltd**, whose registered company number is 03948745 and registered address is 46 West Drayton Park Avenue, West Drayton, Middlesex, UB7 7QB, United Kingdom.

65. **Voxbone SA**, whose registered establishment number is BR017510 and registered address is The Podium, 1 Evershold Street, London, NW1 2DN, United Kingdom.
66. **Wavecrest (UK) Ltd**, whose registered company number is 03042254 and registered address is 1st Floor Bishopsgate Court, 4-12 Norton Folgate, London, E1 6DB, United Kingdom.
67. **X-Mobility Ltd**, whose registered company number is 05748799 and registered address is Cumbrian House, 84 Cumbrian Gardens, Golders Green, London, NW2 1EL, United Kingdom.
68. **Ziron (UK) Ltd**, whose registered company number is 07597853 and registered address is 27 Old Gloucester Street, London, WC1N 3AX, United Kingdom.



## Schedule 2

### The SMP Conditions

#### Part 1: Commencement

1. The SMP conditions in Part 3 of this Schedule, except where specified otherwise, apply from **1 April 2018**.

#### Part 2: Definitions and interpretation

2. 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 Price 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 ten months beginning on 1 June 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.

3. 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 2 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 the period beginning on 1 April 2018 and ending on 30 May 2018 the call termination charge (which shall be expressed in pence per minute) does not exceed 0.495 pence per minute.

**M2.2** 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.

**M2.3** The charge ceiling is:

- a) for any Call on a day in the First Relevant Period, 0.489 pence per minute;
- b) for any Call on a day in the Second Relevant Period and Third Relevant Period:
  - i) an amount equal to:
    - 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,
    - the sum of 100 per cent and the controlling percentage for the relevant period in which the Call was made, and is
  - ii) expressed as being pence per minute and rounded to three decimal places.

**M2.4** 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.

**M2.5** 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.

**M2.6** The dominant provider must comply with any direction Ofcom may make from time to time under this condition.

## A5. Smaller MCT Providers

### Introduction

- A5.1 In our June 2017 Consultation<sup>42</sup>, in addition to the four largest mobile providers, we proposed 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.<sup>43</sup>
- A5.2 Our 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.<sup>44</sup>
- A5.3 In January 2017 we also gathered information from smaller mobile providers using our statutory powers under section 135 of the Act ('January information notices'). In the January information notices, 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 its business, namely, the different services it offers (including but not limited to the services offered over the number ranges held), the total number of 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 providers, 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 providers 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.
- A5.4 As a large majority of smaller mobile providers interconnect with BT, in our formal information notice to BT in February 2017, we asked for information on the MTRs BT charges on behalf of the smaller mobile providers that interconnect with BT, and the

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<sup>42</sup> <https://www.ofcom.org.uk/consultations-and-statements/category-1/mobile-call-termination-market-review>.

<sup>43</sup> The relevant markets include any mobile provider which has requested transfers of relevant UK mobile numbers and offers (or plans to offer) MCT.

<sup>44</sup> Available at <http://www.companieshouse.gov.uk/> and <https://www.btwholesale.com/pages/static/help-and-support/pricing/carrier-price-lists.htm> respectively.

volume of minutes (for calls) that BT terminated to those mobile providers in Quarter 4 2016.

A5.5 Following the June 2017 Consultation, we updated our analysis to reflect the latest available information. As part of this process, in October 2017 we sent further information notices under section 135 of the Act to 28 of the smaller MCT providers ('October information notices'). Further to information received in response to our January information notices, we asked:

- mobile providers that informed us that they had plans to cease offering MCT services to: (i) confirm whether they were currently offering MCT services, and if not when they ceased to do so; (ii) in the event that the mobile provider was not directly offering MCT on its MNRs but purchasing hosting services from another company, to provide the details of that arrangement; (iii) in the event that MCT was not being offered, to confirm that the provider had no plans to launch MCT services within the MCT review period;
- mobile providers that had informed us that they had plans to offer MCT within the MCT review period, to confirm whether their plans had changed, and if so to specify in what way;
- mobile providers that had informed us that they were not using their allocated MNRs to offer MCT services that (i) this was still the case; (ii) in the event that the mobile provider was not directly offering MCT on its MNRs but purchasing hosting services from another company, to provide the details of that arrangement; (iii) in the event that MCT wasn't being offered, to confirm that the provider had no plans to launch MCT services within the MCT review period;
- mobile providers that had acquired mobile number ranges since the date of the June 2017 Consultation to confirm how the acquired mobile number range is being used and whether MCT services are being offered; and
- all mobile providers who received the October information notices to specify each of the services offered (or services they plan to offer) in the MCT review period over the MNRs allocated to it by Ofcom (e.g. voice, SMS, data, international call forwarding, VoIP, any OTT service or any other service).

A5.6 Further to information received in response to the October information notices as well as additional information received in relation to the National Telephone Numbering Plan<sup>45</sup>, on 17 November 2017, we published a further consultation<sup>46,47</sup> containing an updated list of the 75 smaller MCT providers which we proposed to designate as having SMP ('the SMP

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<sup>45</sup> The information received in relation to our management of the National Telephone Numbering Plan confirmed those companies which, since the June 2017 Consultation, have either: (i) acquired MNRs; (ii) applied for a transfer of an MNR previously allocated to another mobile provider; (iii) returned their allocated MNRs; or (iv) had their allocated MNRs withdrawn.

<sup>46</sup> <https://www.ofcom.org.uk/consultations-and-statements/category-3/further-consultation-mobile-call-termination-market-review>.

<sup>47</sup> On 12 December we published an update to the November 2017 Consultation to add a further two companies to our proposed list of telecoms providers that have SMP in MCT. These are: Anywhere Sim Ltd and IV Response Ltd.

list') and on whom we propose to impose SMP conditions. Where Ofcom has evidence that MCT is offered over a company's MNR notwithstanding what it told us in its response to information notices under section 135 of the Act, we included those companies on the revised SMP list.<sup>48</sup>

- A5.7 In November 2017 we also sent a further information notice to BT. In order to ensure that our analysis in the Statement is based on appropriately updated information as part of this notice we asked again 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 companies in Quarter 3 2017.
- A5.8 In December 2017 and January 2018, we also sent a further information notice to Anywhere Sim Ltd to confirm its plans for the use of its MNR, as well as information notices to companies based in the Channel Islands and Isle of Man asking whether they offer MCT services in the UK.
- A5.9 In January 2018 we published a notification of proposed designation of SMP to Telet Research (N.I.) Ltd<sup>49</sup> which had acquired a mobile number range allocation since the publication of the November 2017 Consultation. On the basis that it appears to us that Telet will be terminating calls on its own network for which it will be able to set a MTR (but subject for the time being to its response to the notification), we therefore now include Telet within our market analysis.
- A5.10 In this Statement, taking account of all the information received, we have designated 64 smaller MCT providers as having SMP.<sup>50</sup> We set out the results of our analysis below specifying where we have decided to make changes to the proposals put forward in the June 2017 and November 2017 Consultations.

## Companies included in our market analysis

- A5.11 In our June 2017 Consultation, we proposed to include in our market analysis those mobile providers who submitted that they are currently providing MCT services<sup>51</sup>. We also proposed to include in our market analysis those mobile providers who purchase hosting services in relation to the mobile number ranges allocated to them by Ofcom. We continue to include mobile providers falling in each of these categories in our market analysis.
- A5.12 Some of the smaller mobile providers who provide MCT services on the numbers allocated to them did not respond to our January information notices. Having checked these mobile providers with their hosting providers, and having also checked if the number ranges

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<sup>48</sup> We also removed a small number of providers from the SMP List (see paragraphs [A5.24] below) and confirmed with Companies House that all of the listed companies were still active.

<sup>49</sup> [https://www.ofcom.org.uk/\\_data/assets/pdf\\_file/0027/109791/legal-instrument-telet.research.pdf](https://www.ofcom.org.uk/_data/assets/pdf_file/0027/109791/legal-instrument-telet.research.pdf)

<sup>50</sup> A complete list of those mobile providers designated with SMP can be found in Annex 12.

<sup>51</sup> We now include one additional provider in this category that was included in the November 2017 Consultation: Lanonyx Telecom Ltd.

allocated to them were listed on BT's CPL, we found number ranges allocated to the following providers to be active and therefore included them in our market analysis:

- a) Ace Call Ltd<sup>52</sup>; and
- b) Global Reach Networks<sup>53</sup>.

A5.13 We continue to include these mobile providers in our market analysis.

A5.14 It is also possible that some companies provide MCT notwithstanding what they told us in their responses to information notices under section 135 of the Act.<sup>54</sup> 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 have included them in our market analysis.<sup>55</sup>

A5.15 We also 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 31 March 2021.<sup>56</sup> In October 2017 we sent these MCT providers further information notices to confirm their position with respect to offering MCT services; consequently we have removed two mobile providers<sup>57</sup> from, and added two MCT providers<sup>58</sup> to, the SMP list.<sup>59</sup>

A5.16 We also include in our market analysis any mobile provider which has requested the transfer of previously allocated mobile number ranges<sup>60</sup> that have been used by the

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<sup>52</sup> The mobile number range allocated to Ace Call Ltd is listed on BT's CPL Part no. B1.02 against Core Telecom Ltd (who we understand to be the hosting provider). Core Telecom Ltd confirmed that it hosts this number range and that the range is active.

<sup>53</sup> The mobile number range allocated to Global Reach Networks is listed on BT's CPL Part no. B1.02 against Magrathea Telecommunications Ltd (who we understand to be the hosting provider). Magrathea Telecommunications Ltd confirmed that it hosts this number range and that the range is active.

<sup>54</sup> 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.

<sup>55</sup> Sound Advertising Ltd stated in its response to our each of our January and October information notices that it did not provide MCT services; however, dialing 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. replied to our January information notices, stating it did not offer MCT services; however, further communication with its hosting provider, Magrathea Telecommunications, suggested that it does host its MNRs and that Telecom North America Mobile Inc offers MCT services. IV Response Ltd stated in its response to our information notice that it did not provide MCT services; however, information provided under section 135 of the Act by BT Plc stated that calls were made to IV Response's number range in Q3 2017 and an MTR charged. This therefore leads us to reasonably believe that these numbers remain active and are being interconnected.

<sup>56</sup> These providers are: BT OnePhone Ltd, Compatel Ltd, Globecom International Ltd, Hanhaa Ltd, IPV6 Ltd, Mobile FX Services Ltd, Mobiweb Telecom Ltd, Nodemax Ltd, Premium Routing GmbH, Synectiv Ltd, Test2Date B.V., Telecom Cloud Networks, Wavecrest (UK) Ltd.

<sup>57</sup> AMSUK Ltd and Hay Systems Ltd.

<sup>58</sup> Anywhere Sim Ltd and Esendex Ltd.

<sup>59</sup> Globecom International Ltd did not respond to our October information notice but is included on the basis of information it provided in response to the April information notice which it was given the opportunity to update but did not take.

<sup>60</sup> This designation is without prejudice to the question of whether the request should be granted and is on the forward-looking basis that, if the requests are granted, the relevant providers will have SMP in the provision of MCT in the review period.

previous holder to provide MCT<sup>61</sup>. Further, we include two mobile providers which offer other services falling within the MCT market definition<sup>62</sup>.

- A5.17 In our market definition, we include calls to UK mobile numbers held by MCT providers in any foreign countries and non-UK territories, unless regulated by another competent authority, to the extent that mobile call termination to these numbers is provided in the UK. As a result of this market definition, we have designated JT (Jersey) Ltd with SMP. This is because, in response to a statutory information notice JT (Jersey) Ltd indicated that it sub-allocates some of its mobile number range to Ekit. It appears to us that the services provided by Ekit include the provision of voice calls which are capable of termination in the UK. On the basis that JT (Jersey) Ltd sub-allocates its mobile number range to Ekit, and Ekit has the ability to provide MCT in the UK (which is not regulated by another competent authority), we therefore continue to include JT (Jersey) Ltd in our market analysis.
- A5.18 In addition, we include both the Home Office and the National Cyber Security Centre (in the form of their respective Secretaries of State) in our market analysis. 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, and would be able to do so by being in control of the mobile number range.

## Companies excluded from our market analysis

- A5.19 In our June 2017 Consultation we excluded from our proposed market analysis:
- six mobile providers that had been allocated UK mobile numbers but are now in liquidation,<sup>63</sup> or have been dissolved<sup>64</sup>;
  - four mobile providers that informed us that they have returned, or intend to return their numbers to Ofcom;<sup>65</sup>
  - one mobile provider that informed us it does not offer MCT services on its own number ranges but hosts another mobile provider's number ranges on the network.<sup>66</sup>
- A5.20 We continue to exclude those companies from our market analysis.

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<sup>61</sup> This applies to: Globetouch AB and X-Mobility Ltd.

<sup>62</sup> Spacotel UK Ltd and Voicetec Systems Ltd. Each of these providers has informed us in response to a statutory information notice that they use their mobile number range to offer call forwarding services.

<sup>63</sup> Cheers International Sales Ltd (appointed voluntary liquidator on 31 January 2017), Fogg Mobile AB, Limitless Mobile Ltd (appointed voluntary liquidator on 29 November 2016), Switch Services Ltd (appointed voluntary liquidator on 9 November 2016), Titanium Ltd (appointed voluntary liquidator on 2 August 2016).

<sup>64</sup> Premium O Ltd appointed a voluntary liquidator on 9 February 2016 and was dissolved on 14 May 2017.

<sup>65</sup> Fonix Mobile Ltd, Proton Telecom Ltd, Rexcom Tech Ltd, Vortex Telecom Ltd.

<sup>66</sup> Teleware informed us that they offer MCT services only on the number ranges they host for Teleena UK.



- A5.21 We also proposed to exclude from our market analysis nine mobile providers that 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 had no evidence to show otherwise. On the basis of information received in response to the October information notices we have updated this analysis. On the basis of that information, we now intend to include five of these providers in our market analysis<sup>67</sup>. The four mobile providers<sup>68</sup> remaining from our original proposal will be excluded from our market analysis for the reasons specified in our June 2017 Consultation.<sup>69</sup>
- A5.22 In the June 2017 Consultation we proposed to exclude Icron Network Ltd and SMSRelay AG from the market analysis on the basis that both companies had informed us that they do not offer mobile services and we had no reason to believe that the numbers allocated to these providers were being used for mobile services. Furthermore, since the June 2017 Consultation, SMSRelay's mobile number range has been withdrawn. We therefore exclude each of these providers from our market analysis.
- A5.23 In the June 2017 Consultation and the November 2017 Consultation we proposed to include nine smaller mobile providers which are registered in the Channel Islands or the Isle of Man and are licensed to provide mobile services in their place of registration, to the extent that they provide MCT services in the UK.<sup>70</sup> We no longer plan to include eight of these providers in our market analysis on the basis that either (i) the company has confirmed to us in response to a statutory information notice that it does not have equipment located in the UK capable of terminating calls in the UK<sup>71</sup>; or (ii) we do not have sufficient evidence to conclude that the company offers MCT in the UK<sup>72</sup>.
- A5.24 Additionally, on the basis of information received since the publication of the June 2017 Consultation, we exclude from our market analysis mobile providers that have:
- had their mobile number ranges withdrawn or returned the mobile number ranges allocated to them<sup>73</sup>;
  - transferred their mobile number ranges to another mobile provider<sup>74</sup>; and

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<sup>67</sup> Esendex Ltd, IV Response Ltd, Lanonyx Telecom Ltd, Spacetel UK Ltd, Voicetec Systems Ltd (see paragraphs [A5.11, A5.14-A5.16] above)

<sup>68</sup> Lleidanetworks Serveis Telematics Ltd, CLX Communications Ltd, Telesign Mobile Ltd, UK Broadband Ltd.

<sup>69</sup> We note that since the publication of the June 2017 Consultation UK Broadband Ltd has been acquired by H3G.

<sup>70</sup> These mobile providers are: Guernsey Airtel Ltd, Jersey Airtel Ltd, Jersey Telecom, JT Guernsey, Manx Telecom, Marathon Telecom Ltd, Sure (Guernsey) Ltd, Sure (Isle of Man) Ltd, Sure (Jersey) Ltd.

<sup>71</sup> These mobile providers are: Manx Telecom, JT Guernsey, Sure (Guernsey) Ltd, Sure (Isle of Man) Ltd, and Sure (Jersey) Ltd.

<sup>72</sup> These mobile providers are: Marathon Telecom, Guernsey Airtel Ltd, and Jersey Airtel Ltd.

<sup>73</sup> 09 Mobile Ltd (in the June 2017 Consultation 09 Mobile Ltd was included in the proposed SMP list on the basis it had not replied to our formal information notice), Alliance Technologies LLC, AMSUK Ltd, Cloud9 Communications Ltd, Edge Telecom Ltd, Invomo Ltd, Euro Thai Exchange Process Company Ltd (Yim Siam Telecom), and Legend Tel LLC.

<sup>74</sup> In May 2017 British Telecommunications plc transferred its allocated mobile number ranges (07777 0 to 07777 9) to EE Ltd.

- informed us in response to statutory information notices that they have ceased to offer MCT and/or have no future plans to offer MCT services within the MCT Review Period<sup>75</sup>.

A5.25 In the event that a mobile provider not designated with SMP by this Statement starts offering MCT services within the MCT review period and another communications provider becomes concerned that the new provider is charging above the MTR cap, that communications provider could inform Ofcom. We would use our discretion to determine whether any action should be taken and the appropriate way to publicise any such action.

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<sup>75</sup> Dynamic Mobile Billing Ltd, Hay Systems Ltd and TalkTalk Communications Ltd. In response to the November 2017 Consultation a stakeholder raised concerns that although each of Dynamic Mobile Billing and Hay Systems were excluded from our market analysis, they each still have a mobile number range allocation. We note that we continue to exclude each provider from our market analysis on the basis that they have confirmed to us by statutory information notice that they have each ceased to offer MCT and/or have no plans to offer MCT services within the MCT Review Period. Each provider therefore falls outside the scope of our market analysis.

## A6. Regulation of termination for calls originated outside the EEA – economic effects

### Introduction

- A6.1 This annex sets out our assessment of the economic effects of allowing differential regulation of MCT in respect of certain calls originated outside the UK. In particular, for calls from non-EEA countries, where termination rates are sometimes well in excess of the UK MTR (and in excess of MTRs in European countries that have followed the 2009 EC Recommendation).<sup>76</sup>
- A6.2 The economic rationale underpinning the regulation of termination in the UK (as elsewhere) has been that termination providers with SMP have the incentive and ability to charge high termination rates (i.e. well above cost), and that the promotion of competition, efficiency and consumers' interests, are best served by cost-based termination rates.
- A6.3 We have set out in Section 4 of this statement our conclusion that the capping of termination rates at long-run incremental cost (LRIC) would facilitate more effective competition and be to the benefit of end consumers. Likewise, we consider that termination rates at LRIC would be consistent with the 2009 EC Recommendation.
- A6.4 In assessing the potential effects of differential regulation in this review, our aim is to establish whether there is a sufficient case to make an exception to our approach to the regulation of MCT, for calls originated outside the EEA.
- A6.5 UK MCT providers currently face a net termination revenue outflow to non-EEA countries (where the termination revenue received from inbound calls originating from non-EEA countries is less than the termination outpayment incurred from outbound calls to non-EEA countries) despite, as a whole, being net receivers of traffic (i.e. call minutes) from non-EEA countries.<sup>77</sup> The net termination revenue position is the outcome of two factors – traffic flows and high MTRs in some countries.

### Analytical framework

- A6.6 Annex 11 of the June 2017 Consultation set out our provisional assessment of the regulation of calls originated outside the EEA. We considered three options for the treatment of MTRs from calls originating outside the EEA (see paragraphs A11.21 to A11.24 of the June 2017 Consultation):

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<sup>76</sup> Throughout this annex we refer to calls originated outside the EEA, although the principles behind this analysis are generic to all calls originated outside the UK. Our focus is countries with high termination rates (i.e. well above cost) – this does not apply to MTRs in EEA countries which are regulated with MTR caps at LRIC applying in most cases. In accordance with Ofcom's obligations under EU law, we impose the same regulation on all calls from the EEA, regardless of the Member State in which a call is originated.

<sup>77</sup> See Annex 7 paragraphs A7.19 to A7.22.

- i) Option 1: no differential regulation (i.e. maintain the status quo);
- ii) Option 2: exclude the termination of non-EEA originated calls from the MCT charge control; or
- iii) Option 3: a reciprocity condition for non-EEA originated calls.

A6.7 In considering the effects of differential regulation we looked at:

- a) possible changes to the level of UK and non-EEA MTRs under differential regulation;
- b) the likelihood of differential regulation leading to low termination rates overseas; and
- c) the possible effects of differential regulation, in particular on consumers.

A6.8 This annex presents our further assessment of these issues, taking careful account of stakeholder responses to our June 2017 Consultation.

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

A6.9 Differential regulation of UK MTRs could in principle lead to either reciprocal low termination rates or reciprocal high termination rates.

- i) **Reciprocal low termination rates:** UK MCT providers might secure reciprocal low termination rates by using the threat of charging high MTRs to negotiate down the rates paid for terminating calls in non-EEA countries.
- ii) **Reciprocal high termination rates:** UK MCT providers might respond to differential regulation by increasing MTRs to providers in countries which have high termination rates, with the non-EEA providers leaving their rates at a high level.

A6.10 Reciprocal low termination rates are the most desirable outcome from the perspective of efficient pricing and consumer welfare. 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 and both sets of providers would need to prefer low rates to high rates.

A6.11 In the following sections, we consider first the likelihood of differential regulation leading to low termination rates and second the likelihood of UK consumers being better off under differential regulation.

## The likelihood of differential regulation leading to low termination rates

A6.12 In our June 2017 Consultation, we noted that:

- a) In cases where negotiations did not take place between UK and non-EEA MCT providers, and where the starting rates from the non-EEA providers were high, we would expect high rates to prevail on both sides. 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.<sup>78</sup>
  - b) A number of practical barriers exist to negotiation between UK mobile providers and their non-EEA counterparts.<sup>79</sup>
  - c) In other EU member states where differential regulation has been applied, MTRs charged to non-EEA providers have increased, and some member states noted increases in the MTRs charged by non-EEA providers.<sup>80</sup>
- A6.13 To assess the likelihood of differential regulation leading to low termination rates we now give further consideration to:
- a) the incentives of the UK MCT providers and non-EEA MCT providers to negotiate and agree to low termination rates;
  - b) the practicalities involved in UK MCT providers and non-EEA MCT providers negotiating and agreeing to low termination rates; and
  - c) the evidence from other countries of the outcomes from pricing freedom on MTRs.
- A6.14 For simplicity, we focus on a choice between a ‘high’ and ‘low’ termination rate, although in practice there will be a range of rates that could be considered high, and another range that could be considered low.<sup>81</sup>

## **Incentive and ability of MCT providers to negotiate and agree low termination rates**

- A6.15 In this section, we consider scenarios in which UK and non-EEA MCT providers might have incentives to pursue a reciprocal low outcome. In doing so we are considering a case without any frictions in the market, such as obstacles or delays to negotiating, or to resolving disputes. We also assume unilateral negotiations/interactions between one UK MCT provider and one non-EEA MCT provider. In the following section, we go on to consider how likely this is in practice, given the role of other parties in the exchange of traffic and other transactional costs.
- A6.16 To assess the incentives of the UK MCT providers and non-EEA MCT providers to negotiate and agree to low termination rates, we consider three different scenarios:

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<sup>78</sup> Paragraph A11.35 of June 2017 Consultation.

<sup>79</sup> See paragraphs A11.36 – A11.39 of June 2017 Consultation.

<sup>80</sup> Paragraph A11.41 of June 2017 Consultation.

<sup>81</sup> Some non-EEA rates, such as India and China, are low in an international context. Data provided by the four large UK MCT providers indicates they are 1.1ppm and 1.4ppm respectively) but are higher than in the UK (which is around 0.5ppm).

- a) **UK provider as a net sender of traffic** – where a UK MCT provider originates more call minutes than it terminates from a particular non-EEA MCT provider.
  - b) **Balanced traffic** – where a UK MCT provider originates a similar number of call minutes to a particular non-EEA MCT provider as it terminates from that provider.
  - c) **UK provider as net receiver of traffic** – where a UK MCT provider originates fewer call minutes than it terminates from a particular non-EEA MCT provider.
- A6.17 In determining its preferred termination rate, we would in principle expect each party to consider:
- a) the increased (decreased) revenue per call it can attain from a higher (lower) rate;
  - b) the likely demand response (i.e. a higher MTR may lead to fewer inbound calls, and a lower one to more inbound calls);
  - c) the expected response from the other party (in terms of the MTR it sets); and
  - d) the likely retail effect of this (for example, a reduction (increase) in the MTR set by the other party would lead to an increased (reduced) retail margin on outbound calls, or potentially to higher (lower) outbound call volumes if the originating party decided to reduce (increase) the retail price).
- A6.18 MCT providers typically charge MTRs significantly above cost in the absence of regulation, suggesting that – before we consider the response of the other party – the combined effect of (a) and (b) above points towards parties preferring a higher termination rate over a lower one.
- A6.19 Absent regulation of either MCT provider’s MTR for overseas originated traffic, we expect the party who is the net receiver of traffic will typically prefer a higher termination rate as this will maximise its net revenue position from termination between those MCT providers. Given this, the best response of the other party is also to set a high termination rate.
- A6.20 However, if the gain at the retail level from reciprocal low rates exceeded the net revenue gain from reciprocal high rates, then the party who is the net receiver of traffic could nevertheless prefer low rates to high rates.

#### **UK provider as a net sender of traffic**

- A6.21 Where the UK MCT provider is a net sender of traffic, the non-EEA MCT provider is unlikely to have an incentive to agree to a lower termination rate through negotiation even when faced with the prospect of the UK MCT provider increasing its MTR, and therefore we would expect reciprocal high termination rates to prevail. This is illustrated in the box below.

### Illustrative example

A UK MCT provider is a net sender of traffic to an MCT provider in Country A, with 8m outbound calls and 7m inbound calls. Country A's MCT provider currently charges an MTR of 10ppm to the UK MCT provider, while the UK MCT provider currently charges the regulated MTR of 0.5ppm.

#### No volume changes

First, we assume that there is no volume change (i.e. no demand response) in either direction if the MTR of Country A's MCT provider is reduced to 0.5ppm, or if the UK MCT provider's MTR is increased to 10ppm.

In this case, Country A's MCT provider will prefer reciprocal high rates of 10ppm to reciprocal low rates of 0.5ppm as its net revenue position would be £100,000 under reciprocal high and only £5,000 under reciprocal low.

#### Volume changes

Next, we assume that if Country A's MTR were reduced to 0.5ppm, there would be a 10% increase in UK outbound calls and alternatively if the UK MCT provider's MTR were increased to 10ppm, there would be a 10% decrease in inbound calls to the UK.<sup>82</sup>

In this case, Country A's MCT provider will continue to prefer reciprocal high rates of 10ppm to reciprocal low rates of 0.5ppm as its net revenue position would be £170,000 under reciprocal high<sup>83</sup> and only £9,000 under reciprocal low.

This example illustrates that a non-EEA MCT provider who is a net recipient of traffic from a UK provider will prefer reciprocal high MTRs with no demand response, and may also prefer such an outcome if there is a demand response. A demand response from a move by the UK provider to reciprocal high MTRs will tend to increase the net traffic outflow to the non-EEA MCT provider.

### Balanced traffic

A6.22 In the case of balanced traffic, if there is little prospect of a change in traffic flows, the parties might be indifferent between reciprocal low or reciprocal high rates. In this case, the outcome (reciprocal low or high rates) may depend on whether one party is already setting a high MTR, and/or whether there is the prospect of volume changes.

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<sup>82</sup> For the purpose of this example we have assumed the same percentage demand response in both countries. We recognise that this implies different wholesale demand elasticities given the percentage change in MTR is not symmetric. However, assuming constant elasticities would lead to a larger demand response on UK inbound calls than on UK outbound calls (as the percentage change in the UK MTR is greater). This would make the UK provider an even larger net sender of traffic, strengthening the incentive of the Country A MCT provider to prefer reciprocal high rates.

<sup>83</sup> While this payoff to the Country A MCT provider is higher than in the case without a demand response (£100,000), it relates only to MTR payments. In practice the provider would lose retail margins on traffic to the UK provider, and so would likely prefer the demand response not to occur. We consider demand responses to higher MTRs in paragraphs A6.46 to A6.53.

- A6.23 For example, if the non-EEA MCT provider is currently setting a high MTR, the UK provider is likely to have an incentive to set a high MTR to avoid a net revenue outflow. An alternative for the UK MCT provider would be to seek to negotiate a reciprocal low outcome. This would have the advantage of avoiding a negative demand response from high UK MTRs, but could entail the UK provider becoming a net recipient (if rates were successfully negotiated to reciprocal low) and ultimately preferring a reciprocal high MTR. In our view, for those routes where non-EEA MCT providers set a high MTR, it is more likely to be in the UK MCT provider's interest to also set a high MTR even if the traffic is balanced at current (asymmetric) MTRs.
- A6.24 If, following an increase in its MTR to a high reciprocal rate, the UK MCT provider then experienced a reduction in inbound calls such that it became a net sender of traffic to the non-EEA MCT provider, this would shift the incentives to those described in the previous example. That is, the non-EEA provider would have a strong incentive to prefer a reciprocal high outcome, thereby reinforcing the likelihood of this high MTR outcome, even if traffic was initially balanced.

#### **UK provider as a net receiver of traffic**

- A6.25 In the same way as a non-EEA MCT provider prefers a reciprocal high outcome when the UK is a net sender of traffic, where the UK MCT provider is a net receiver of traffic it will have an incentive to increase its MTR. Given this, the best response of the non-EEA MCT provider is also to set a high termination rate.
- A6.26 However, if we adopted a reciprocity condition for non-EEA originated calls (Option 3 in paragraph A6.6 above) then the non-EEA MCT provider may have an incentive to reduce its MTR to prevent the UK MCT provider setting its MTR to a reciprocal high level. However, the incentives of the non-EEA MCT provider to seek this outcome would depend on the extent of the volume changes resulting from any changes in MTRs, as we show in the following illustrative example. If the potential volume changes were such that under a reciprocal high outcome the UK MCT provider became a net sender of traffic to the non-EEA MCT provider, then the non-EEA MCT provider would prefer reciprocal high rates.<sup>84</sup>

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<sup>84</sup> Based on information provided by the four largest UK MCT providers on 23 countries where they were net receivers of traffic and faced a net revenue outflow of more than £50,000 in the period Q4 2016 to Q3 2017, we estimate that if the decrease in inbound traffic as a result of the UK moving to reciprocal high rates was 13%, the UK would become a net sender of traffic to over half of these countries.



### Illustrative example

A UK MCT provider is a net receiver of traffic from an MCT provider in Country B, with 7m outbound calls and 8m inbound calls. Country B's MCT provider currently charges an MTR of 10ppm to the UK MCT provider, while the UK MCT provider charges an MTR of 0.5ppm.

#### No volume changes

If, for example, we assumed that there was no volume change in either direction if the MTR of Country B's MCT provider was reduced to 0.5ppm or if the UK MCT provider's MTR was increased to 10ppm.

Country B's MCT provider will prefer reciprocal low rates of 0.5ppm to reciprocal high rates of 10ppm as its net revenue position would be -£5,000 under reciprocal low and -£100,000 under reciprocal high.

#### Volume changes

If, for example, we assumed that if Country B's MTR was reduced to 0.5ppm, there would be a 10% increase in UK outbound calls, and if the UK MCT provider's MTR was increased to 10ppm, there would be a 10% decrease in UK inbound calls.

In that case, Country B's MCT provider will prefer reciprocal low rates of 0.5ppm to reciprocal high rates of 10ppm as its net revenue position would be -£1,500 under reciprocal low and -£20,000 under reciprocal high.

However, if the volume changes exceeded 12.5% then under a reciprocal high outcome the UK MCT provider could become a net sender rather than net receiver of traffic and therefore Country B's MCT provider would prefer reciprocal high rates of 10ppm to reciprocal low rates of 0.5ppm.

As in the previous example, we have focused here on payoffs related to MTRs, rather than the effect of demand responses to retail margins. However, this example illustrates that, if current net traffic outflows from UK to non-EEA providers are in part a reflection of the large differences between MTRs on each side, then allowing the UK provider to set reciprocal high MTRs could reduce or reverse the traffic imbalance, in which case the non-EEA provider could have less (or no) incentive to seek a reciprocal low outcome rather than a reciprocal high outcome.

## Practicalities of negotiating and agreeing lower termination rates

A6.27 The previous section shows that, of the possible outcomes, a reciprocal low outcome is most likely where the UK MCT provider is a net receiver of traffic from a non-EEA counterparty and a reciprocity condition is applied to UK MTRs. In this scenario it is the non-EEA MCT provider rather than the UK MCT provider which is likely to have an incentive to reach a reciprocal low termination rate outcome, via the reciprocity condition, if call volumes are not very sensitive to the MTR level.

A6.28 However, even if a reciprocity condition were in place, there would be practical obstacles to the non-EEA MCT provider acting on any incentive it might have to reduce its MTR (because it is a net sender of traffic to the UK MCT provider) so as to achieve reciprocal low rates.

- a) First, doing so would require the non-EEA MCT provider to be able to set a low termination rate specifically to the UK, or specifically to the UK MCT provider with which it has a traffic imbalance. Non-EEA providers may not always be able to identify the country from which international traffic has originated. As we noted in the June 2017 Consultation (paragraph A11.37), UK large providers indicated that they have limited ability to identify the country from which their international traffic has originated. H3G said in its response to our June 2017 Consultation that at present UK MCT providers have no need for the functionality to identify the origin of international traffic, given there is currently no scope for differential charging but that technically this functionality could be introduced. However, the overall point is that there may be cases where this functionality needs to be introduced by a non-EEA MCT provider, and this could prove to be an obstacle to reaching a low reciprocal outcome.
- b) Second, the non-EEA MCT provider needs to be able to get the UK MCT provider to reduce (or not raise) its MTR, either by negotiation or a regulatory route. Where the non-EEA MCT provider's current MTR is high we consider that, as a commercial strategy, it is more likely that the UK MCT provider will move to a high MTR in the first instance. In order to then bring about a reduction in the UK provider's MTR, the non-EEA MCT provider will incur costs in doing so, both in terms of resource costs to negotiate or pursue regulatory action, as well as potential costs associated with a delay in the UK provider moving to a reciprocal low rate. The challenges associated with this are likely to be exacerbated by the fact that at present most negotiations are with international carriers rather than directly with individual MCT providers.
- c) Third, if the non-EEA MCT provider does not differentiate between one UK MCT provider and another or between UK MCT providers and those in other countries when setting its MTR, then the balance of traffic with a specific UK MCT provider (or UK MCT providers in general) will not drive the non-EEA provider's incentives in setting its MTR.

- d) Fourth, we understand there are a number of countries that effectively impose price floors on termination rates.<sup>85</sup> MCT providers in those countries would be unable to lower their termination rate to UK MCT providers even if they had an incentive to do so (because they were net senders and the UK MCT providers were under a reciprocity condition). We estimate that for three of the countries where the UK is a net receiver of traffic a price floor is in place, i.e. under a reciprocity condition on UK providers, providers in these countries otherwise have an incentive to reduce rates to UK MCT providers but would be restricted in their ability to do so.<sup>86</sup>
- e) In addition, the potential financial gain for a given non-EEA MCT provider in successfully moving to a reciprocal low termination rate outcome with a given UK MCT provider compared to a reciprocal high termination rate outcome is typically small. For example, we estimate that only three countries would gain more than £500,000 per annum<sup>87</sup> by successfully moving to a reciprocal low MTR of 0.5ppm with a given UK MCT provider compared to a reciprocal high MTR at their current MTR level.<sup>88</sup> We would therefore expect this to reduce the incentive for the non-EEA provider to attempt to move to a reciprocal low termination outcome in the first place.

A6.29 In light of the above challenges, we assess that, while it is possible that under a reciprocity condition on UK providers a low-MTR outcome could arise where a UK MCT provider is a net receiver of traffic from a non-EEA counterparty, it seems likely that this would not materialise in practice, or that it would do so in only a limited number of cases. Where a low MTR outcome does not materialise, the resulting high-MTR outcome would lead to a net revenue inflow for the UK MCT provider, but with the potential downsides of a reciprocal high outcome, such as a lower consumption of calls between the two countries than is socially efficient.<sup>89</sup>

A6.30 In light of all these points, our judgment is that a reciprocal high MTR outcome is more likely than a low one, at least in most cases.<sup>90</sup>

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<sup>85</sup> For example, in a 2014 report, the OECD identified the following African countries as introducing 'Surcharges on International Incoming Traffic' (SIIT): Benin, Central African Republic, Chad, Congo, Cote d'Ivoire, Djibouti, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Senegal, Sierra Leone, Togo and Zimbabwe. Source: OECD (2014), *International Traffic Termination*, OECD Digital Economy Papers No.238. [www.oecd-ilibrary.org/science-and-technology/international-traffic-termination\\_5jz2m5mnlvk-en](http://www.oecd-ilibrary.org/science-and-technology/international-traffic-termination_5jz2m5mnlvk-en)

<sup>86</sup> Based on data provided by the four largest MCT providers for Q4 2016 – Q3 2017, we estimate that for three of these countries (Ghana, Guinea and Sierra Leone) the UK is a net receiver of traffic. The UK currently has a net revenue outflow of around £3m to these three countries. This is an approximation as our information notice only related to countries where the UK MCT provider had a net revenue outflow of more than £50,000 in a year.

<sup>87</sup> These gains are estimated at a country-level - for an individual MCT provider in those countries the gain would be less (unless they are the only provider in that country).

<sup>88</sup> Based on information provided by the four largest UK MCT providers on countries where they were net receivers of traffic and faced a net revenue outflow of more than £50,000 in the period Q4 2016 to Q3 2017. There was one additional country that would gain more than £500,000 across multiple UK MCT providers but less than £500,000 for each MCT provider. This assumes no volume change.

<sup>89</sup> UK consumer outcomes under a reciprocal high outcome are discussed in paragraphs A6.44 to A6.59 below.

<sup>90</sup> As set out in paragraph A6.27, a reciprocal low outcome is most likely where the UK MCT provider is a net receiver of traffic from a non-EEA counterparty and a reciprocity condition is applied to UK MTRs. The UK is currently a net receiver of traffic from 23 of the 60 countries for which we have data (see Table A7.3). Given the practicalities of negotiating and

## Experience of pricing freedom

- A6.31 The practical experience of pricing freedom in other jurisdictions supports our assessment that high termination rates rather than low rates are a more likely outcome.
- A6.32 As set out in Section 4 (and Annex 7), a number of other EEA countries have introduced differential regulation in respect of calls originating outside the EEA in recent years. The available evidence (as set out in Annex 7) shows that where MCT providers have responded to these changes, this has largely been to increase their termination rates for calls originating from certain countries outside the EEA.
- A6.33 In response to our questionnaire to EEA NRAs, only one NRA (Poland) highlighted an example of differential regulation leading to lower termination rates. This was in relation to rates between Polish and Ukrainian providers, with Polish termination rates to other non-EEA countries increasing following the introduction of differential regulation. We are also aware of negotiations between Swiss and certain EEA providers leading to lower termination rates.<sup>91</sup>
- A6.34 As regards non-EEA jurisdictions, the high MTRs in certain non-EEA countries for overseas originated calls, about which UK operators have raised concerns, are an outcome of pricing freedom (or at least an absence of effective cost-based regulation for termination of these calls). South Africa, having previously regulated MTRs for overseas originated calls at a relatively low rate, has recently removed these regulations.<sup>92</sup> We understand that, since then, all South African mobile providers have increased their MTR for non-domestic traffic, with the termination rate for UK traffic increasing from around 1-2ppm to around 9-11ppm.<sup>93</sup>
- A6.35 Historically, where UK MTRs have not been subject to a charge control, they have tended to be set above cost. In our SMP assessment, in Section 3, we find that UK providers do not have sufficient countervailing power 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 countervailing power for UK MCT providers vis-à-vis their non-EEA counterparts in relation to negotiating rates down. Indeed, the contrary seems more likely as negotiations are more arms-length and dependent on transit providers than for domestic traffic.
- A6.36 This analysis would again, therefore, indicate that the more likely outcome of differential regulation is reciprocal high rates.

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agreeing lower termination rates (see paragraphs A6.27 to A6.30) and the experience of pricing freedom set out in Annex 7 we consider that it is likely that only a subset of these routes would settle at a reciprocally low rate.

<sup>91</sup> See Annex 7 paragraphs A7.8 to A7.10.

<sup>92</sup> This change became effective on 1 October 2017.

<sup>93</sup> Based on submissions from two large UK MCT providers.

## Possible effects of differential regulation

A6.37 In this section we consider the likely consumer outcomes under both a reciprocal low and reciprocal high termination rate outcome.

### UK MCT providers

A6.38 Under differential regulation of MTRs, UK MCT providers are likely to gain as it will lead either to them facing lower MTRs for their outbound international traffic (under a reciprocal low outcome) or increased revenue on inbound international traffic as a result of them charging higher MTRs (under the reciprocal high outcome). The weaker the pass-through<sup>94</sup> and waterbed effect<sup>95</sup> to UK consumers, the more UK MCT providers stand to gain from differential regulation of MCT for non-EEA traffic.

### UK consumer outcomes under a reciprocal low outcome

A6.39 A reciprocal low outcome would be likely to benefit UK consumers if passed through to UK retail prices or, if retail prices were unchanged, if the increased margin on calls to non-EEA countries was used to discount other parts of UK retail tariffs.

A6.40 We estimate that if reciprocal low rates prevailed in all countries where the UK was a net receiver of traffic, then the gain to UK MCT providers from the reduction in non-EEA termination rates could be around £14m per year.<sup>96</sup>

A6.41 We would expect at least some of this potential reduction to be passed through to UK consumers, for example, in the form of lower UK retail prices for calls to those countries. In that case, consumers who make more calls to non-EEA countries would be the largest beneficiaries.

A6.42 However, we also note that the rates which UK providers pay to terminate in non-EEA countries are typically a small proportion of the retail prices paid by UK consumers for calling those countries.<sup>97</sup> [3<]’s retail revenue for calls to non-EEA countries was around 17 times their costs of non-EEA termination (including transit fees).<sup>98</sup> This suggests that there may in reality be limited scope for a reduction in termination rates to significantly reduce UK international call prices.

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<sup>94</sup> That is, the smaller the decrease in price following a decrease in marginal cost.

<sup>95</sup> That is, in this case where an increase in revenue from MCT is used to either discount aspects of retail tariffs (i.e. a ‘waterbed effect’ on retail subscription or call prices) or to fund efficient investment which would not otherwise have occurred (i.e. a ‘waterbed effect’ on investment).

<sup>96</sup> We focus here only on countries where the UK is a net receiver of traffic, because as set out in paragraph A6.21 above, we consider that where the UK is a net sender of traffic, the non-EEA provider would not have an incentive to move to reciprocal low rates. See Annex 7 paragraph A7.39.

<sup>97</sup> See Annex 7, Table A7.4.

<sup>98</sup> [3<]’s combined retail revenue for calls to non-EEA providers was £ [3<] m in comparison to gross wholesale charges of approximately £ [3<] m (even when they include transit fees), i.e. a multiple of around 17 times the cost of non-EEA termination. These figures are based 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 [3<] were able to provide the requested data on the average retail price for making outbound calls to providers in these non-EEA countries.

A6.43 We consider that pass-through in the form of a waterbed effect to other elements of the retail tariff is less likely. Increased margins from retail calls to overseas destinations (as a result of lower MTRs) would only arise for customers that make significant use of their mobile to call overseas. We would expect the best way to attract such customers would be to offer discounts on international call packages, so if there is weak pass-through to international call prices, it seems unlikely that lower non-EEA MTRs would otherwise materialise as a benefit to UK consumers in general via a waterbed effect.

## UK consumer outcomes under a reciprocal high outcome

A6.44 Reciprocal high termination rates passed through to retail calls prices result in the price of calls being above incremental cost in both directions. This would result in a lower volume of calls between the two countries concerned than is socially efficient.

A6.45 Whether or not UK consumers would gain under a reciprocal high outcome would depend on:

- a) the reduction in calls to UK consumers from outside the EEA; and
- b) the extent of the UK waterbed effect.

We discuss these in turn.

### Reduction in calls to UK consumers from outside the EEA

A6.46 The increase in UK MTRs as a result of the move to a reciprocal high outcome would be likely to lead to some decrease in calls to UK consumers and businesses from outside the EEA. It is likely that UK consumers value and benefit from these calls and therefore that they would suffer detriment as a result of any reduction in calls.<sup>99</sup> UK consumers might in some cases respond to a reduction in inbound calls by making more outbound calls but this would be at additional expense to them.

A6.47 The magnitude of the reduction in calls to UK consumers from outside the EEA will depend on:

- a) the size of the increase in UK MTRs;
- b) the extent of pass-through of the increase in UK MTRs to non-EEA retail prices; and
- c) the price responsiveness of non-EEA demand for calls to UK mobiles.

A6.48 At one extreme, if a large increase in UK MTRs were fully passed through to retail prices in the country concerned, and callers in that country were price sensitive, the effect could be a material reduction in calls to the UK from that country. At the other extreme a small

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<sup>99</sup> We also note that approximately 2.5m UK citizens live in the 60 non-EEA countries where the UK has the largest net revenue outflow, and that they could also experience detriment if the increase in UK MTRs were passed on to higher retail prices for them to call the UK. Source: Ofcom analysis of UN data: United Nations, Department of Economic and Social Affairs (2015). Trends in International Migrant Stock: Migrants by Destination and Origin (United Nations database, POP/DB/MIG/Stock/Rev.2015).

increase in UK MTRs, largely absorbed by the non-EEA providers concerned, or passed through to price-insensitive callers, might have little or no impact on call volumes.

- A6.49 If UK MCT providers were to increase their MTR to the level of their non-EEA counterparty's MTR, then in many cases this would lead to a very large increase in the UK MTR. For example, if a UK MCT provider increased its MTR for calls originating in a non-EEA country from 0.5ppm to 14ppm<sup>100</sup> this would be a 2700% increase in the price of MCT.
- A6.50 While we cannot ascertain with confidence what the extent of the pass-through of the increase in UK MTRs to non-EEA retail prices would be, we consider it may be material given the scale of MTR increases likely to arise. As noted in the June 2017 Consultation<sup>101</sup> some price data suggests that retail prices for international calls are relatively low in some lower-income countries, in which case any increase in the MTRs charged by UK MCT providers could potentially have a material impact on those prices. For example, as set out in Table A6.1 the retail price for calling the UK in some countries is lower than the MTR currently charged for calls from the UK.

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<sup>100</sup> 14ppm was the median MTR (for the period Q4 2016 to Q3 2017) across the 60 countries to which at least one of the four large UK MCT provider had a net revenue outflow of more than £50,000.

<sup>101</sup> Paragraph A11.55 (footnote 116) of June 2017 Consultation.

**Table A6.1: Current MTRs and retail prices in selected non-EEA countries<sup>102</sup>**

|             | UK net revenue outflow (£) | Typical current MTR paid by UK providers (ppm) | Typical current retail price for calling the UK (ppm) | % increase in retail price to cover reciprocal MTR set by UK MCT providers | % increase in retail price to maintain initial margin over UK MTR |
|-------------|----------------------------|--|---|--|---|
| Gambia      | 3.6m                       | 49   | 26  | 90%  | 190%  |
| UAE         | 3.1m                       | 11   | 25  | -  | 40%   |
| Nigeria     | 2.5m                       | 6  | 7   | -  | 80%   |
| Switzerland | 2.1m                       | 7  | 46  | -  | 10%   |
| Zimbabwe    | 2.0m                       | 31   | 35  | -  | 90%   |
| Ghana       | 1.8m                       | 18   | 2   | 840%   | 910%  |
| Turkey      | 1.7m                       | 8  | 44  | -  | 20%   |
| Albania     | 1.2m                       | 27   | 44  | -  | 60%   |
| Tunisia     | 1.2m                       | 46   | 15  | 210%   | 300%  |
| Uganda      | 1.0m                       | 21   | 5   | 320%   | 410%  |
| Russia      | 1.0m                       | 11   | 62  | -  | 20%   |
| Jamaica     | 0.9m                       | 13   | 10  | 30%  | 120%  |

Source: Ofcom analysis of data provided by the four large MCT providers for Q4 2016 to Q3 2017 (for net revenue outflow and current MTRs) and Ofcom analysis of non-EEA mobile operators websites<sup>103</sup> (for current retail prices). Percentage increases rounded to nearest 10%.

A6.51 For such cases, differential regulation which led to reciprocal high rates would result in UK termination rates exceeding existing retail prices, making price increases very likely in that country. For example, in Uganda retail prices for calls to the UK are currently around 5ppm.

<sup>102</sup> The 12 countries with which the UK currently has the largest net revenue outflow.

<sup>103</sup> We recognise that this may be incomplete information, as we were not always able to obtain information for every operator in each country, and operators may have offers and discounts that we have not identified in our search. Nonetheless we regard these figures as a reasonable indicator, and if anything they are likely to overstate the retail prices in these countries.



If UK MCT providers were to increase their rates for terminating calls from Uganda to 21ppm (a reciprocal high outcome), Ugandan providers would have to increase their retail prices by at least 16ppm to avoid making a loss – i.e. a 320% increase. To maintain their existing 20.5ppm retail margin over the UK MTR they would have to increase their retail prices by 410%.

- A6.52 We cannot ascertain with confidence what the likely price responsiveness of non-EEA demand for calls to UK mobiles is, particularly in response to potentially significant increases in price. However, even a relatively inelastic response could lead to a material reduction in call volumes. For example, if we assume a low retail price elasticity of demand of -0.25 this would imply a reduction in call volumes of 8% in Jamaica and 80% in Uganda based on the above percentage increases in the retail price.<sup>104</sup> If we assumed just elastic demand (i.e. an elasticity of -1), the volume reduction would be 30% in Jamaica, while any retail price elasticity over -0.31 would imply a 100% reduction in call volumes from Uganda.
- A6.53 Based on the above factors, we consider that there is likely to be some reduction in calls to UK consumers as a result of a reciprocal high outcome and that UK consumers would lose out as result.

#### **Extent of the UK waterbed effect**

- A6.54 Under a reciprocal high outcome, UK MCT providers would see an increase in MCT revenue from calls originating outside the EEA.<sup>105</sup> However, the size of this potential gain for UK MCT providers is uncertain.
- A6.55 The increased revenue would only benefit consumers if it were used to either discount aspects of retail tariffs (i.e. a ‘waterbed effect’ on retail subscription or call prices) or to fund efficient investment which would not otherwise have occurred (i.e. a ‘waterbed effect’ on investment). However, as noted previously, the incentive to “compete away” such increased termination profits will depend on attracting consumers more likely to receive calls from overseas. Consumers receiving calls from overseas are also more likely to be consumers that would make calls overseas, so a waterbed effect seems more likely to act on retail call tariffs if anywhere. Alternatively, these MTR revenue gains could partially or completely be retained as profits, which would not benefit consumers.

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<sup>104</sup> That is, the percentage increase in retail price to cover reciprocal MTR set by UK MCT providers.

<sup>105</sup> Assuming that the call volume reduction from outside the EEA is not so large that the volume effect outweighs the price effect (in which case UK providers would not increase MTRs to that extent). Under call reversal UK providers could also see an increase in retail revenue from the increased outbound calls that UK consumers make.

- A6.56 The potential gain of up to £39m<sup>106</sup> would be limited in the context of UK mobile revenues from international calls (of c.£450m<sup>107</sup>) and would represent a relatively small proportion of UK MCT providers EBITDA (of around £4bn) or EBIT (around £1bn).
- A6.57 An empirical study, using data up to 2011, indicates that, as fixed-to-mobile volumes declined, the previously observed waterbed effects from MTRs in general (not specifically for international traffic) diminished and there was no discernible effect on investment.<sup>108</sup> This suggests that the waterbed effect is unlikely to have an appreciable impact on market outcomes for UK consumers. Vodafone, on the other hand, contended that we have incorrectly used these findings<sup>109</sup> and that there is little reason to suppose that the waterbed effect would not be near perfect as UK MCT providers would have an incentive to use the additional revenue to lower their retail prices for international calls and to offer more competitive bundles to consumers for domestic services.
- A6.58 We do not find this contention compelling. Call volumes from outside the EEA are very small relative to UK MCT volumes (we estimate call minutes from outside the EEA account for around 1.5% of total off-net calls received).<sup>110</sup> We estimate that the potential net gain represents around 11% of total revenues from mobile wholesale termination (and around 45% of net termination revenue).<sup>111</sup> We therefore expect a similar effect to that observed as the relative volume of fixed-to-mobile calls declined. That is, the waterbed effect from calls originating from outside the EEA is unlikely to have an appreciable impact on market outcomes for UK consumers. Based on the information available to us, we estimate the maximum potential gain would represent less than 10% of retail consumer spend on calls to non-EEA countries.<sup>112</sup> Relative to spend on all international calls, the maximum would be less still.

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<sup>106</sup> We estimate that UK MCT providers would gain around £39m relative to the current position if they moved to a reciprocal high outcome with all 60 non-EEA countries for which we have data. If reciprocal high rates prevail on routes where the UK is a net sender of traffic and reciprocal low rates prevail on routes where the UK is a net receiver of traffic, then the potential gain could be around £26m per year (£14m from countries where reciprocal low rates prevail and £12m from countries where reciprocal high rates prevail). This assumes there is no inbound call volume reduction as a result of the UK MTR increase. Call volume reductions would reduce the size of the potential gain. See Annex 7 paragraphs A7.36 to A7.42.

<sup>107</sup> Ofcom, *Telecommunications Market Data Tables, 2 November 2017*, Section 3, Table 1. Figures shown are for calendar year 2016.

<sup>108</sup> See Genakos, C. and T. Valletti, 2015, 'Evaluating a decade of mobile termination rate regulation', *Economic Journal*. Their earlier work using data for 2002-2006 found that a 10% reduction in MTRs led to a 5% increase in mobile retail prices. Using an extended dataset covering 27 countries from 2002 until the end of 2011 they found that the waterbed effect was not present anymore across the whole sample and that the distinguishing feature for this change was the importance of calls made from and to mobiles relative to calls made to mobile phones from fixed lines. In 2002-2006 MTRs accounted for a larger share of mobile retail prices than they do now and therefore a pass-through of a given percentage reduction in MTR would have a larger impact on retail prices.

<sup>109</sup> Vodafone said the dissipation of the waterbed effect observed by Genakos and Valletti relates only to MTRs applied domestically in a system where mobile-to-mobile calls between competing operators dominate. It said that it is of no relevance to MTRs levied on incoming calls from outside the EEA.

<sup>110</sup> See Table A7.2 in Annex 7.

<sup>111</sup> This is based on a maximum potential gain of £39m (see paragraphs A7.37 - A7.42) and termination revenues of £350m gross and £85m net (see paragraph 1.10).

<sup>112</sup> This is based on [3]s combined retail revenue for calls to non-EEA providers (see paragraph A6.42) and our estimate of their share of the potential gain, based on their share of the current net revenue outflow.

A6.59 While we consider that the UK market is effectively competitive (we have not identified single or joint dominance at the retail level), it is a relatively concentrated market with providers offering services which are to some extent differentiated, and where there is less than perfect information among consumers. We do not consider, therefore, that we can assume a full waterbed.

### **Overall impact on consumers**

A6.60 The overall impact of differential regulation on consumer welfare will depend on the extent to which it results in reciprocal low termination rates and the extent to which it results in reciprocal high termination rates.

A6.61 If we exclude the termination of non-EEA originated calls from the MCT charge control (Option 2), we would expect high termination rates to prevail as the party which is the net receiver of traffic will prefer a higher termination rate. To judge that consumers would be better off in this scenario, we would have to believe that there was a limited impact on inbound call volumes and a strong waterbed effect. For the reasons set out above, we consider that the scale of MTR increases under a reciprocal high outcome is likely to be sufficiently significant to reduce inbound call volumes and the extent of the waterbed effect is difficult to quantify, but we anticipate is unlikely to have a significant effect on retail prices. Therefore, there is a material risk that consumers would be worse off under reciprocal high rates. Option 2 could also lead to UK MCT providers increasing MTRs to non-EEA MCT providers which currently charge low MTRs for calls from the UK.

A6.62 If we introduced a reciprocity condition for non-EEA originated calls (Option 3) then, as set out above, a reciprocal low outcome is likely to arise only where the UK MCT provider is a net receiver of traffic from a non-EEA MCT provider. Under this scenario, UK consumers would be likely to benefit from countries which ended up reciprocal low if there was a pass-through by UK providers of lower non-EEA MTRs to UK retail prices.

A6.63 However, as set out in paragraphs A6.27 to A6.36, there are practical obstacles to this outcome occurring and experience from other countries suggests that reciprocal high rates are more likely in most instances.

A6.64 We therefore consider that the most likely outcome of differential regulation would be reciprocal high rates with non-EEA MCT providers which currently set high MTRs, with the possibility of reciprocal low rates in some instances. The effect on consumer welfare would therefore be ambiguous, but to consider that consumers would be better off with differential regulation of UK MTRs, we would have to believe that there was a limited reduction in inbound call volumes and/or a strong waterbed effect. Given the scale of MTR increases necessary for reciprocity with the high non-EEA MTRs in place, inbound volume reductions seem likely, and the extent of the waterbed effect is uncertain but seems unlikely to be significant (given the sums involved).

A6.65 Differential regulation also potentially gives rise to other economic effects with adverse implications for consumers, such as:

- a) **Escalation in MTRs:** giving UK MCT providers freedom to increase MTRs very significantly above current levels could lead to an escalation in the level of termination rates if non-EEA providers respond to higher UK MTRs by raising their own (already high) termination rates. Nevertheless, as BT/EE noted, if non-EEA MCT providers are already setting a profit maximising MTR, it would not be rational for them to further increase this rate in response to the UK MCT provider increasing its MTR. But we note that in practice there have been some examples of higher MTRs by non-EEA providers following increased MTRs by EEA providers.<sup>113</sup>
- b) **Wider MTR increases:** there is also a risk of wider MTR increases, including to those countries where MTRs are above the UK level, but not “high” in the sense of being more than an order of magnitude higher than the UK LRIC-based rate. Among the 60 non-EEA countries to which UK providers report a net revenue outflow above £50,000, around 40% of the outbound traffic is to 9 countries which each charge MTRs of less than 5ppm on average to the UK. Three of the largest in terms of outbound volume (USA, China and India – accounting for around 30% of the outbound volumes) charge less than 1.5ppm.<sup>114</sup> Absent regulation of UK MTRs for calls from these countries, UK MTRs could be increased – and we might expect UK MCT providers to particularly have this incentive where they are net recipients of traffic.<sup>115</sup> Whilst a reciprocity condition would limit the extent of UK MTR increases initially, we cannot know how these non-EEA MCT providers (or the relevant NRAs) would respond if UK MCT providers increased rates just to match the current non-EEA MTR.

## Conclusion

A6.66 In our assessment, the most likely outcome of differential regulation is reciprocal high termination rates. High MTRs harm UK consumers as the likely level of MTR increase is such that we would expect reductions in calls from non-EEA countries. Whilst this might be offset to an extent by a waterbed effect on UK retail prices, this effect is unlikely to register significantly on the prices paid by UK consumers. We recognise that consumers could gain if a sufficient number of routes settle at a reciprocally low rate, but we anticipate that this is likely to represent a minority of non-EEA routes. It would also require a pass-through by UK providers of overseas MTR reductions to retail call prices (or a waterbed effect from the increase in the margin on retail calls from the UK if call prices were left unchanged). We note that, on the available evidence, average retail call prices for UK calls to non-EEA destinations appear to bear little relation to the MTRs faced in these countries. This would suggest that any negotiated reduction in non-EEA MTRs may not be passed through, or if it were, would have at best a modest impact on retail call prices faced by UK consumers.

A6.67 On balance, therefore, based on the economic incentives discussed in this annex and on current market evidence, we do not consider that consumers would be best served by

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<sup>113</sup> See Annex 7, paragraphs A7.11 to A7.12. NRAs in four European countries [X] and Latvia told us that some MTRs faced by operators in their countries had increased following the introduction of differential regulation.

<sup>114</sup> As noted in paragraph A6.34 South Africa had until recently charged an MTR of around 1-2ppm, but this has now increased to around 9-11ppm.

<sup>115</sup> Of the nine countries referred to above, the UK is a net receiver of traffic from three of these countries.

differential regulation of MCT for non-EEA originated traffic which permitted MTRs very significantly above the cost of MCT.

- A6.68 Retaining a cap on termination rates at LRIC, including in respect of non-EEA originated calls, does not undermine cost-recovery by UK MCT providers. First, this is because LRIC allows cost recovery on termination (including the cost of capital). Second, as we show in paragraph A6.42, UK retail prices for call to non-EEA destinations far exceed the wholesale payments incurred in providing these calls.

## A7. Regulation of termination for calls originated outside the EEA – Other NRA experience and evidence on UK to non-EEA traffic, pricing and revenue flows

### Introduction

A7.1 This annex sets out the following:

- a) a summary of the regulatory treatment of non-EEA originated calls by other EEA NRAs; and
- b) our investigation of the scale of traffic, pricing and revenue flows with non-EEA countries.

### Regulatory treatment of non-EEA originated calls by other EEA NRAs

#### Approaches taken

A7.2 In other EEA countries, NRAs have adopted varying approaches to the treatment of termination rates for calls originated outside the EEA:

- a) some 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);
- b) some have excluded calls from outside the EEA from the definition of the relevant market for MCT;
- c) some, while including calls from outside the EEA within the relevant markets, have either:
  - i) excluded the termination of non-EEA originated calls from the MCT charge control; or
  - ii) applied some form of 'reciprocity' condition for non-EEA originated calls.

A7.3 The approach taken by each NRA is shown in Table A7.1 below.

#### Table A7.1: Approaches to regulation of calls originated outside the EEA

| Single MTR cap for all calls | 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 |
|------------------------------|---|---|-------------|
| Finland                      | Denmark   | Austria   | France      |
| Ireland                      | Estonia   | Belgium   | Germany     |
| Romania                      | Latvia  | Croatia   | Netherlands |
| Sweden                       | Luxembourg  | Czech Republic  |             |
| United Kingdom               | Poland  | Greece  |             |
|                              |   | Hungary   |             |
|                              |   | Italy   |             |
|                              |   | Norway  |             |
|                              |   | Portugal  |             |
|                              |   | Slovenia  |             |
|                              |   | Slovakia (proposed)   |             |
|                              |   | Spain (proposed)  |             |

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

- A7.4 The precise workings of the reciprocity arrangements vary between countries. For example:
- a) French providers can set their termination rates up to, but not exceeding, the rates set by the counterparty non-EEA provider.
  - b) German providers are only allowed exemption from the charge control on a country-by-country basis. They are required to apply to BNetzA (the German NRA) and provide evidence that they are charged asymmetric tariffs by providers in the respective countries. [X].

## Impact of differential regulation

A7.5 We have issued two questionnaires (in January and November 2017) to other EEA NRAs to understand the impact (if any) of differential regulation in their countries. Here we summarise what we have been told by these NRAs.

### Impact on MTRs charged to non-EEA countries

A7.6 Of those NRAs that had information on the change in MTRs charged by their operators, the majority found that MTRs had increased, at least in part. In response to our November 2017 questionnaire, Croatia, [redacted], Austria, Italy, Latvia, the Netherlands and Poland said that MTRs charged by their operators had increased. Earlier, in response to our January 2017 questionnaire, the Czech Republic, Italy, Poland and Portugal said that MTRs in their country had increased. Several NRAs had no information available, or did not provide any information, regarding any changes to MTRs.<sup>116</sup>

A7.7 In [redacted], rather than setting country-specific termination rates, we understand that providers group countries together (based on the termination rates faced in that country) and apply different rates for different groups.

### Negotiation leading to lower termination rates

A7.8 In response to our November 2017 questionnaire, UKE (the Polish NRA) said that there had been a negotiation resulting in lower MTRs between Polish and Ukrainian providers, but MTRs to other countries had increased. No other NRA had evidence of examples of non-EEA providers reducing their MTRs after the introduction of differential regulation, or any MCT provider negotiating lower rates with a non-EEA country.

A7.9 In the June 2017 Consultation (paragraph A11.12) we noted that a UK MCT provider highlighted two EEA providers (both within its corporate group) that were able to agree reduced MTRs in a single country outside the EEA. [redacted]

A7.10 In its response to our June 2017 Consultation, Vodafone said that Swiss operators had responded against EU operators who surcharged them (i.e. raised MTRs) by applying their own surcharges. Vodafone said this had the effect that, in nearly all cases, EU operators ceased to levy surcharges against Swiss operators and that, during the period when this took place, Swiss MTRs declined by about 50%.

### Changes to non-EEA MTRs following increases in EEA providers' MTRs

A7.11 As set out in our June 2017 Consultation (paragraph A11.11), in three EEA countries - [redacted] - increases in MTRs for calls originating from non-EEA countries were followed by increases in termination rates in those other countries.

A7.12 In response to our November 2017 questionnaire almost none of the respondents had information about changes in non-EEA MTRs. In its response, the Latvian NRA said that

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<sup>116</sup> Estonia, Hungary, Luxembourg, Macedonia and Slovakia.



some MTRs have increased, some decreased and some stayed the same. The Italian NRA said that their providers have stated that they have greater countervailing buyer power in commercial relationships with non-EEA operators but did not point to any specific change in MTRs.

### Impact on call volumes from non-EEA countries

- A7.13 Very few NRAs had any information on the impact on the volume of calls from non-EEA countries as a result of increases in their providers' MTRs to non-EEA countries. The Latvian NRA said that the volume of calls from non-EEA countries has remained the same. The Polish NRA reported the volume of calls from non-EEA countries has decreased by 70% since MTRs have increased. It said that this may be related to a large number of calls coming in to Poland with disguised CLIs.
- A7.14 In its response to our June 2017 Consultation, BT/EE said that one French provider had not observed significant changes in calling patterns or inbound call volumes with the introduction of a surcharge.

### Practical obstacles

- A7.15 The Polish NRA said that 80% of calls to Poland originated outside the EEA come with fake EEA numbers. Similarly, according to the Italian NRA, there have been cases of CLI disguising in Italy which are currently being investigated. The NRAs in the Czech Republic, Croatia and Slovenia also found that differential regulation had led to attempts to disguise non-EEA calls as EEA calls. In the Netherlands there have not yet been any specific cases of this, but the NRA noted that it is a general concern for operators.
- A7.16 The Dutch and Slovenian NRAs said that their operators have no direct interconnection with non-EEA providers as traffic typically comes via a transit provider.
- A7.17 In [3<], the NRA said that operators charge the same MTR as the regulated cap to avoid the additional administrative burden (invoicing systems etc.).

## Scale of traffic and revenue flows with non-EEA countries

### Call volumes

- A7.18 Next, we set out evidence on traffic and revenue flows between UK MCT providers and non-EEA countries, largely based on responses by the UK providers to our information requests.
- A7.19 Table A7.2 below shows the volumes per annum of calls made to, and received from, countries outside the EEA by UK mobile consumers (including calls to and from businesses). In aggregate, UK consumers receive more calls from countries outside the EEA than they make to them.

#### Table A7.2: Annual call flows (minutes) between UK MCT providers and countries outside the EEA

|   | 2016                  |                     | 2017                  |                       |
|---|-----------------------|---------------------|-----------------------|-----------------------|
|   | Calls made            | Calls received      | Calls made            | Calls received        |
| Volume of call minutes to/from countries outside the EEA <sup>117</sup> | 800 million (approx.) | 1 billion (approx.) | 800 million (approx.) | 1.1 billion (approx.) |
| Proportion of total off-net calls made/received                         | 1.0%                  | 1.5%                | 0.9%                  | 1.5%                  |

Source: Ofcom analysis of data provided by the four large MCT providers. 2016 figures are based on a full calendar year of data while 2017 figures are based on data for Q1-Q3 2017, scaled up for a full year.

## Net revenue outflows

- A7.20 In the June 2017 Consultation (paragraphs A11.14 to A11.16) we estimated 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 was based on data for the calendar year 2016.
- A7.21 We also set out that there were reasons to think that this £36 million estimate was likely to overstate the true net outflow from UK MCT providers to non-EEA providers as a result of high termination rates. This was 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; 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).
- A7.22 We re-ran this analysis based on updated data up to Q3 2017. Based on this data, we estimate that UK MCT providers' total gross termination and transit payments for calls to outside the EEA remained stable at approximately £40m per annum, and their gross termination revenues for calls from outside the EEA at approximately £4m per annum, leading to net termination and transit flows of approximately £36m per annum across all MCT providers.

## Country-level analysis

### Data

<sup>117</sup> 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 [redacted], as these were unable to disaggregate inbound international volumes based on country of origin.

- A7.23 In February 2017, we asked the four largest mobile 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. We estimated that these countries accounted for around £33m of the £36m total net revenue outflow from the UK.
- A7.24 In November 2017, we asked the four largest mobile providers to provide updated information on these countries for the period Q4 2016 to Q3 2017 as well as any additional countries to which they expected to have a net revenue outflow in excess of £50,000 in 2017.<sup>118</sup>
- A7.25 In Annex 6 the figures presented are based on the more recent Q4 2016 to Q3 2017 data unless stated otherwise.

### Net revenue outflows

- A7.26 Net revenue outflows can be driven by:
- 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.
- A7.27 Table A7.3 below sets out the breakdown of the UK's net revenue outflow to the 60 countries cited by the four large UK MCT providers by those to which the UK is a net receiver of traffic and those to which the UK is a net sender of traffic.

**Table A7.3: UK net revenue outflow to countries outside the EEA**

|   | 2016                       |                          |       | 2016 Q4 – 2017 Q3          |                          |       |
|---|----------------------------|--------------------------|-------|----------------------------|--------------------------|-------|
|   | UK net receiver of traffic | UK net sender of traffic | Total | UK net receiver of traffic | UK net sender of traffic | Total |
| Number of countries                       | 29                         | 31                       | 60    | 23                         | 37                       | 60    |
| UK net revenue outflow to these countries | £16m                       | £17m                     | £33m  | £13m                       | £22m                     | £35m  |

<sup>118</sup> While some MCT providers cited additional countries that they expected to have a net revenue outflow of more than £50,000 in 2017 which they had not included in their 2016 list, these additional countries had previously been cited by at least one other MCT provider and therefore there remain 60 countries in total for which at least one MCT provider has a net revenue outflow in excess of £50,000.

|   | 2016                       |                          |       | 2016 Q4 – 2017 Q3          |                          |       |
|---|----------------------------|--------------------------|-------|----------------------------|--------------------------|-------|
|   | UK net receiver of traffic | UK net sender of traffic | Total | UK net receiver of traffic | UK net sender of traffic | Total |
| Average MTR in these countries (ppm) <sup>119</sup>                 | 15                         | 18                       | 16    | 16                         | 20                       | 19    |
| Interquartile range of MTRs in these countries (ppm) <sup>120</sup> | 7-23                       | 8-24                     | 7-23  | 8-22                       | 8-26                     | 8-25  |

A7.28 The shift from the UK being a net receiver of traffic from 29 countries in 2016 to 23 countries in 2016 Q4 – 2017 Q3 is a result of the UK switching from being a net receiver of traffic to a net sender of traffic to 9 countries, and switching from being a net sender of traffic to a net receiver of traffic to 3 countries. This illustrates that there is a fair degree of variation in traffic volumes on a given route year-on-year.<sup>121</sup>

A7.29 Around half of the total net revenue outflow arises from just nine countries, in each of which UK MCT providers as a whole face a net revenue outflow of over £1 million.<sup>122</sup> These are shown in Figure A7.1 below.

**Figure A7.1: Non-EEA countries with industry-wide net revenue outflows of over £1 million<sup>123</sup>**

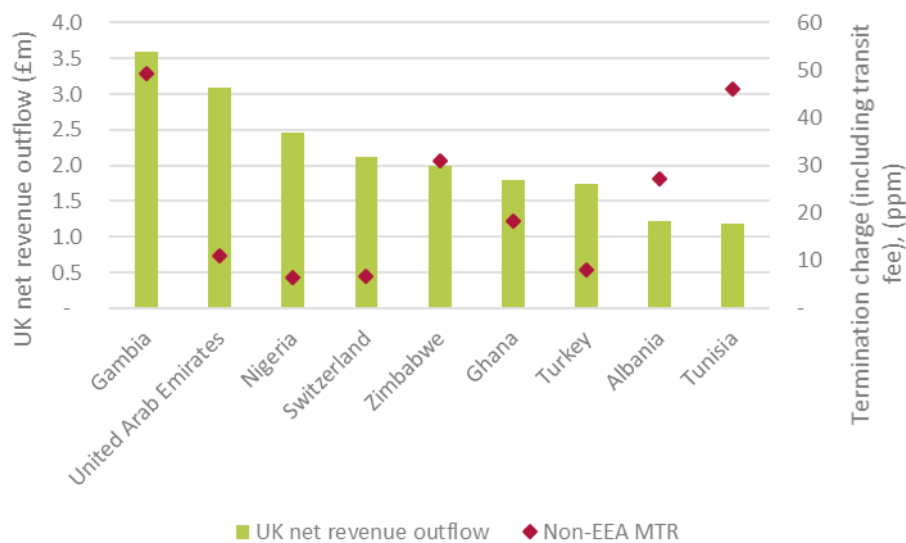
<sup>119</sup> Unweighted average of MTRs in these countries rounded to the nearest ppm.

<sup>120</sup> Rounded to the nearest ppm.

<sup>121</sup> We estimate that UK inbound volumes from 34 of the 60 countries increased or decreased by more than 20% between 2016 and 2016 Q4 – 2017 Q3 (on a like-for-like basis, i.e. excluding cases where volume changes were driven by an additional MCT provider including data for that country in their response for 2016 Q4 – 2017 Q3).

<sup>122</sup> Source: Ofcom analysis of data from the four large UK MCT providers.

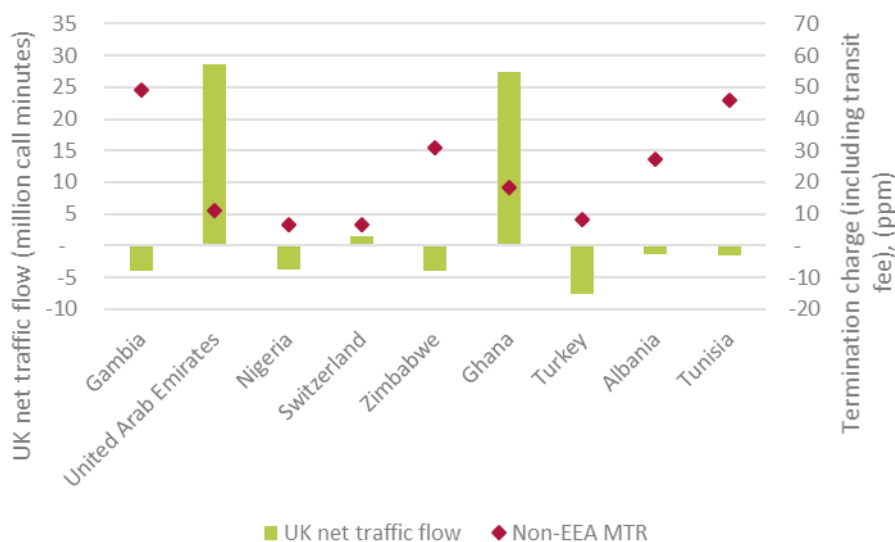
<sup>123</sup> Note this does not refer to the full net revenue outflow for these countries, as some large MCT providers did not experience a net revenue outflow above the threshold with respect to these countries. However, any net revenue outflow not captured would be relatively small (i.e. less than £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.



Source: Ofcom analysis of data provided by the four large MCT providers for Q4 2016 to Q3 2017.

A7.30 As shown in Figure A7.2 below, the UK is a net receiver of traffic from three of these countries and a net sender of traffic to the other six. The UK’s net revenue outflows to these countries are driven by a mixture of a high net volume of calls from the UK to the non-EEA country and high termination rates in the recipient non-EEA country.

**Figure A7.2: Termination rates and net traffic flows with non-EEA countries where UK has net revenue outflows of over £1 million**



Source: Ofcom analysis of data provided by the four large MCT providers for Q4 2016 to Q3 2017.

Note: A positive UK net traffic flow is when UK inbound call volumes are greater than UK outbound call volumes, that is the UK is a net receiver of traffic.

### Termination rates and regulation

- A7.31 There is significant variation in the rates charged by operators in countries outside the EEA:
- a) Some countries outside the EEA have relatively low termination and transit charges. This includes some countries with high call volumes such as the USA, India and China<sup>124</sup>, where rates are still above, but closer to, those charged by UK and EEA providers.<sup>125</sup>
  - b) On the other hand, some countries, such as Gambia, Zimbabwe, Albania and Ghana, termination rates are very high (as shown in Figure A7.1 above).
- A7.32 In terms of regulation of termination rates, some non-EEA countries impose relatively low termination caps (e.g. India<sup>126</sup>). In contrast, some 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 (Benin, Central African Republic, Chad, Congo, Cote d'Ivoire, Djibouti, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Senegal, Sierra Leone, Togo and Zimbabwe) and notes that this has increased in recent years.<sup>127</sup> For example, legislation in Ghana sets a minimum price of USD0.19 per minute (approximately 14ppm) for termination of international calls.<sup>128 129</sup>

#### UK retail prices for calls to non-EEA countries

- A7.33 As set out in paragraph A6.42 the rates which UK providers pay to terminate in non-EEA countries are typically a small proportion of the retail prices paid by UK consumers for calling those countries.
- A7.34 Table A7.4 sets out the PAYG international retail call prices for the four large MCT providers as well as Lycamobile and Lebara for ten countries with high MTRs.

#### Table A7.4: Termination rates and UK retail prices to selected non-EEA countries<sup>130</sup>

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<sup>124</sup> USA, India and China all charge less than 1.5ppm but still above the UK MTR of c.0.5ppm.

<sup>125</sup> Provider data suggests that in addition to USA, China and India mentioned above, Australia, Bangladesh, Japan, Malaysia, Pakistan and Thailand 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 somewhat lower). In the June 2017 Consultation we also mentioned South Africa as a country with a relatively low termination rate. South African MTRs increased in Q4 2017 to around 9-10ppm.

<sup>126</sup> Telecom Regulatory Authority of India, 23 February 2015, *Information Note to the Press (Press Release No.13/2015)*, p.2., <http://traf.gov.in/sites/default/files/PR-13-2015.pdf>;

<sup>127</sup> OECD (2014), *International Traffic Termination*,

[http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=DSTI/ICCP/CISP\(2013\)9/FINAL&docLanguage=En](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-](https://www.gsma.com/publicpolicy/wp-content/uploads/2012/03/Surtaxes_on_International_Incoming_Traffic_in_Africa_FULL-REPORT_WEB.pdf)

[content/uploads/2012/03/Surtaxes\\_on\\_International\\_Incoming\\_Traffic\\_in\\_Africa\\_FULL-REPORT\\_WEB.pdf](https://www.gsma.com/publicpolicy/wp-content/uploads/2012/03/Surtaxes_on_International_Incoming_Traffic_in_Africa_FULL-REPORT_WEB.pdf)

<sup>128</sup> Parliament of Ghana, Electronic Communications (Amendment) Act 2009

<http://www.nca.org.gh/assets/Uploads/Ghana-Electronic-Communications-Amendment-Act-Act-787.pdf>

<sup>129</sup> Based on the information provided by the four large MCT providers we estimate that the termination charge (including transit fees) for calls from the UK to Ghana is currently around 18ppm.

<sup>130</sup> Based on the information provided by the four large MCT providers, we estimate that these countries have the highest MTRs of the 60 countries cited by at least one MCT provider as having a net revenue outflow in excess of £50,000. We have excluded St Helena from this table as while we estimate they have a high MTR, the reported call volumes are low.

|              | UK PAYG retail prices (ppm)   |     |     |       |          |            |        |
|--------------|-------------------------------|-----|-----|-------|----------|------------|--------|
|              | Estimate of current MTR (ppm) | EE  | O2  | Three | Vodafone | Lycamobile | Lebara |
| Maldives     | 53                            | 150 | 150 | 102   | 150      | 60         | 60     |
| Gambia       | 49                            | 150 | 150 | 102   | 150      | 69         | 55     |
| Tunisia      | 46                            | 150 | 150 | 102   | 150      | 49         | 39     |
| Seychelles   | 40                            | 150 | 150 | 102   | 150      | 59         | 49     |
| Guinea       | 35                            | 150 | 150 | 102   | 150      | 34         | 34     |
| Chad         | 33                            | 150 | 150 | 102   | 150      | 49         | 49     |
| Algeria      | 33                            | 150 | 150 | 102   | 150      | 42         | 33     |
| Zambia       | 31                            | 150 | 150 | 102   | 150      | 42         | 39     |
| Zimbabwe     | 31                            | 150 | 150 | 102   | 150      | 39         | 37     |
| Sierra Leone | 30                            | 150 | 150 | 102   | 150      | 49         | 49     |

Source: Source: Ofcom analysis of data provided by the four large MCT providers for Q4 2016 to Q3 2017 (for current MTRs) and Ofcom analysis of MCT providers' websites<sup>131</sup> (for current retail prices).

A7.35 These figures illustrate that the standard PAYG retail prices for international calls charged by the four largest mobile providers are significantly higher than the wholesale charges faced for terminating those calls. Call bundles and international call add-ons are often available which offer lower call prices to international countries. However, the data provided by [3<]<sup>132</sup> on the average retail price for making outbound calls to providers in the non-EEA countries to which they faced a net revenue outflow in excess of £50,000 implied an average retail price of calls to those countries of 84ppm compared to an average termination cost (including transit fees) of 5ppm<sup>133</sup>, suggesting that the actual prices faced

<sup>131</sup> Sources: EE (<http://ee.co.uk/help/add-ons-benefits-and-plans/call-or-going-abroad/calling-abroad-from-the-uk> - page accessed on 19 February 2018); O2 ([http://international.o2.co.uk/internationaltariffs/calling\\_abroad\\_from\\_uk](http://international.o2.co.uk/internationaltariffs/calling_abroad_from_uk) - page accessed on 20 February 2018); Three ([http://www.three.co.uk/Support/Roaming\\_and\\_international/Calling\\_and\\_texting\\_abroad\\_from\\_the\\_UK](http://www.three.co.uk/Support/Roaming_and_international/Calling_and_texting_abroad_from_the_UK) - page accessed on 20 February 2018); Vodafone (<https://www.vodafone.co.uk/explore/costs/calling-abroad-from-the-uk/> - page accessed on 20 February 2018); Lycamobile (<https://www.lycamobile.co.uk/en/international-rates> - date accessed 20 February 2018); and Lebara (<https://mobile.lebara.com/gb/en/international-calls> - date accessed 20 February 2018).

<sup>132</sup> Of the four large MCT providers only [3<] were able to provide the requested data.

<sup>133</sup> This figure is low relative to the average MTRs set out in Table A7.3 due to [3<] having a large volume of calls to the USA where the MTR is low.

by consumers are many multiples of the price paid by UK providers to non-EEA providers for termination.

### **Potential changes in UK net revenue outflow as a result of differential regulation**

A7.36 Using the information we obtained from the four largest UK mobile providers on countries with which they experienced net revenue outflows in excess of £50,000 in the period Q4 2016 to Q3 2017, we considered the potential changes to the UK net revenue outflow as a result of differential regulation.

#### ***Reciprocal high rates in all countries***

A7.37 If we assumed that reciprocal high rates prevailed in all 60 countries as a result of differential regulation, UK MCT providers would move from having a net revenue outflow to these countries of approximately £35m (see Table A7.3 above) to a net revenue inflow of approximately £4m (reflecting that overall the UK is a net receiver of traffic from these countries), that is a gain of around £39m per year.<sup>134</sup> These figures assume no inbound call volume reduction as a result of the increase in UK MTRs, but a very large volume reduction would be required to offset this potential gain to UK MCT providers.<sup>135</sup> For example, if inbound call volumes reduced by 25% then, other things equal the potential gain to UK MCT providers would be around £28.5m per year.

#### ***Reciprocal low rates in countries where UK is net receiver of traffic***

A7.38 The figures above would require UK operators to sustain high MTRs to countries from which they are net receivers of traffic. In Annex 6, we considered how a reciprocal low outcome may occur where the UK MCT provider is a net receiver of traffic to a non-EEA counterparty, if a reciprocity condition were applied to UK MTRs for non-EEA originated calls.

A7.39 Notwithstanding the likely difficulties of such negotiated rate reductions, if we assumed that reciprocal low rates prevailed in all countries where the UK was a net receiver of traffic, UK MCT providers would move from having a net revenue outflow to these countries of approximately £13m to a net revenue inflow of approximately £1m, that is a gain of around £14m per year.<sup>136</sup> Again, these figures assume no call volume change in either direction.

#### ***Reciprocal high rates in countries where UK is net sender of traffic***

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<sup>134</sup> This assumes that UK MTRs move to a reciprocal high at the non-EEA country's MTR and is calculated by multiplying the UK inbound traffic volume for each of these countries by the difference between the current non-EEA MTR and the UK regulated MTR.

<sup>135</sup> Inbound call volumes would have to reduce by 94% to fully offset this revenue gain. This is based on taking the weighted average MTR across the 60 countries (7.7ppm) and estimating the reduction in inbound call volumes across the 60 countries that would offset the £39m gain.

<sup>136</sup> This assumes that they move to a reciprocal low rate at the UK's current regulated MTR and is calculated by multiplying the UK outbound traffic volume for each of these countries by the difference between the current non-EEA MTR and the UK regulated MTR.



- A7.40 In Annex 6, we considered how a reciprocal high outcome was likely to prevail where the UK MCT provider is a net sender of traffic to a non-EEA counterparty.
- A7.41 If we assumed that reciprocal high rates prevailed in all countries where the UK was a net sender of traffic, UK MCT providers' net revenue outflow to these countries would reduce from approximately £22m to £10m, that is a gain of around £12m per year.<sup>137</sup> Again, these figures assume no inbound call volume reduction as a result of the increase in UK MTRs. If the UK MTR increase was passed through to retail call prices by non-EEA providers, then a volume reduction would be expected. It would take a volume reduction of around 93% for the wholesale revenue gain to be offset for UK MCT providers.<sup>138</sup> Given this, we might expect at least some wholesale gain to UK MCT providers if reciprocal high rates prevail on routes where the UK is a net sender of traffic.

***Combined reciprocal low and reciprocal high outcome***

- A7.42 If reciprocal high rates prevail on routes where the UK is a net sender of traffic and reciprocal low rates prevail on routes where the UK is a net receiver of traffic, then the potential gain could be around £26m per year, assuming no call volume changes.<sup>139</sup>

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<sup>137</sup> This assumes that UK MTRs move to a reciprocal high at the non-EEA country's MTR and is calculated by multiplying the UK inbound traffic volume for each of these countries by the difference between the current non-EEA MTR and the UK regulated MTR.

<sup>138</sup> This is based on taking the weighted average MTR across the 37 countries where the UK is a net sender of traffic (7.6ppm) and estimating the reduction in inbound call volumes across the 37 countries that would offset the £12m gain.

<sup>139</sup> This is the sum of the £12m gain from the reciprocal high routes (paragraph A7.41) and the £14m gain from reciprocal low routes (paragraph A7.39).

## A8. Regulation of termination for calls originated outside the EEA - Stakeholder responses to the consultation

### Introduction

- A8.1 The application of the charge control to calls originated outside the EEA was the main focus of responses to the June 2017 Consultation with eleven respondents discussing non-EEA calls in their response.
- A8.2 Four (Colt, [S<], Manx Telecom and Verizon) were supportive of our proposed approach while seven (BT/EE, Core, H3G, Swiftnet, Telecom2, Telefónica, and Vodafone) were not.
- A8.3 In this Annex, we summarise the issues raised by respondents and set out our response. A more detailed assessment of our overall approach and the decisions we have made in respect of non-EEA calls is in Section 4 and Annex 6 of this statement.

### Our overall approach

#### Stakeholder responses

- A8.4 The four largest mobile providers did not support our proposal of no differential regulation. BT/EE and Telefónica supported a reciprocity regime for MTRs from non-EEA calls while Vodafone contended that non-EEA originated calls should be outside the scope of regulation. H3G said our concerns could be alleviated by adopting a regime similar to the German approach.
- A8.5 Telefónica submitted that our analysis was mainly speculative and not supported by any evidence, while BT/EE contended that our analysis to support our preferred option was *“unduly conservative, overstates the risk and understates the benefits of a reciprocity regime”*.
- A8.6 Vodafone said that we had not conducted a cost benefit analysis of the relative advantages of including non-EEA MCT within the domestic charge control and that we had not considered the disproportionate impact on MCT providers relative to the objective we were seeking to achieve (to protect consumers).
- A8.7 Swiftnet, meanwhile, said our proposed approach was disproportionate. It also described it as *‘very probably unlawful’* on the basis that MTRs charged on calls that originate outside the EU but terminated within it do not have an appreciable effect on trade between member states.
- A8.8 Telecom2 submitted that we should make a distinction for services marketed at callers outside the EEA and where access to them from within the EEA is barred. It said these services have no impact on the UK or EEA market or suppliers but are expensive to provide.

A8.9 On the other hand, Verizon supported our approach and considered that differential regulation would be a violation of EU telecommunication rules, general competition law and the WTO GATS. It said that, if operators had concerns about high termination rates in other countries, they should lobby the relevant regulators, governments or operators to change that situation, and should not use UK consumers as leverage.

## Ofcom's assessment and conclusions

A8.10 Our analysis in the June 2017 Consultation, in particular Annex 11, set out an assessment of the costs and benefits of the different options considered in relation to the inclusion (or not) of non-EEA originated calls in the charge control. We are considering the potential effects of a change in regulation, so our analysis is a hypothetical one. Nonetheless, we have considered all stakeholders' responses carefully, have sought further evidence of the impact of differential regulation in other EEA countries and have refined our analysis, drawing on relevant evidence.

A8.11 On the bases we have set out in Section 4, there is scope for MTRs in the UK to harm consumers and we have explained fully in that section and Annex 6 (supported by evidence in Annex 7) our assessment of the balance of possible benefits and likely risks of differential regulation. We have taken account of our duties to UK and EU consumers and citizens in Sections 3 and 4 of the Act and Article 8 of the Framework Directive, as well as the tests for setting SMP conditions in Sections 47 and 88 of the Act. For the reasons we have set out, there are bases for us to intervene in respect of non-EEA calls and we have decided to cap MTRs for them with the same charge control as for domestically originated calls.

## Potential impact of Brexit

### Stakeholder responses

A8.12 Three respondents (BT/EE, Vodafone and Core Telecom) highlighted the potential impact of Brexit.

A8.13 BT/EE said we had not considered a policy for EEA calls in case the UK leaves the EEA and that we must ensure suitable contingent arrangements are in place to avoid consumer harm if the UK was to do so. It proposed a reciprocity regime for MTRs for EEA calls in that scenario. It submitted that our 'wait and see' approach risks leaving UK consumers without adequate protection from asymmetric MTR increases and therefore we should consult immediately on such a regime so that it is ready to implement promptly if the UK leaves the EEA during the charge control period.

A8.14 Vodafone, meanwhile, said that Brexit could lead to a wide variety of international trade deals being reviewed (including the UK's membership of the EEA) and that our proposed approach would impair UK mobile providers by constraining their negotiating hand before any discussions began. Vodafone also estimated that if, post-Brexit, the UK is outside the EEA, and EEA countries begin to surcharge UK providers for terminating calls in their

country, termination out-payments from the UK to EEA countries would be in excess of £50m.

- A8.15 Core Telecom said that, in light of Brexit, we should postpone consideration of this issue until we have greater certainty of how the UK is going to deal with EU/EEA countries and potential trading partners in non-EEA countries post-Brexit. It said that a regulatory cap would hinder UK businesses and their ability to compete on an equal footing with most of the rest of Europe.

## Ofcom's assessment and conclusion

- A8.16 For the reasons set out in this Statement, we consider that the MCT charge control should apply to all calls regardless of origin, including calls from other EEA countries.
- A8.17 The risks around Brexit informed our proposed position set out in our June 2017 Consultation – specifically, the risk of higher MTRs between UK and EEA countries. Our approach seeks to reduce these risks by preventing UK MCT providers from triggering an escalation in MTRs.
- A8.18 Nevertheless, we recognise that there remains a risk that EEA countries could increase their MTRs to the UK if the UK leaves the EEA.
- A8.19 Given this, as set out in paragraph 4.163 we do not rule out introducing some form of differential regulation in certain circumstances, using the direction-making power reserved to us in the SMP Condition we have decided to make.
- A8.20 We also note that for countries which currently have a reciprocity type regime (Germany, France and Netherlands), there would be no increase in the MTRs charged for calls originating in the UK to those countries so long as UK MTRs remain capped at LRIC.

## Likelihood of differential regulation leading to low termination rates

### Stakeholder responses

#### Incentive and ability of MCT providers to negotiate and agree low termination rates

- A8.21 Verizon contended that the call by some MCT providers to implement differential regulation was driven by a desire to increase rates and considered that the most likely outcome was that providers would raise rates.
- A8.22 Vodafone set out its expectation that excluding MCT from the charge control for non-EEA originated calls would lead to an equilibrium being reached where UK MTRs are higher for calls from certain non-EEA destinations that themselves have higher MTRs, and for non-EEA MTRs to be lower for calls to non-EEA countries that have lower or regulated MTRs. It said that in both cases that UK MCT providers' net revenue outflow would be reduced.

- A8.23 Vodafone also contended that there is no reason or evidence to suppose that non-EEA MTRs will rise ('race to the top'), while Verizon considered that it was likely that other countries would retaliate and increase their MTRs.
- A8.24 BT/EE submitted that it would not be profit maximising for UK MCT providers to raise MTRs in a 'race to the top' since this would lead to lower retail call volumes. Rather, they would have an incentive to negotiate down counterparty MTRs and pass these savings through into lower retail prices for customers.
- A8.25 H3G, meanwhile, said that our examination of incentives was too narrow and ignored the retail market impact of an MCT provider being able to offer highly competitive international calling propositions. It contended that the profitability associated with an increase in demand at the retail level may outweigh the incentive to raise rates at the wholesale level. It also noted that actual net balances vary country by country and that we had over generalised by provisionally concluding that UK MCT providers would rather increase MTRs (noting that it is itself a net recipient of traffic).
- A8.26 Telefónica submitted that reciprocity has been successfully used on wholesale roaming charges outside the EEA and noted that wholesale roaming prices are below the regulated rate. It considered that there was no reason to think that MTRs would not follow the same path.

#### **Practical obstacles to negotiating and agreeing lower termination rates**

- A8.27 H3G submitted that we had overstated the practical barriers to the effectiveness of differential regulation. In particular, it said the transit charge typically accounted for a negligible proportion of the overall cost of interconnection, and the current functionality to identify the origin of international traffic and lack of direct lines of negotiation with non-EEA MCT providers were a function of the current regulatory regime which could be changed if the incentive was there.
- A8.28 Verizon contended that termination rates are typically bundled into the price of transit, can cover a number of countries and tend not to be individually negotiable. It submitted that differential regulation would not help MCT providers negotiate lower rates, while implementing differential regulation would cause an administrative and cost burden which would be likely to be passed on to consumers.
- A8.29 Similarly, Colt said that existing billing systems do not offer the functionality to differentiate termination rates according to call-origin so, in the short term, rates would be blended. In the longer term, industry would have to upgrade its billing systems to implement the differentiation. Given the competitiveness of the industry, these costs would be passed through to the end user, with no offsetting benefits.

#### **Practical experience of pricing freedom**

- A8.30 BT/EE contended that we had over-relied on hypothetical analysis when reaching our preliminary finding that the risks of a reciprocity regime outweighed the benefits. It argued that we had given no weighting to the empirical evidence within EEA countries that had

adopted differential regulation. It noted that, to its knowledge, there had been no customer detriment in relation to 17 countries which had introduced differential regulation. It submitted that we should seek more information before reaching a final decision. Similarly, H3G said there was no evidence of the adverse consequences we suggested actually occurring.

- A8.31 As noted above in Annex 7 (paragraph A7.10), Vodafone highlighted Switzerland as one example of how allowing surcharging for the termination of calls from other countries can have a positive effect on net revenue flows, the domestic termination rate offered to other countries and the termination rate charged by other countries for terminating domestically originated traffic.

## Ofcom's assessment and conclusion

- A8.32 In light of stakeholders' responses, we carried out a further assessment of the likelihood of differential regulation leading to low termination rates. This included giving further consideration to:
- a) the incentives of the UK MCT providers and non-EEA MCT providers to negotiate and agree to low termination rates;
  - b) the practicalities involved in UK MCT providers and non-EEA MCT provider negotiating and agreeing to low termination rates; and
  - c) the evidence from other countries of the outcomes from pricing freedom on MTRs.
- A8.33 This analysis is set out in Annex 6 and Annex 7. Based on this assessment, we consider that the likely outcome of differential regulation would be reciprocal high rates with most countries, with the possibility of reciprocal low rates in some instances.

## Other possible effects of differential regulation

### Stakeholder responses

#### Reduced prices for international calls

- A8.34 H3G said that high non-EEA termination rates were preventing it from expanding its competitive international calling proposition and that we were wrong to suggest that reductions in non-EEA termination rates will not be passed on to retail prices.
- A8.35 Vodafone contended that, to the extent that non-EEA MTRs fall, UK providers will almost certainly pass-through the cost saving to consumers by reducing the retail price of outgoing international calls made from the UK.

#### Reduction in calls to UK consumers from outside the EEA

- A8.36 Vodafone submitted that higher MTRs for non-EEA originated calls are unlikely to reduce the volume of incoming international calls to UK mobiles to any significant effect because it is likely callers will switch to using OTT services or fixed lines. It also noted that

international calls made by mobiles have been in decline since 2013, despite any consistent price trend, and argued that the available evidence showed no price elasticity effect when OTT services were included.

### Extent of UK waterbed effect

A8.37 Vodafone also contended that there was little reason to suppose that the waterbed effect would not be near perfect, as UK operators would have an incentive to use the additional revenues from non-EEA MTRs to lower their retail prices for international calls and to offer more competitive bundles to consumers for domestic services.

### Ofcom's assessment and conclusion

A8.38 As set out in Annex 6, if differential regulation led to reductions in non-EEA termination rates, we would expect at least some of this to be passed through to UK consumers, for example, in the form of lower prices. However, we also note that, as set out in paragraph A6.42 and Table A7.4, the rates which UK providers pay to terminate in non-EEA countries are typically a small proportion of the retail prices paid by UK consumers for calling those countries. This suggests that there may in reality be more limited scope for a reduction in termination rates to significantly reduce UK international call prices.

A8.39 We cannot ascertain with any precision the extent of the pass-through of an increase in UK MTRs to non-EEA retail prices, or the likely price responsiveness of non-EEA demand for calls to UK mobiles. However, for the reasons set out in Annex 6, we consider that, given the potential scale of MTR increases necessary for reciprocity, inbound volume reductions seem likely.

A8.40 In terms of the extent of the waterbed effect, while we consider that the UK market is effectively competitive (in that we have not identified single or joint dominance at the retail level), it is not perfectly competitive. As set out in Annex 6, we further note that the waterbed effect in mobile telecoms has no longer been found statistically significant on the basis of recent academic research. We cannot therefore assume a full waterbed effect.

## Impact of low termination rates on UK MCT providers' investment

### Stakeholder responses

A8.41 Telefónica said that our comparison of net termination revenue with total sector revenues was meaningless and that by imposing a charge control on non-EEA originated calls we were forcing UK MCT providers to subsidise non-EEA providers to the detriment of UK consumers.

A8.42 Vodafone, meanwhile, highlighted what it considered to be challenging investment conditions and said we needed to support UK consumers and UK industry. It contended that applying the charge control to non-EEA originated calls placed *'further obstacles in the path to future growth, which will need to be driven by investment, service enhancement and technological progress.'*

## Ofcom's assessment and conclusion

A8.43 As set out in Section 4, we do not consider that UK MTRs set at LRIC for calls originating outside the EEA undermine investment by UK MCT providers. MTRs capped at LRIC are designed to allow for cost-recovery by efficient MCT providers, including the cost of capital, and on the available evidence we note that retail calls to non-EEA destinations appear to earn significant margins over the wholesale outpayments on these routes.



## A9. MCT cost model approach and design

### Introduction

- A9.1 This annex provides further information on the approach we have taken to estimating the costs of MCT and explains the functionality of our model. Our decisions are informed by the '2018 MCT model', which is published alongside this Statement. The 2018 MCT model uses a bottom-up approach to estimate the costs of MCT for an average efficient national mobile provider, and is closely based on the 2015 MCT model.
- A9.2 In Section 5 we summarised our proposals from the June 2017 Consultation, addressed the responses received from stakeholders and explained our conclusion that it is not necessary or appropriate to conduct further data collection, analysis and testing of the model. We explained that, having carefully considered the matter, including relevant responses to the June 2017 Consultation, we have decided that that our reasoning is valid and the 2018 MCT Model is therefore unchanged from our modelling for the June 2017 Consultation.
- A9.3 This annex consists of two parts:
- We first explain how we approached the modelling and the analysis we undertook to inform our proposals in the June 2017 Consultation (but do not repeat our analysis of the consultation responses on this, which are addressed in Section 5); and
  - We then recap the structure and workings of the 2018 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 2018 MCT model are presented in Annex 11.

### 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 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 produce a bottom-up model grounded in reality.

A9.7 As has been the case in previous MCT market reviews, we were 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 considered in the June 2017 Consultation was whether it continued to provide a reasonable approximation of reality for the period 1 April 2018 to 31 March 2021.

A9.9 To answer this question,<sup>140</sup> we identified the key inputs to the 2015 MCT model and investigated the likely impacts of updating them on the model results. We did this first by adjusting individual parameters and then by considering the impact of those adjustments on a cumulative basis. We would have been concerned if the cumulative impact of any adjustments were material as this might have suggested 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 reflected the fact that the 2015 MCT model contained an internally consistent set of inputs and hence we were wary of introducing inconsistency by changing some inputs in isolation.

A9.10 In performing this analysis, we bore in mind the likely materiality of any impact on MTRs. Without attempting to provide a specific materiality threshold, we noted 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.<sup>141</sup>

A9.11 As part of informing our testing for the June 2017 Consultation we collected data from the four largest mobile providers using our information gathering powers under section 135 of the Act. We sent information notices to the four largest mobile 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 also considered updates to unit equipment costs and the WACC, and in the following sub-sections discuss each of technology, volumes, equipment costs and WACC, before considering the impact of updates in the round.

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<sup>140</sup> Provisionally for the purposes of the June 2017 Consultation, and for the purposes of this statement.

<sup>141</sup> 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.

## Choice of technology

- A9.13 In order to build a bottom-up network cost model, we needed to decide which network technology or combination of technologies to model. Since we wished 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 sought to model the technologies that an average efficient mobile provider would have used. We based these modelled technologies on the networks that the national MCT providers have deployed.
- A9.15 Our approach in the June 2017 Consultation was 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 the same services at the same or lower cost. Our approach to modelling was to only include proven technologies (i.e. the technology of the day).
- A9.16 In deciding which technologies to model we also took 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”*,<sup>142</sup> 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 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 5);
  - 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 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.<sup>143</sup>

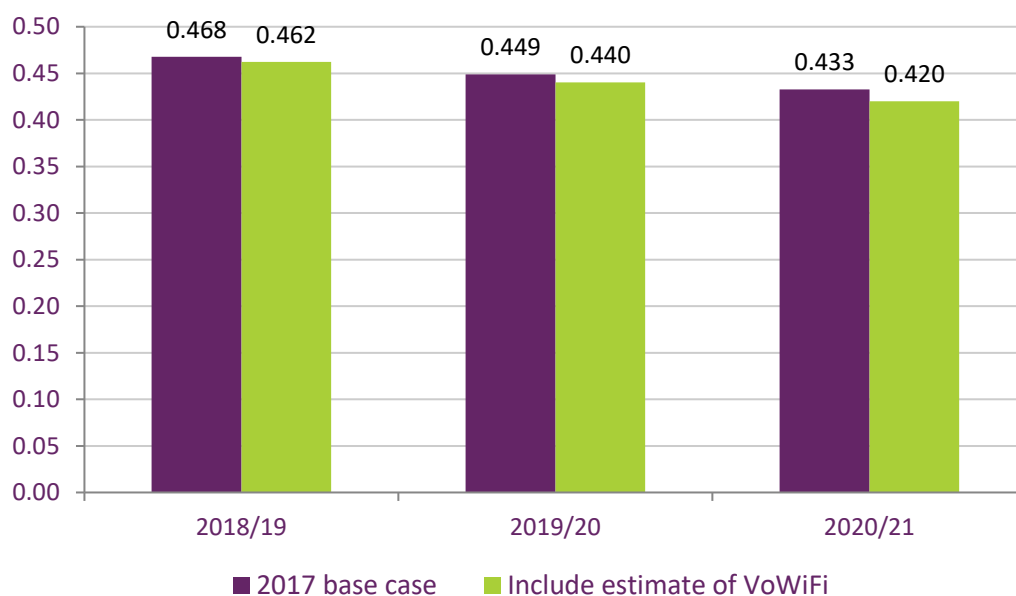
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<sup>142</sup> 2009 EC Recommendation, point 4.

<sup>143</sup> 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.

- A9.19 Consequently, for the June 2017 Consultation we tested this using some simplifying assumptions. We first assumed 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 required 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 suggested that the extent of VoWiFi is currently low, but varies between MCT providers (between 0% and 4%). The extent to which it might grow was unclear however, and we therefore tested a range of assumptions for this.
- A9.21 On the basis of the actual range, our view was that a forecast of 3% of termination traffic being on VoWiFi in 2020/21 is reasonable. However, we noted that capturing the effect of VoWiFi in this way takes no account of the effect that the 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 found that approximating the effect by assuming a cost of zero and 3% of total termination traffic on VoWiFi in 2020/21 reduced the LRIC of MCT by around 2-3% compared to our updated base case,<sup>144</sup> 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: 2018 MCT model.

<sup>144</sup> The '2018 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

## Traffic volumes

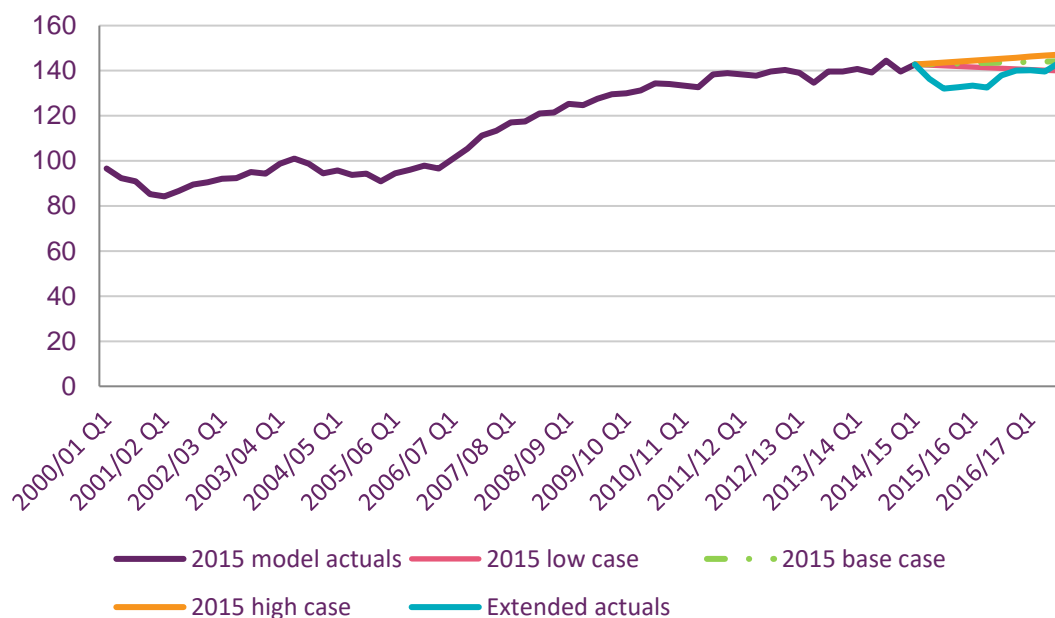
A9.23 The 2015 MCT model included forecasts of all types of traffic carried by mobile networks. In the June 2017 Consultation we tested the accuracy of the forecasts we made in the 2015 MCT model by comparing them to actual traffic volumes gathered using our statutory powers. In each case we also tested the impact of updating the volumes in the model. To do this we 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.<sup>145</sup>

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

### 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: 2018 MCT model.

<sup>145</sup> 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.

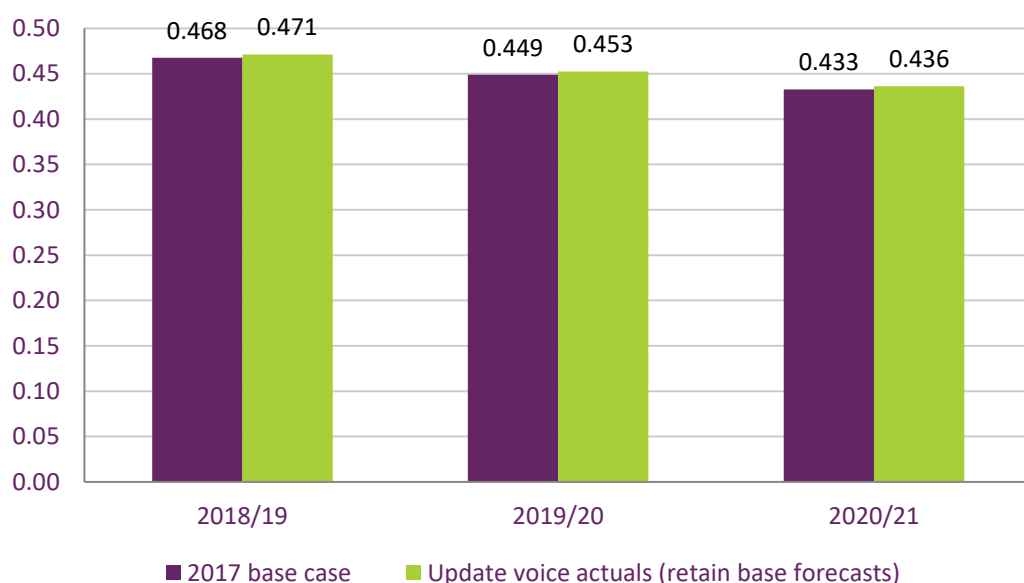
A9.26 Figure A9.2 shows that initially the outturn volumes fall below the 2015 MCT ‘low case’ but come back within the 2015 MCT forecast range more recently. We investigated this and sought explanation from the mobile operators of the temporary fall in voice minutes per subscriber. They explained that:

- H3G’s voice minutes per [redacted];<sup>146</sup>
- EE’s voice minutes per subscriber [redacted];<sup>147</sup> and
- Vodafone’s voice minutes per subscriber [redacted].<sup>148</sup>

A9.27 This suggested 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.

A9.28 We tested the 2018 MCT Model using the updated series of actuals and retaining the existing base case forecasts thereafter. This produced 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: 2018 MCT model.

### Total data traffic

A9.29 Turning to data services we found that the outturn figures on total data traffic (i.e. 2G, 3G and 4G) indicated 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

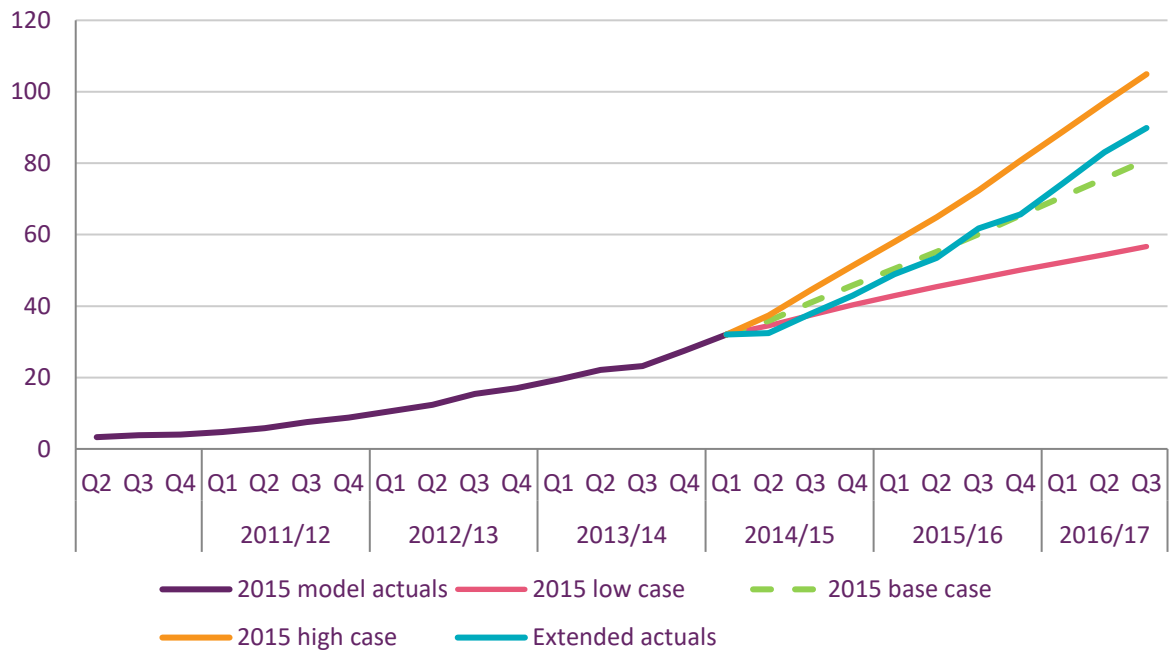
<sup>146</sup> Email sent on 31 March 2017.

<sup>147</sup> Email sent on 31 March 2017.

<sup>148</sup> Email sent on 27 March 2017.

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)**



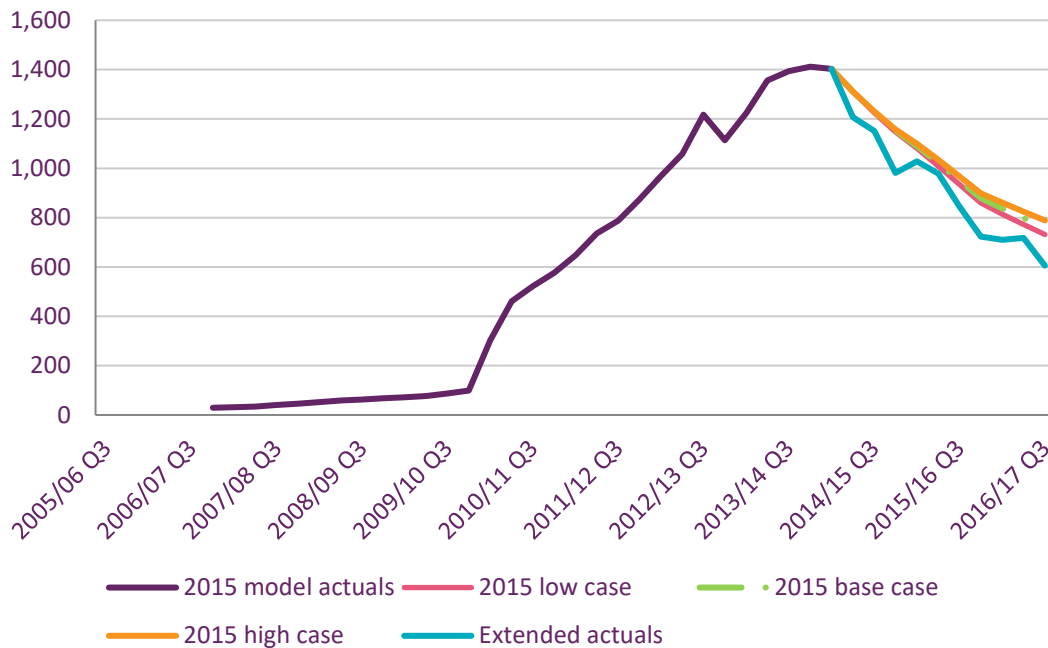
Source: 2018 MCT model.

A9.30 In order to understand the impact of this in more detail we broke the data traffic 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: 2018 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 showed 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)

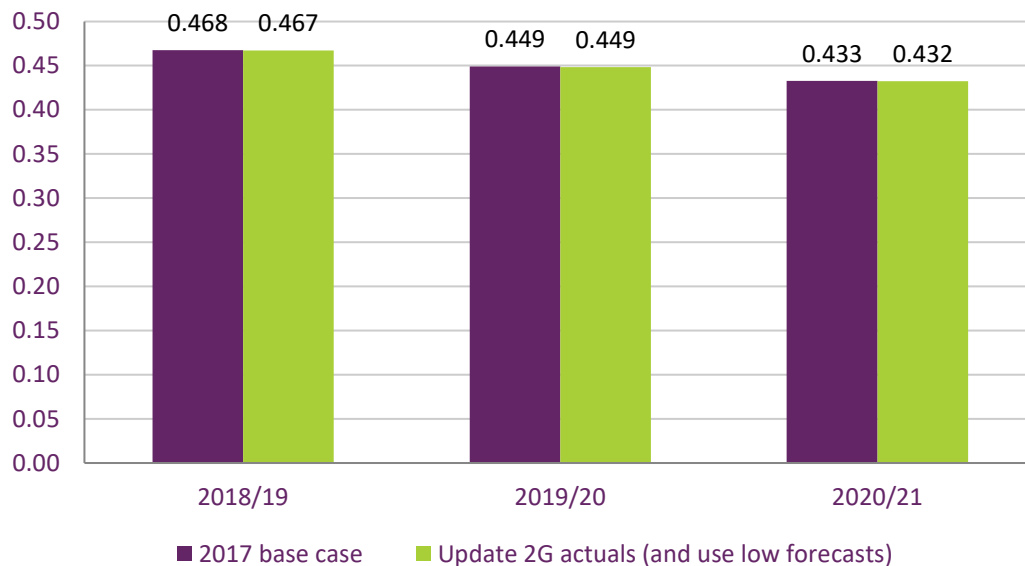


Source: 2018 MCT model.



A9.33 When we 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 found that the results were 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: 2018 MCT model.

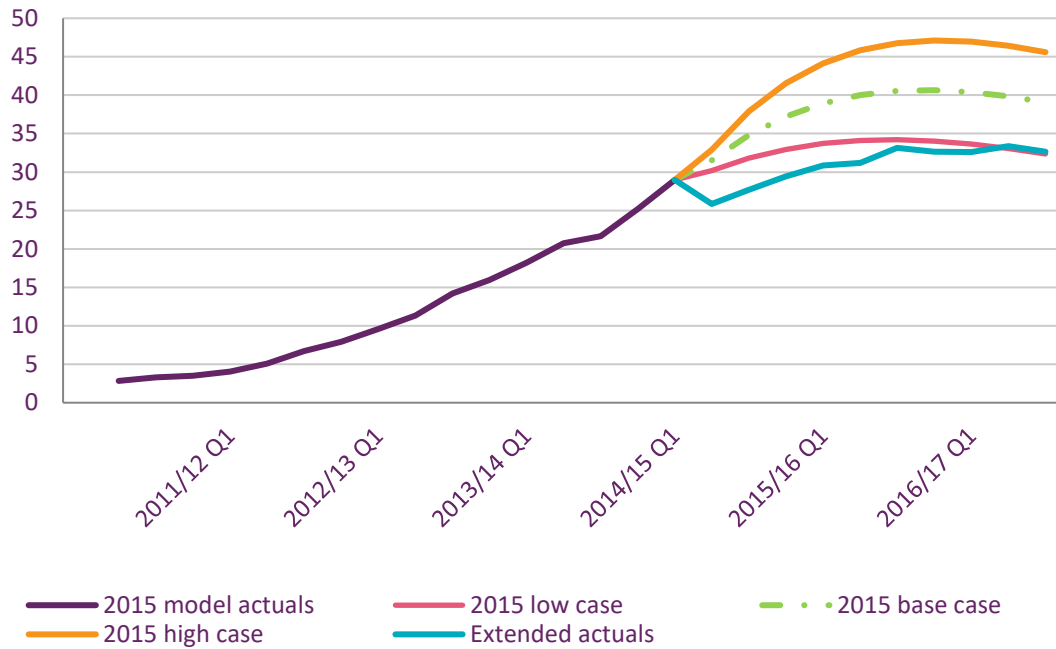
### 3G data

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 suggested that this was not unreasonable, but raised 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 found that it is mainly [X].<sup>149</sup>

<sup>149</sup> Email sent on 26 March 2017.

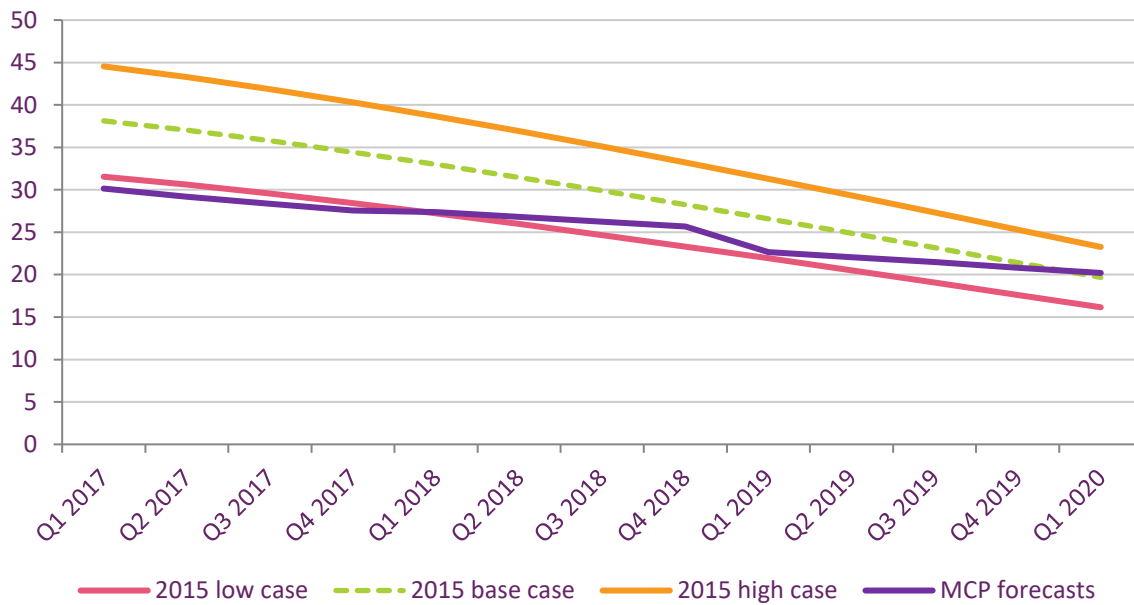
Figure A9.8: Quarterly total 3G data volumes (PB)



Source: 2018 MCT model.

A9.36 As was the case for 2G data traffic volumes, however, the MCT providers’ latest forecasts provided under statutory powers showed 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.

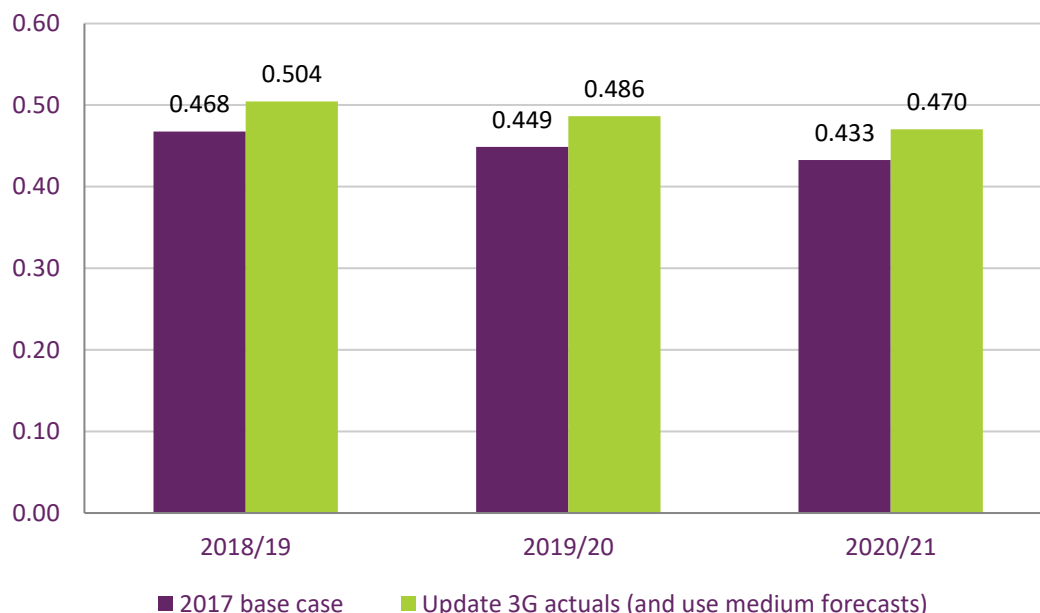
Figure A9.9: Quarterly 3G data forecast (PB)



Source: 2018 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) produced a 2020/21 LRIC of MCT 9% above the 2018 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)**



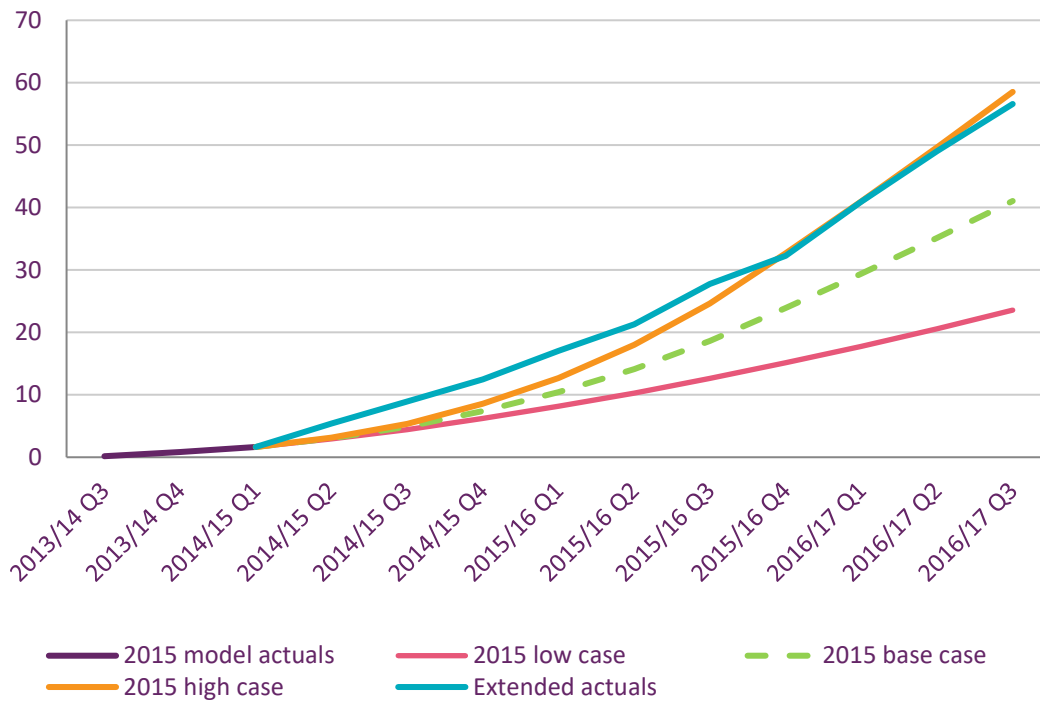
Source: 2018 MCT model.

A9.38 We might have expected 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 revealed that the change in 3G data volumes has the effect of increasing 2G, 3G and 4G voice termination costs. Investigation in the model suggested 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 indicated 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.

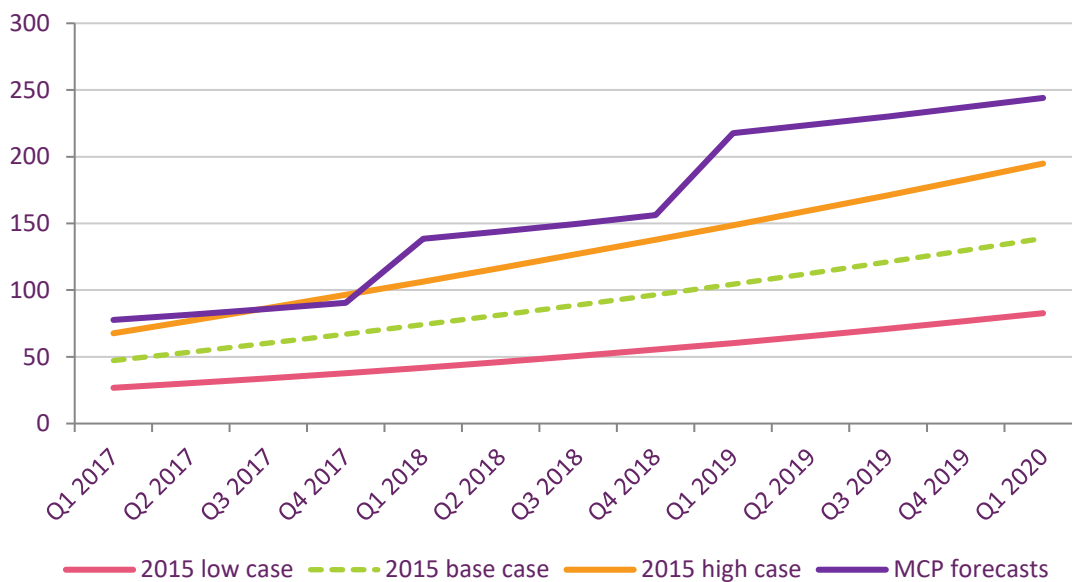
Figure A9.11: Quarterly total 4G data volumes (PB)



Source: 2018 MCT model.

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

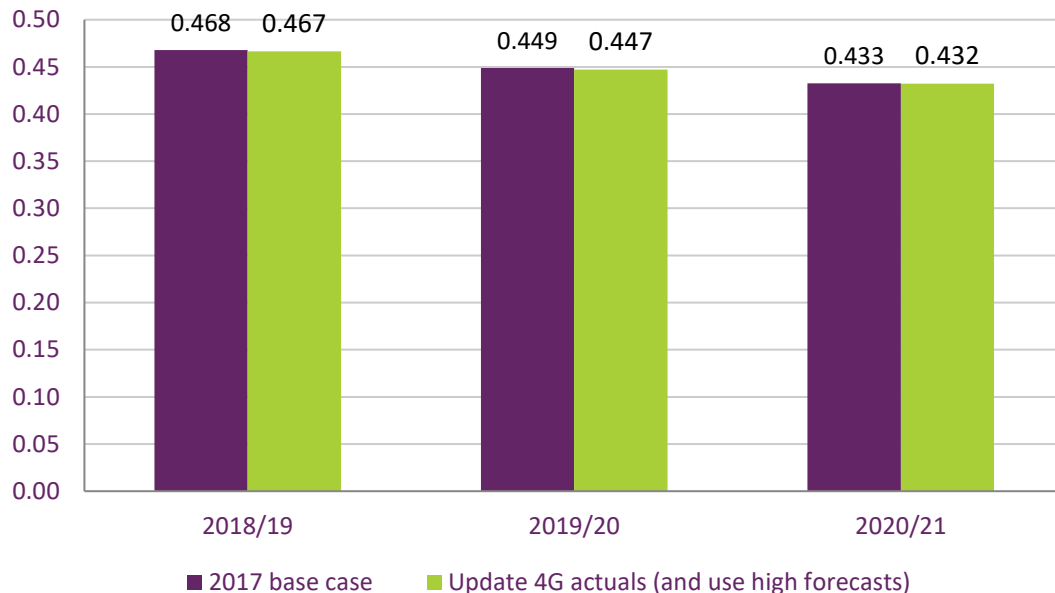
Figure A9.12: Quarterly 4G data forecast (PB)



Source: 2018 MCT model.

A9.41 The impact of 4G data traffic volumes on the LRIC of MCT was very limited, as shown in Figure A8.13 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 have reduced 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: 2018 MCT model.

A9.42 We further noted that, were we to reforecast 4G data volumes based on the latest MCT providers' data, we would have likely used something higher than the previous high case scenario. This would have reduced 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:

- H3G [redacted];<sup>150</sup>
- EE [redacted];<sup>151</sup>
- Vodafone [redacted];<sup>152</sup> and

<sup>150</sup> Email sent on 7 March 2017.

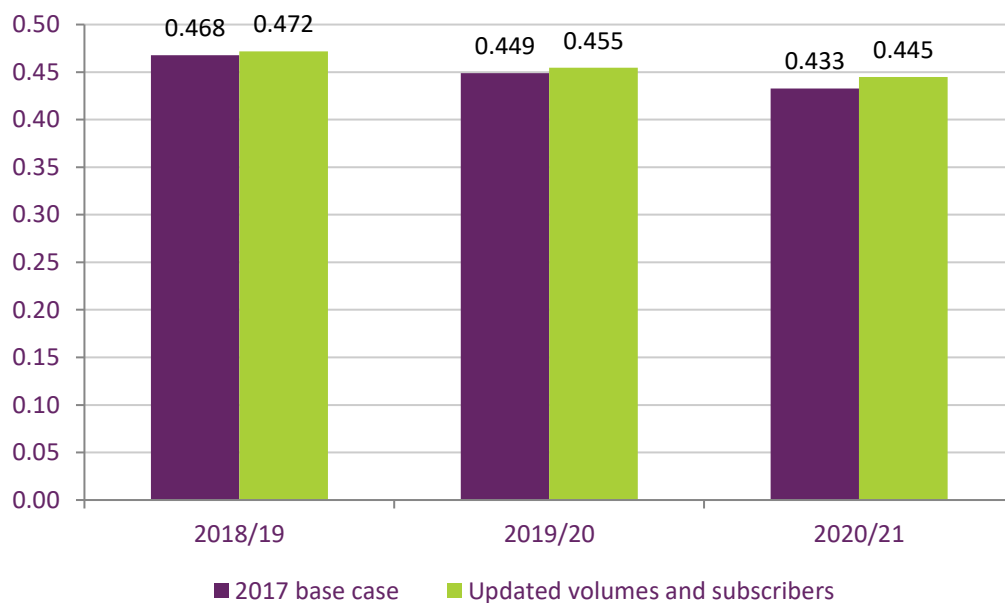
<sup>151</sup> Email sent on 10 March 2017.

<sup>152</sup> Email sent on 3 March 2017.

- Telefónica [S&K].<sup>153</sup>

A9.44 Combining the adjustments to volumes of individual services explained above, and also updating the mix of subscribers between the different technologies, resulted 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: 2018 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 drew 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 2018 MCT model, and we compared the (real) cost trends over the next charge control period against those from the French MCT model as shown in Table A9.1 below.

<sup>153</sup> Email sent on 5 March 2017.

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

## Cost of capital

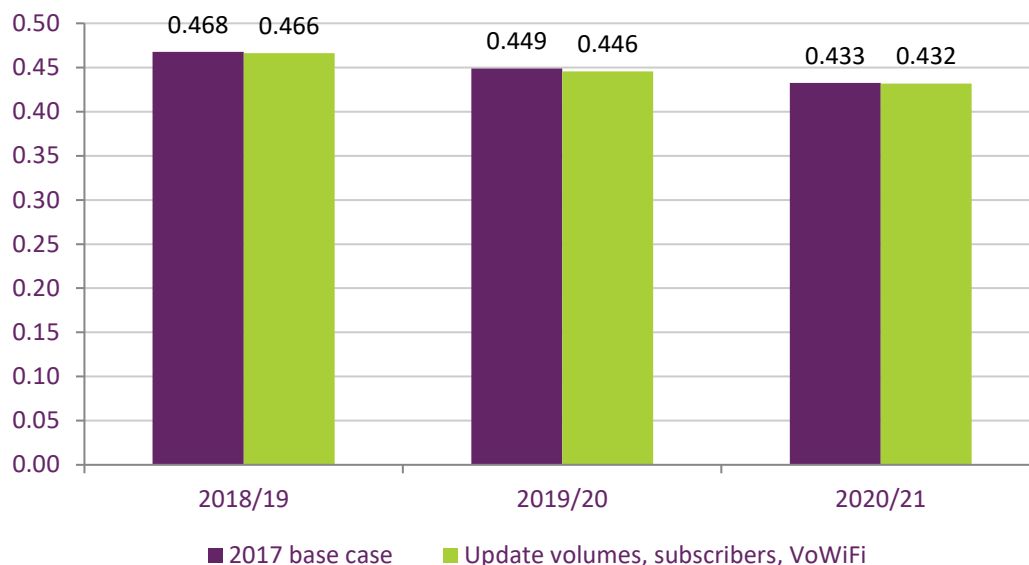
- A9.49 The 2015 MCT model used a pre-tax real WACC of 7.0% for an average efficient mobile provider. In the June 2017 Consultation we updated the analysis such that the market-wide parameters used in the calculation were consistent with those in the recent WLA Consultation and reviewed the asset betas and debt premiums.
- A9.50 This led to a range of 6.1% to 7.8%. As explained further in Annex 10 we have decided that, in light of this range, a pre-tax real WACC of 7.0% remains reasonable.

## Conclusions on model updates

- A9.51 In considering how to model the costs of MCT for the next review period, our (provisional) view was that the 2015 MCT model provides the appropriate starting point. In particular, it appeared 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 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 updated 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 was 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: 2018 MCT model.

A9.53 As explained above, our view was that the reduction in the blended cost resulted 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 have led 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<sup>154</sup>).

A9.54 Consequently, we found 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 decided (provisionally for the purposes of the June 2017 Consultation, and now finally for the purposes of this statement) on a 2018 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.

<sup>154</sup> We noted for example that since the publication of the 2015 MCT Statement the pound is worth roughly 16% less against the dollar.



## Model structure and calculation

### Model structure

A9.55 As outlined in Section 5, the 2018 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:

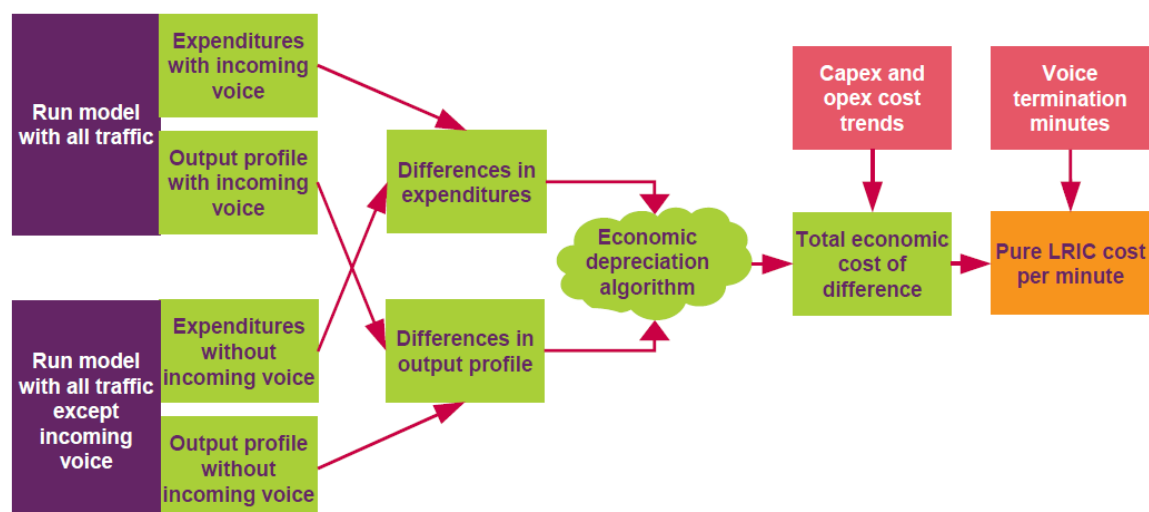
- The **'Scenario Control'** module defines and allows the selection of the model scenarios and sensitivities. It also contains a summary of the key results.
- The **'Traffic'** module contains the service demand forecasts and network coverage assumptions.
- The **'Network'** module contains network 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 2018 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. 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 2018 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 2018 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 2018 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 2018 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.

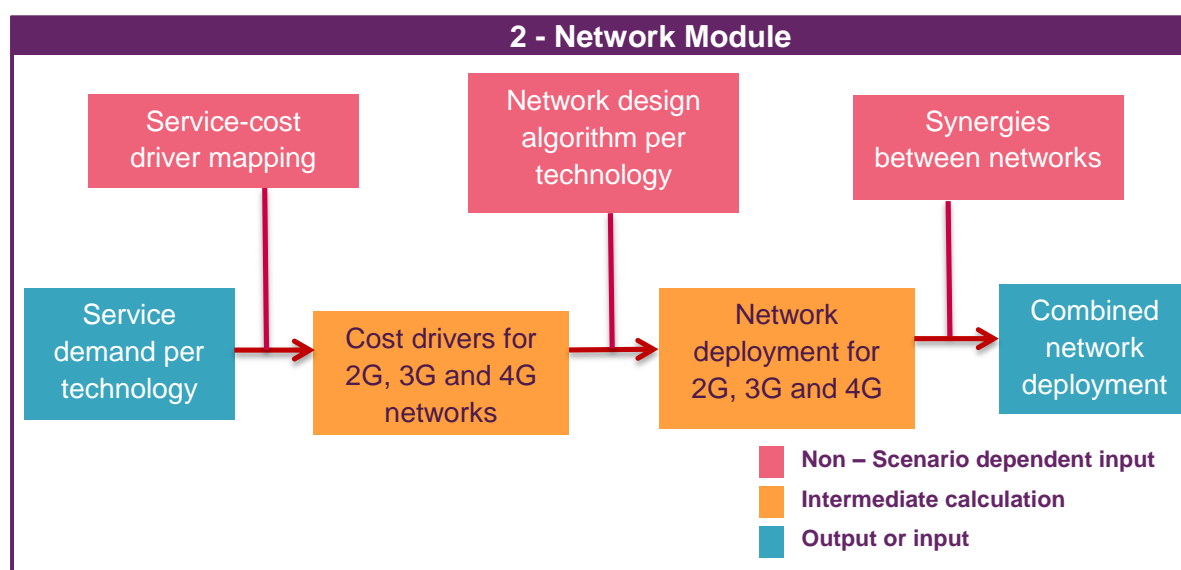
A9.62 We also note that our traffic forecasts must be consistent with our assumptions concerning network technology and spectrum. The 2018 MCT model uses the technology of the day with no further developments in the future. This means that although in the short term the 2018 MCT model forecasts are based 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 2018 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

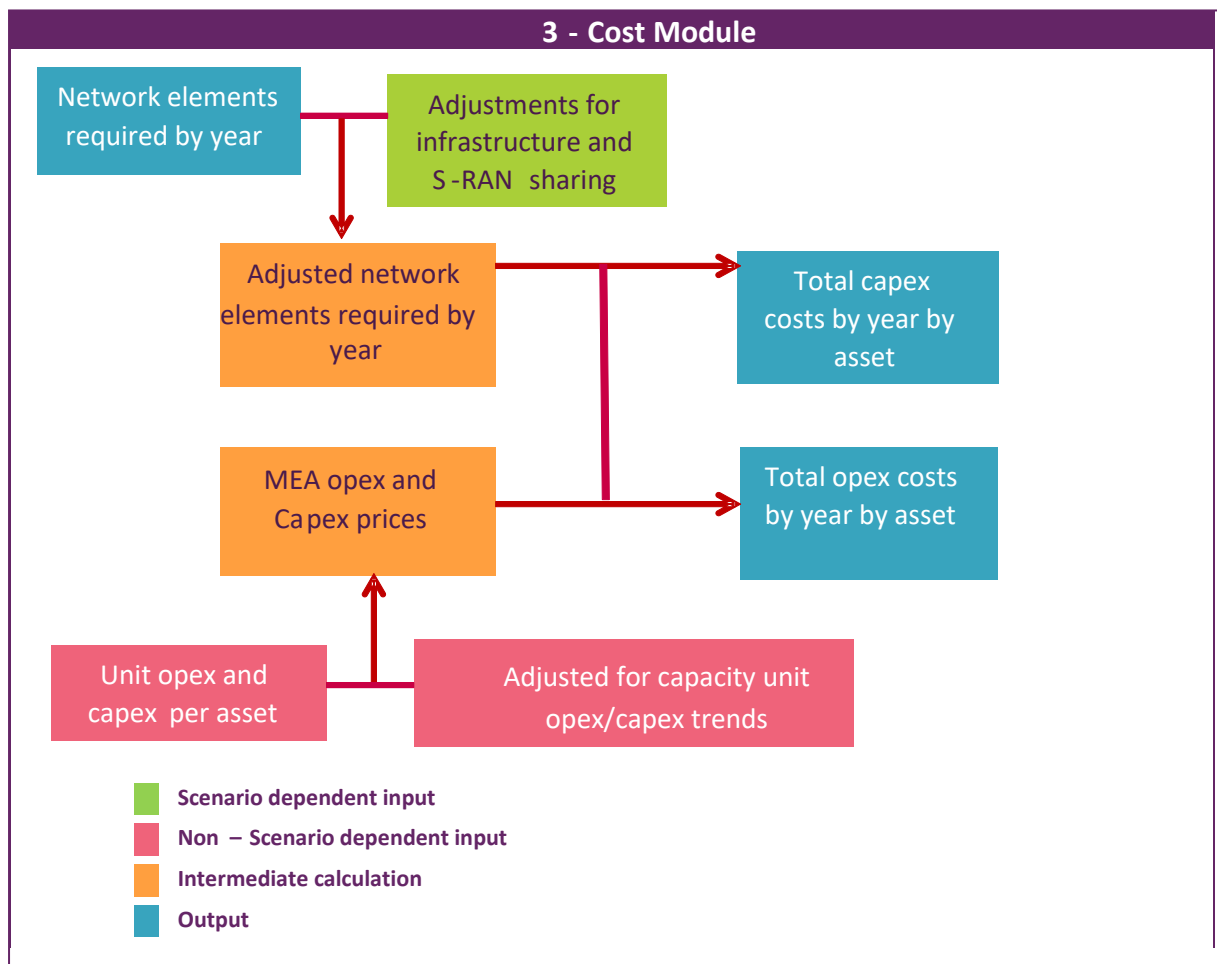
factor in determining radio equipment requirements are the assumptions made relating to the spectrum bandwidth and the spectrum holdings of the modelled mobile provider. The spectrum holdings and associated assumptions included in the 2018 MCT model are unchanged from the 2015 MCT model, as explained 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 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**

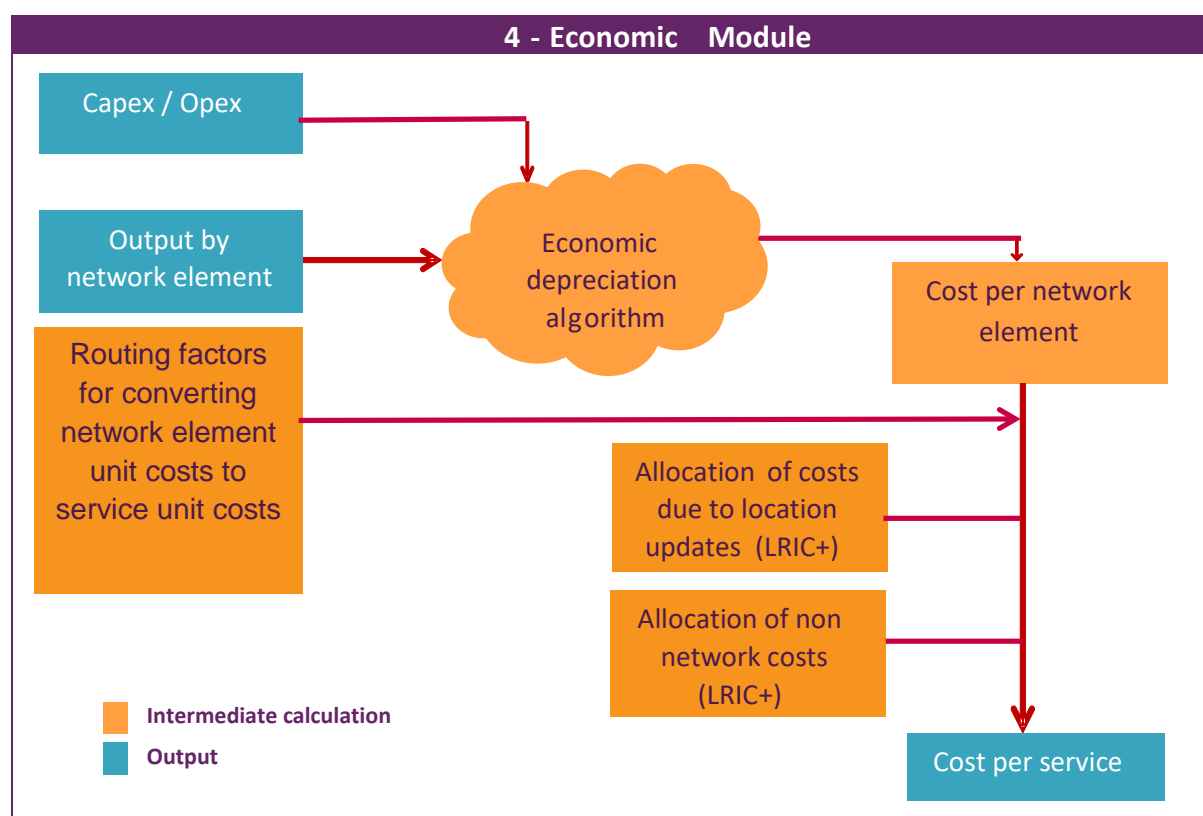


Source: Ofcom.

**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 2018 MCT model we have used the form of economic depreciation known as Original Economic Depreciation (Original ED), consistent with our previous MCT models since 2005.
- A9.74 We have continued 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.”<sup>155</sup>

- A9.75 Our 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.

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<sup>155</sup> 2009 EC Recommendation, point 7.

## A10. Cost of capital

### Introduction

A10.1 The weighted average cost of capital (WACC) is used as the discount rate in the 2018 MCT model. The 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.

A10.2 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). Using gearing,  $g$ , and corporate tax rate,  $t$ , the pre-tax WACC is defined as follows:<sup>156</sup>

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

A10.3 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 over the risk-free rate (i.e. the equity risk premium, or ERP) and the systematic risk of the company (i.e. equity beta,  $\beta_e$ ):

$$Ke = RFR + ERP * \beta_e$$

A10.4 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:

$$Kd = RFR + dp$$

A10.5 The pre-tax real WACC (with respect to CPI inflation) is obtained using the following formula:

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

A10.6 In the 2015 MCT Statement we used a pre-tax real WACC for an average efficient mobile provider of 7.0%. In the June 2017 Consultation we considered whether a pre-tax real WACC of 7.0% remained reasonable in light of parameter developments since the 2015 MCT Review.

A10.7 Following careful consideration of responses to the consultation, we adopt the same approach in this statement. The February 2018 WLA Statement published at the same time as this MCT statement has updated the market parameters consulted on in the March 2017 WLA Consultation. In line with our approach in the June 2017 Consultation we have used the same market parameters as those set out in our detailed examination of the cost of capital for the WLA review.

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<sup>156</sup> Debt finance benefits from a tax shield whereas equity does not

A10.8 As shown in Table A10.1, our view is that the pre-tax real WACC for an average efficient mobile provider would lie between 5.9% and 7.6% assuming a corporate tax rate of 17% and between 6.1% to 7.7% assuming a corporate tax rate of 19%.<sup>157</sup> The 7.0% pre-tax real WACC used in the 2015 MCT Statement lies comfortably within both these ranges. Therefore, we consider that the pre-tax real WACC of 7.0% used in the 2015 MCT model remains within the plausible range of values for an average efficient mobile provider.

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

| WACC component                      | Range assuming corporate tax of 17% |       | Range assuming corporate tax of 19% |       | Source  |
|-------------------------------------|-------------------------------------|-------|-------------------------------------|-------|---|
|                                     | Low                                 | High  | Low                                 | High  |   |
| Real RFR                            | 0.0%                                | 0.0%  | 0.0%                                | 0.0%  | February 2018 WLA Statement                   |
| RPI inflation                       | 3.3%                                | 3.3%  | 3.3%                                | 3.3%  | Ofcom estimate                                |
| Nominal RFR                         | 3.3%                                | 3.3%  | 3.3%                                | 3.3%  | $= (1 + \text{RFR}) * (1 + \text{RPI}) - 1$   |
| Real ERP                            | 6.1%                                | 6.1%  | 6.1%                                | 6.1%  | February 2018 WLA Statement                   |
| Nominal ERP                         | 6.3%                                | 6.3%  | 6.3%                                | 6.3%  | $= \text{ERP} * (1 + \text{RPI})$             |
| Debt beta ( $\beta_d$ )             | 0.10                                | 0.10  | 0.10                                | 0.10  | Ofcom estimate                                |
| Asset beta ( $\beta_a$ )            | 0.55                                | 0.75  | 0.55                                | 0.75  | Ofcom estimate                                |
| Gearing (forward looking) (g)       | 25%                                 | 50%   | 25%                                 | 50%   | Ofcom estimate                                |
| Equity Beta ( $\beta_e$ )           | 0.70                                | 1.40  | 0.70                                | 1.40  | $= (\beta_a - \beta_d * g) / (1 - g)$         |
| Cost of equity (post-tax) ( $K_e$ ) | 7.7%                                | 12.1% | 7.7%                                | 12.1% | $= \text{Nominal RFR} + \text{ERP} * \beta_e$ |
| Cost of equity (pre-tax)            | 9.3%                                | 14.6% | 9.5%                                | 15.0% | $= K_e / (1 - t)$                             |
| Debt premium (dp)                   | 1.0%                                | 1.5%  | 1.0%                                | 1.5%  | Ofcom estimate                                |
| Corporate tax rate (t)              | 17%                                 | 17%   | 19%                                 | 19%   | HMRC  |
| Cost of debt (pre-tax) ( $K_d$ )    | 4.3%                                | 4.8%  | 4.3%                                | 4.8%  | $= \text{Nominal RFR} + \text{dp}$            |

<sup>157</sup> As explained below, we have estimated a range for the asset beta and debt premium for an average efficient mobile provider and these drive the difference between the low case and high case shown in the table.



| WACC component                                  | Range assuming corporate tax of 17% |      | Range assuming corporate tax of 19% |      | Source   |
|---|-------------------------------------|------|-------------------------------------|------|--|
|   | Low                                 | High | Low                                 | High |  |
| WACC (pre-tax nominal)                          | 8.0%                                | 9.7% | 8.2%                                | 9.9% | $=(K_e*(1-g))/(1-t)+(K_d*g)$   |
| CPI   | 2.0%                                | 2.0% | 2.0%                                | 2.0% | Bank of England  |
| WACC (pre-tax real)                             | 5.9%                                | 7.6% | 6.1%                                | 7.7% | $= (1 + \text{pre-tax nominal WACC}) / (1 + \text{CPI inflation}) - 1$ |
| <b>Pre-tax real WACC used in this statement</b> | <b>7%</b>                           |      |                                     |      |  |

Note: The pre-tax nominal WACC is rounded to one decimal place but all intermediate calculations shown in the table are unrounded.

## 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. In the June 2017 Consultation we proposed to use the same values for these economy-wide parameters as in the March 2017 WLA Consultation. Since then we have published the February 2018 WLA Statement which sets out the updated estimates for these market parameters. We have used these updated parameters in this statement.

A10.10 We have used the following economy-wide parameters:

- **Real risk-free rate (RFR) of 0.0%:** In the February 2018 WLA Statement we reduced our estimate of the real RFR from 0.5% to 0.0%.<sup>158</sup> When combined with the RPI inflation forecast for this MCT review of 3.3% (see next sub-section), the nominal RFR would be 3.3%.<sup>159</sup>
- **Real equity risk premium (ERP) of 6.1%:** In the February 2018 WLA Statement we increased the real ERP from 5.5% to 6.1%.<sup>160</sup> Combined with the RPI inflation forecast for this statement of 3.3%, the nominal ERP would be 6.3%.
- **Corporate tax rate of 17%:** In the June 2017 Consultation we proposed 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 and is consistent with the 17% tax rate

<sup>158</sup> Annex 20, February 2018 WLA Statement.

<sup>159</sup> Using the Fisher equation where the nominal RFR =  $((1+RPI) \times (1 + \text{real RFR})) - 1$ .

<sup>160</sup> Annex 20, February 2018 WLA Statement.

proposed in the March 2017 WLA Consultation.<sup>161</sup> However, as noted in Section 5, BT/EE contended that we did not take into account that the corporate tax rate is currently 19% and is only expected to reduce to 17% from 1 April 2020.<sup>162, 163</sup> Notwithstanding the long run horizon of the 2018 MCT model, such that the corporate tax rate of 17% is relevant for more of the forward looking period modelled, we recognise that the corporate tax rate of 19% will apply for a significant proportion of the next charge control period of 2018/19 to 2020/21. Given this, we have considered the sensitivity of the WACC range using corporate tax rates of 17% and 19%. We do not consider that the corporate tax rate assumption would alter our decision to continue using a 7.0% real pre-tax WACC, since this value of 7.0% lies comfortably within the range for the WACC whichever corporate tax rate is used (see Table A10.1 above).

## Other WACC parameters

A10.11 No respondents to the June 2017 Consultation commented on our proposals for the other WACC parameters set out below. Because of our ongoing work on the WACC for the WLA review, we have taken the opportunity to update our analysis and have amended the forward-looking gearing range to 25% to 50% and reduced the upper end of the debt premium range from 2% to 1.5%. We do not consider that the updated analysis supports changing any of our other consultation proposals relating to RPI inflation or the asset beta range.

## RPI inflation

A10.12 Given the long-run horizon of the 2018 MCT model, which works in real terms with respect to CPI inflation, we have used a long-run forecast for the CPI inflation rate when estimating the WACC. We have used the Bank of England's target CPI inflation rate of 2% in our calculation of the real (CPI-deflated) WACC. However, we still need a long run estimate of RPI inflation as well as CPI inflation because the data used to inform our real RFR and ERP estimates is typically in real terms with respect to RPI (for example, index-linked gilts are linked to RPI and historical yields from the 2017 Yearbook are in real terms with respect to RPI for much of the period).

A10.13 Consistent with our proposal in the June 2017 Consultation, we have used 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

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<sup>161</sup> Paragraph A16.102, March 2017 WLA Consultation.

<sup>162</sup> 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%".

<https://www.gov.uk/government/publications/rates-and-allowances-corporation-tax/rates-and-allowances-corporation-tax>.

<sup>163</sup> Section 5, paragraph 5.39

the Bank of England published a 'long run' estimate of the wedge between RPI and CPI of 1.3%.<sup>164</sup> This implies an RPI forecast of around 3.3% based on long-run expectations.<sup>165</sup>

## Equity beta

A10.14 A company's equity beta measures the returns to shareholders relative to returns from the equity market as a whole. We 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

A10.15 One source to inform the appropriate asset beta range for an average efficient mobile provider is to look at trends in the asset betas for parent companies with significant interests in mobile businesses. In the June 2017 Consultation, we presented a range of estimates for UK and European comparator company asset betas.

A10.16 Another source of information is our work on the WACC for the WLA review. In the WLA review we have disaggregated the BT Group asset beta into three categories; Openreach copper access, Other UK telecoms and the Rest of BT. The Other UK telecoms asset beta captured BT's mobile activities and in light of our analysis in the WLA review, we proposed that a reasonable range for the asset beta for BT's Other UK telecoms activities was 0.55 to 0.75.

A10.17 In the June 2017 Consultation, we proposed that a reasonable asset beta range for an average efficient mobile provider in the UK would be 0.55 to 0.75. This was based on evidence from UK and European mobile operators and the asset beta range for BT's Other UK telecoms activities considered in the March 2017 WLA Consultation. No respondents specifically commented on this proposal.

A10.18 We consider that our approach in the June 2017 Consultation remains appropriate. Our analysis here is also supported by a report from NERA published in Annex 16 of this statement which considers the empirical evidence on the asset betas for mobile and fixed telecoms providers. NERA concludes that there is no evidence of a statistically significant difference in the asset betas between mobile and fixed telecoms operators.<sup>166</sup>

A10.19 Tables A10.2 and A10.3 show the 2-year asset betas estimated by NERA as at 29 September 2017 for the UK and European mobile providers considered in tables A10.2 and

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<sup>164</sup> Page 34, Bank of England, Inflation Report, February 2014.

<http://www.bankofengland.co.uk/publications/Documents/inflationreport/2014/ir14feb.pdf>. The Bank of England's November 2017 Financial Stability Report indicates that this remains the best estimate of the long run wedge: see the note under Chart A.23 of that report.

<sup>165</sup> 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.

<sup>166</sup> Page 17, Annex 16.

A10.3 of the June 2017 Consultation.<sup>167</sup> Asset betas have been calculated assuming a debt beta of 0.10 and average gearing over the preceding two years.<sup>168</sup> NERA concludes that the latest beta evidence does not indicate there has been a significant change in the betas of mobile comparators and finds no evidence that the range for mobile telecoms providers has changed since the June 2017 Consultation.<sup>169</sup>

**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 | 2-year average mobile revenue share |
|-------------------------|----------------|----------------|-----------------|------------------------|-------------------------------------|
| <b>BT Group</b>         | 0.78           | 0.86           | 0.63            | 26%                    | 10%                                 |
| <b>Vodafone</b>         | 0.60           | 0.52           | 0.37            | 42%                    | 64%                                 |
| <b>Telefónica Spain</b> | n/a            | 0.86           | 0.60            | 56%                    | 62%                                 |

Source: Table 2.1, Annex 16 (NERA report). BT's mobile operations represented around 20% of revenue in the year to March 2017 (see page 9 of BT's 2017 annual report). Over the last two years the proportion is lower since BT only acquired EE in January 2016.

**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 | 2-year average mobile revenue share |
|----------------------------|----------------------|-----------------------|------------------------|-------------------------------------|
| <b>Tele2</b>               | 0.82                 | 0.60                  | 24%                    | 76%                                 |
| <b>Telefónica Deutsche</b> | 0.86                 | 0.54                  | 14%                    | 87%                                 |

<sup>167</sup> Consistent with previous reviews we have placed the 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 statistically robust. Note that in the June 2017 Consultation we excluded CK Hutchison, the owner of H3G, from Table A10.2 because it is a diversified conglomerate operating across several sectors, including retail, ports and telecoms and we did not consider that its asset beta would convey useful information about an average efficient UK mobile provider.

<sup>168</sup> We used a debt beta of 0.10 in the 2015 MCT Statement, the 2016 BCMR Statement and the February 2018 WLA Statement. We would associate a higher debt beta with relatively higher debt premiums and gearing levels, and vice versa. Our view is that the gearing and debt premium assumptions proposed in this statement 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:

$$\beta_{asset} = \text{Gearing} * \beta_{debt} + (1 - \text{Gearing}) * \beta_{equity}$$

<sup>169</sup> Page 17, Annex 16.

|                         | All World Asset Beta | All Europe Asset Beta | 2-year average gearing | 2-year average mobile revenue share |
|-------------------------|----------------------|-----------------------|------------------------|-------------------------------------|
| <b>Telekom Austria</b>  | 0.42                 | 0.29                  | 43%                    | 64%                                 |
| <b>Ellisa</b>           | 0.75                 | 0.56                  | 17%                    | 63%                                 |
| <b>Orange Belgium</b>   | 0.51                 | 0.39                  | 25%                    | 82%                                 |
| <b>Telenor</b>          | 0.72                 | 0.51                  | 28%                    | 79%                                 |
| <b>Telia Co</b>         | 0.68                 | 0.49                  | 36%                    | 46%                                 |
| <b>Deutsche Telekom</b> | 0.69                 | 0.42                  | 46%                    | 60%                                 |
| <b>Minimum</b>          | 0.42                 | 0.29                  | 14%                    | 46%                                 |
| <b>Maximum</b>          | 0.86                 | 0.60                  | 46%                    | 87%                                 |
| <b>Average</b>          | 0.68                 | 0.48                  | 29%                    | 70%                                 |

Source: Table 2.2, Annex 16 (NERA report). Note that according to Bloomberg, Telia Co's mobile revenue share in the year to December 2016 was 55%, excluding equipment sales.

A10.20 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. However, the only companies for which we have asset beta estimates against the FTSE All Share are BT Group and Vodafone. Of these two, BT is more UK focused but has a modest proportion of revenues from mobile (c.10% over the last two years, 20% in the last financial year), whereas Vodafone has significant mobile revenues (64%) but its UK revenues are small (around 15%<sup>170</sup>). Both are therefore candidate, but imperfect, comparators for a "pure" UK mobile provider.

A10.21 Before relying on these asset beta estimates for BT and Vodafone, it is helpful to consider how they compare to European mobile comparators. When expressed on the basis of a consistent index, we can see that BT's asset beta (0.86 against the All World) lies at the top of the range of European mobile comparators (0.86 against the All World). Vodafone's asset beta (0.52 against the All World) lies towards the bottom of the European mobile comparator range (0.42 against the All World). The average asset beta for BT and Vodafone against the All World is 0.69, and the average asset beta for the European mobile

<sup>170</sup> Derived from Vodafone Group Plc Annual Report 2017, page 110. Available at:

[http://www.vodafone.com/content/annualreport/annual\\_report17/downloads/Vodafone-full-annual-report-2017.pdf](http://www.vodafone.com/content/annualreport/annual_report17/downloads/Vodafone-full-annual-report-2017.pdf)

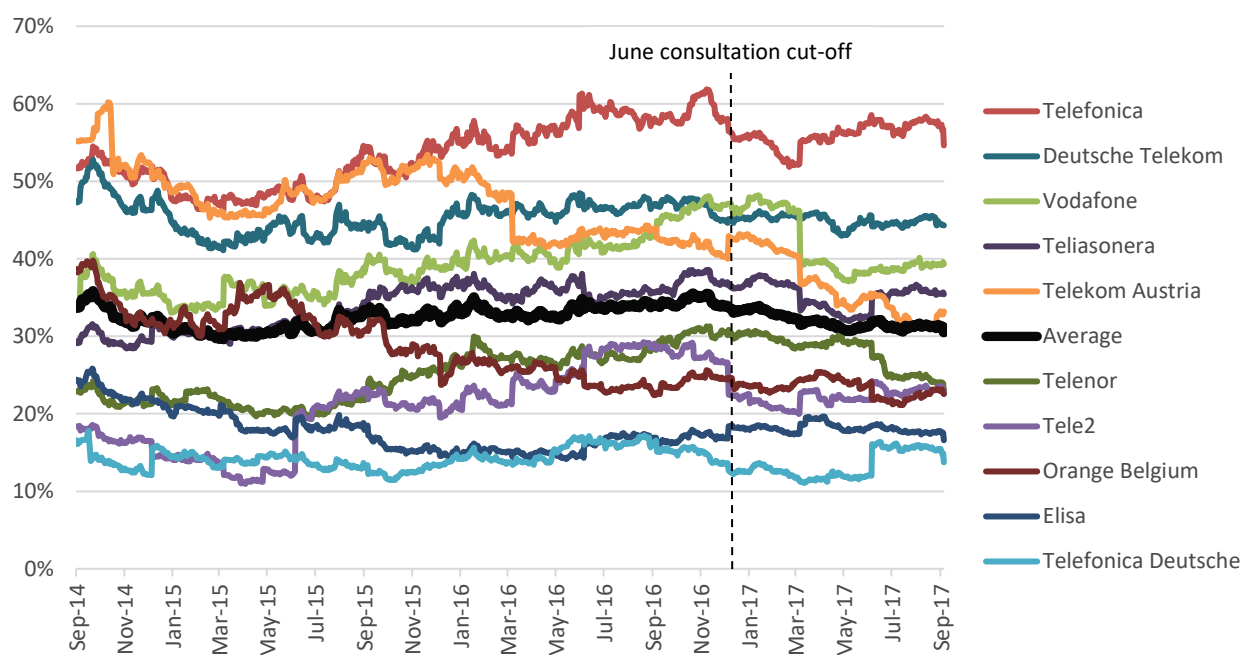
comparators (excluding Telefónica Spain) is 0.68 against the All World Index (including Telefónica the average is 0.70). These results suggest that the asset beta range for the UK-listed mobile providers (BT and Vodafone) is likely to encompass the range of systematic risk if we broaden the sample to include the European mobile comparators. The Vodafone and BT asset beta range of 0.60 to 0.78 expressed on the basis of their “home” index (i.e. the FTSE All Share) overlaps closely with the “other UK telecoms” asset beta range of 0.55 to 0.75 used in the WLA review, suggesting little reason to change that range for the purposes of the MCT review.

- A10.22 This is consistent with NERA’s findings in Annex 16 that asset betas for mobile operators are similar to those for fixed operators. Therefore, we conclude that it would be reasonable to apply an asset range of 0.55 to 0.75 to an average efficient mobile provider in the UK.

### Forward-looking gearing

- A10.23 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. In the June 2017 Consultation, we proposed a forward-looking gearing of 35% based on analysis of gearing of UK and European mobile providers using data up to December 2016.
- A10.24 As shown in Tables A10.2 and A10.3, the 2-year average gearing for European mobile providers in the two years to 29 September 2017 ranges from 14% to 46%, averaging 29% across all providers. For Vodafone and Telefónica Spain (the only two listed UK providers which are predominantly engaged in mobile activities) the 2-year average gearing is slightly higher at 42% and 56% respectively.
- A10.25 Figure A10.1 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 55% based on the most recent data) the daily average has been reasonably stable at around 30% to 35% in the last three years.

### Figure A10.1 Daily gearing of UK and European mobile providers



Source: NERA. Note the above chart displays the daily gearing while Tables A10.2 and A10.3 show the average gearing over a 2-year period. The June 2017 Consultation cut-off was 31 December 2016.

A10.26 We consider that a forward-looking gearing range of 25% to 50% would be appropriate to apply to an average efficient mobile provider. This range captures the range of variation for the majority of UK and European mobile comparators shown in Figure A10.2. In addition, given that NERA concludes in Annex 16 that there is no evidence of a statistically significant difference in the systematic risk between mobile and fixed telecoms providers, we consider that it would be appropriate to use a forward-looking gearing consistent with the WLA review, where we also use a range of 25% to 50%.

A10.27 Therefore, we use a forward-looking gearing range of 25% to 50% for an average efficient mobile provider.

### Estimate of forward-looking equity beta

A10.28 Combining an asset beta range of 0.55 to 0.75, a forward-looking gearing range of 25% to 50% and a debt beta of 0.1 we derive a forward-looking equity beta for an average efficient mobile provider of 0.70 to 1.40.

### Debt premium

A10.29 In estimating the nominal cost of debt for an average efficient mobile provider, our approach involves summing together two parameters:

- the nominal RFR; and
- the debt premium (representing 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 29 December 2017, five of the seven mobile providers rated by S&P have a rating of 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 3 to 18 years. This analysis is consistent with that presented in the June 2017 Consultation.

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

|                           | Credit rating | Average debt maturity |
|---------------------------|---------------|-----------------------|
| <b>Telenor</b>            | A             | 3.5                   |
| <b>Telia Co</b>           | A-            | 18.1                  |
| <b>Deutsche Telekom</b>   | BBB+          | 7.0                   |
| <b>Vodafone</b>           | BBB+          | 8.6                   |
| <b>Elisa OYJ</b>          | BBB+          | 4.2                   |
| <b>Telefónica Spain</b>   | BBB           | 7.2                   |
| <b>Telekom Austria</b>    | BBB           | 11.2                  |
| <b>Tele 2</b>             | n/a           | 3.9                   |
| <b>Telefónica Germany</b> | n/a           | 7.2                   |
| <b>Orange Belgium</b>     | n/a           | 7.7                   |
| <b>Average</b>            | BBB+          | 7.9                   |

Source: S&P, Bloomberg, Ofcom analysis. n/a represents no rating on S&P. For the credit rating the average represents the mode while for the average debt maturity the average represents the mean.

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 June 2017 Consultation we proposed a debt premium range of 1.0% to 2.0%. Updating this analysis to 29 December 2017, over the last year, the 5-year BBB index spread has ranged from 0.9% to 1.2% (1.0% to 1.1% interquartile) with an average of 1.1% and the 10-year BBB index spread has ranged from 1.2% to 1.4% (1.2% to 1.3% inter-quartile) with an average of 1.3%. Over the last two years the 5-year BBB index spread has ranged from 0.9% to 2.1% (1.1% to 1.3% inter-quartile), with an average of 1.2% and the



10-year BBB index spread has ranged from 1.1% to 2.4% (1.2% to 1.5% inter-quartile) with an average of 1.4%.<sup>171</sup>

- A10.32 Given the uncertainty around the exact credit rating and debt profile of an average efficient mobile provider, we consider that the updated evidence from the inter-quartile range for spreads on 5 and 10-year BBB bonds would support a debt premium range of 1.0% to 1.5%. This range captures the interquartile ranges of the spread on 5 and 10-year BBB corporate bonds over the last one and two years (1.0% to 1.3% over the last year and 1.1% to 1.5% over the last two years).<sup>172</sup>
- A10.33 We have further considered the spreads on a sample of sterling debt held by the UK mobile providers (in Table A10.5) with a similar average debt maturity to the mobile providers from Table A10.4 (i.e. around 8 years).
- A10.34 Table A10.5 shows that the one-year average spreads on these sterling bonds fall within the range of 1.0% to 1.5% identified above. The two-year average spread on the BT, Vodafone and Telefónica 2022 bonds falls within the range whilst the two-year average spread on the Telefónica 2026 bond is slightly outside the range, possibly reflecting Telefónica's lower credit rating. We consider that this analysis is consistent with a debt premium range of 1% to 1.5%.

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

| Bond and maturity date | Debt maturity in years as at 29 December 2017 | Debt premium (one-year average) | Debt premium (two-year average) |
|------------------------|---|---------------------------------|---------------------------------|
| Vodafone 2025          | 8   | 1.3%                            | 1.5%                            |
| Telefónica Spain 2022  | 5   | 1.3%                            | 1.5%                            |
| Telefónica Spain 2026  | 8   | 1.5%                            | 1.6%                            |
| BT Group 2028          | 11  | 1.3%                            | 1.3%                            |

Source: Bloomberg, Ofcom analysis. Debt premium is derived from the average spread over gilts to 29 December 2017. We have selected bonds with an average maturity close to 8 years.

## WACC estimate

- A10.35 Table A10.6 sets out the range of estimates of the pre-tax real WACC for an average efficient mobile provider, and shows the sensitivity of the range to the corporate tax rate assumption. Based on this updated range, we consider that the 2015 MCT pre-tax real WACC of 7.0% remains appropriate.

<sup>171</sup> Source: Bloomberg, Ofcom analysis

<sup>172</sup> Referencing inter quartile ranges avoids placing weight on the highest and lowest spreads over the period.

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

|                               | Range assuming corporate tax rate of 17% |      | Range assuming corporate tax rate of 19% |      |
|-------------------------------|--|------|--|------|
|                               | Low                                      | High | Low                                      | High |
| <b>WACC (pre-tax nominal)</b> | 8.0%                                     | 9.7% | 8.2%                                     | 9.9% |
| <b>WACC (pre-tax real)</b>    | 5.9%                                     | 7.6% | 6.1%                                     | 7.7% |

Source: Ofcom analysis. Pre-tax real estimates are real with respect to CPI.

# A11. Model output and sensitivities

## Introduction

- A11.1 This annex summarises the results of the 2018 MCT model under a base case scenario and under a range of alternative scenarios in order to provide a sensitivity analysis. We also constructed high and low scenarios that show the range for the efficient unit costs of MCT.
- A11.2 The contents of this annex are unchanged from the June 2017 Consultation, and it 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.
- A11.3 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

- A11.4 The base case scenario of the 2018 MCT model used the following key assumptions and inputs, which are unchanged from the 2015 MCT model:<sup>173</sup>
- 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<sup>174</sup>);
  - 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.

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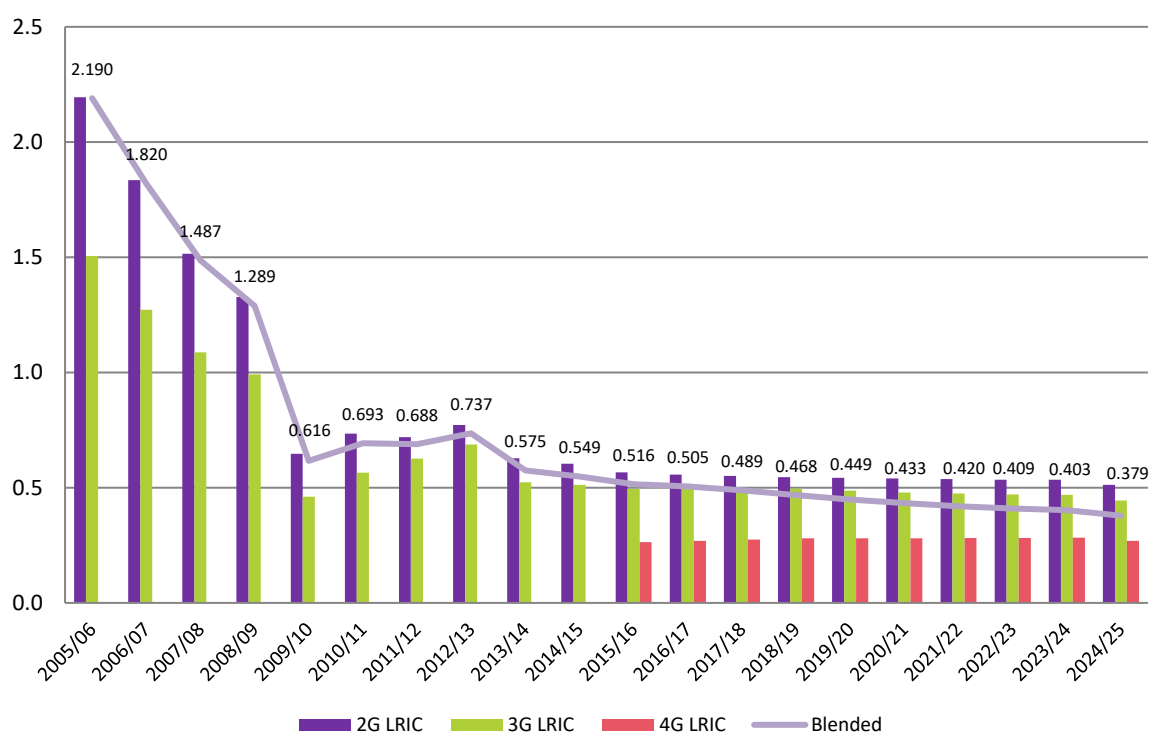
<sup>173</sup> A full list of the assumptions used in the base case can be found on the ‘Scenario’ sheet of the ‘Scenario Control’ module of the model.

<sup>174</sup> 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.

## Results

A11.5 The base case LRIC unit costs of 2G, 3G, 4G and blended LRIC of MCT are shown in Figure A11.1 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 A11.1: LRIC of MCT (ppm, real 2015/16 prices)**



Source: 2018 MCT model.

A11.6 Figure A11.1 shows that the blended unit cost of MCT is generally declining over time and, as we would expect, would follow the pattern set by the 2015 MCT model.<sup>175</sup> 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

A11.7 Below we report the results of a range of sensitivity tests, these show the impact on the results of the 2018 MCT model by flexing model inputs such as the demand inputs, the WACC and cost trends. We also combined these sensitivities to produce overall high and low unit cost scenarios.

<sup>175</sup> See Section 12 and in particular Figure A12.1 of the 2015 MCT Statement.

## Demand assumptions

A11.8 As explained in Annex 9, we tested the 2018 MCT model and the base case traffic volumes from the 2015 MCT model. Nevertheless, we considered it appropriate to test and demonstrate the sensitivity of the model to changes in demand assumptions. For the demand assumptions we 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.

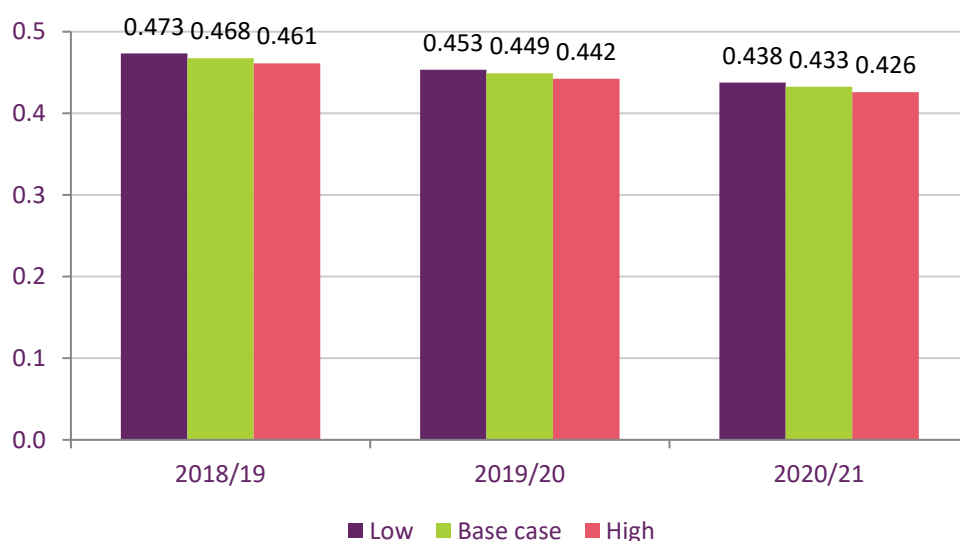
A11.9 In order to construct these scenarios, we drew on the sensitivity analysis performed for the 2015 MCT Statement. Since we maintain the base case assumptions from the 2015 MCT model this effectively means shifting the point at which the low and high projections branch off from the base case from Q2 2014 to Q4 2016.

A11.10 These changes were 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 merged the changes in the main demand parameters to create combined high and low demand scenarios.

### Handset penetration

A11.11 The impact of varying our handset penetration assumption on the blended LRIC of MCT is shown in Figure A11.2 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 A11.2: Sensitivity of handset penetration on the blended LRIC of MCT (ppm, 2015/16 prices)**

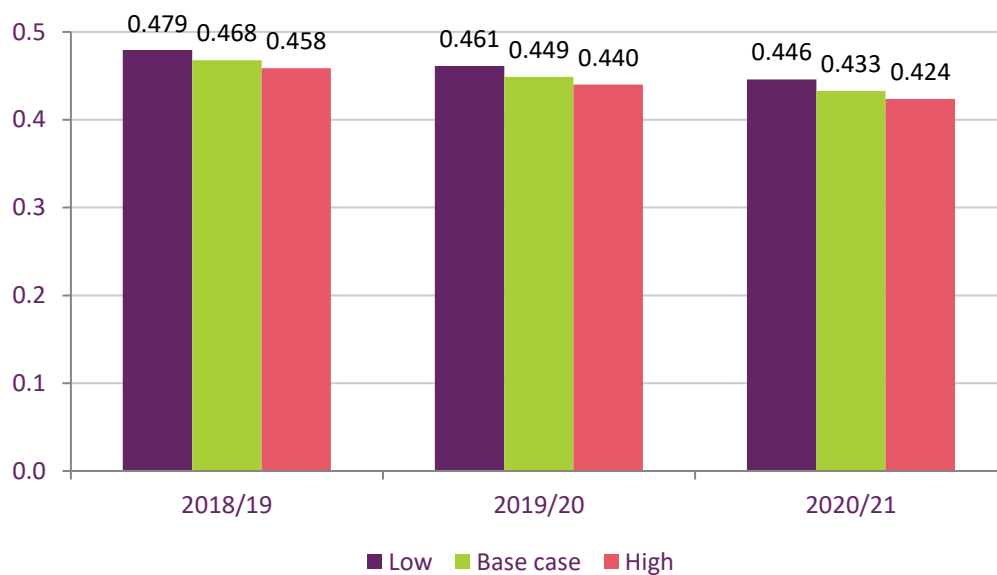


Source: 2018 MCT model.

### Voice usage

A11.12 The effect of varying voice usage assumptions on the blended LRIC of MCT is shown in Figure A11.3 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.

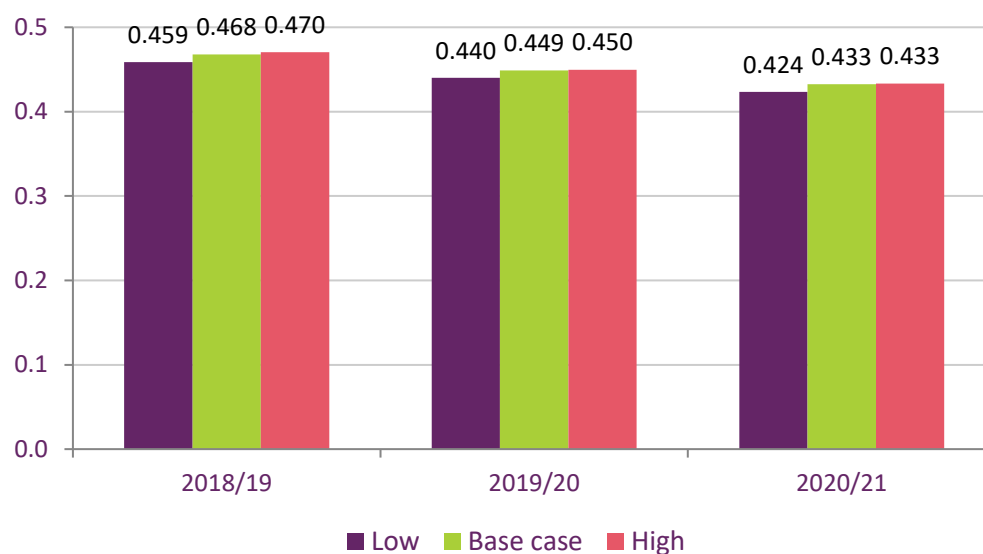
**Figure A11.3: Sensitivity of voice usage on the blended LRIC of MCT (ppm, 2015/16 prices)**



Source: 2018 MCT model.

### Data usage

A11.13 The impact of varying data usage assumptions on the LRIC of MCT is shown in Figure A11.4 below. Compared to the base case blended LRIC results, lower data usage would lead to a slightly lower LRIC and higher data usage to slightly higher LRIC in each year of the charge control.

**Figure A11.4: Sensitivity of data usage on the blended LRIC of MCT (ppm, 2015/16 prices)**

Source: 2018 MCT model.

- A11.14 This is a counterintuitive result and we investigated its causes, which related to the assets that are incremental to termination being negative. In common with previous MCT models, in this case it was primarily backhaul assets of different speeds and types that gave 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<sup>176</sup> and the Competition Commission in its 2012 Determination,<sup>177</sup> calculating LRIC using a decremental approach and economic depreciation can result in seemingly counterintuitive unit cost effects.
- A11.15 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 20% to 40% higher than those in the base case in 2020/21. Despite this the impact on the results was almost negligible, so the model is relatively insensitive to changes in this assumption.

### Combined demand scenarios

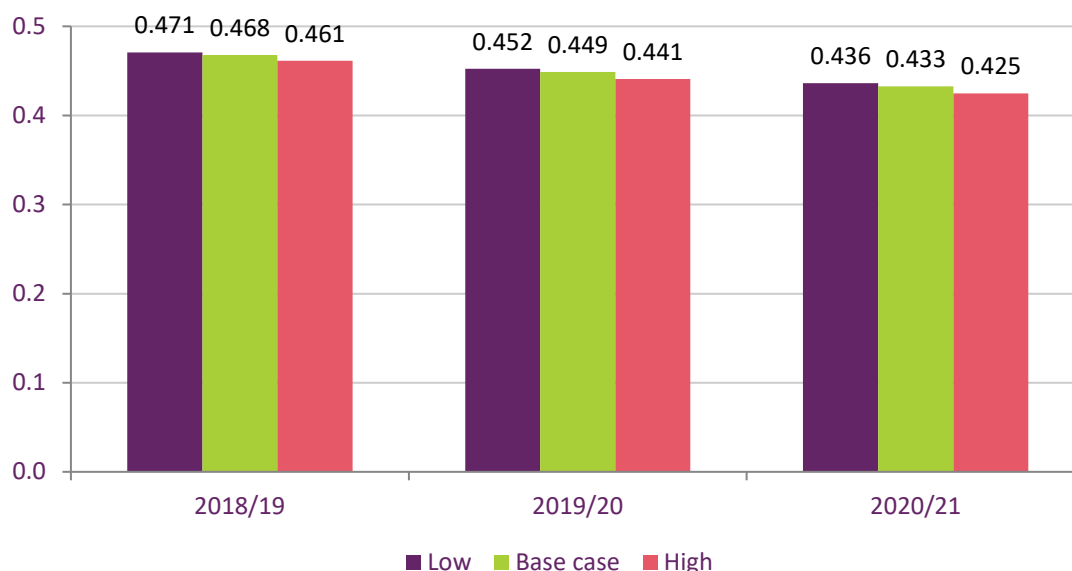
- A11.16 The impact of varying the demand parameters above in a combined manner is shown in Figure A11.5 below. This shows that the impact of our combined low demand forecasts on the blended LRIC of MCT would be to increase it in all years of the charge control, relative to the base case. The corresponding combined high demand forecasts have the effect of reducing the LRIC of MCT.
- A11.17 Quantifying the sensitivity of the model when multiple parameters are being changed was 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

<sup>176</sup> See paragraphs A7.274 to A7.282.

<sup>177</sup> 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](http://www.catribunal.org.uk/files/1.1180-83_MCT_Determination_Excised_090212.pdf).

case and yet produced 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 A11.5: Sensitivity of combined low and high demand forecasts on the blended LRIC (ppm, 2015/16 prices)**



Source: 2018 MCT model.

## WACC and cost trend assumptions

A11.18 We next tested the sensitivity of the model results to non-demand assumptions and inputs, as follows:

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

A11.19 As above, these changes were 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 combined these sensitivities with the demand sensitivities to create combined scenarios.

### WACC

A11.20 The impact on the blended LRIC results of varying the WACC is shown in Figure A11.6 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%) produced 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 changed by less than 9% in 2020/21.



**Figure A11.6: Sensitivity of changing the WACC on the blended LRIC of MCT (ppm, 2015/16 prices)**



Source: 2018 MCT model.

### Cost trends

A11.21 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.<sup>178</sup> We also used this functionality to test the sensitivity of the model to changes in unit cost assumptions and repeated this test for the 2018 MCT model using the values shown in Table A11.1 below.

<sup>178</sup> 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 A11.1: 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: 2018 MCT model.

A11.22 To give an example, compared to the base case the low case assumption resulted in a GBV (excluding 4G costs and spectrum) in 2020/21 that was 13% lower. The impact on the blended LRIC of varying the cost trends using the inputs in Table A11.1 is shown in Figure A11.7 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 A11.7: Sensitivity analysis of changing equipment cost trends on the blended LRIC of MCT (ppm, 2015/16 prices)**

Source: 2018 MCT model.

## Base, high and low scenario: Summary of outputs

A11.23 In order to show the sensitivity of the 2018 MCT model to further combinations of parameter changes we used 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 have made our decisions in setting the caps in the charge control.

A11.24 The composition of these combined scenarios is shown in Table A11.2 below.

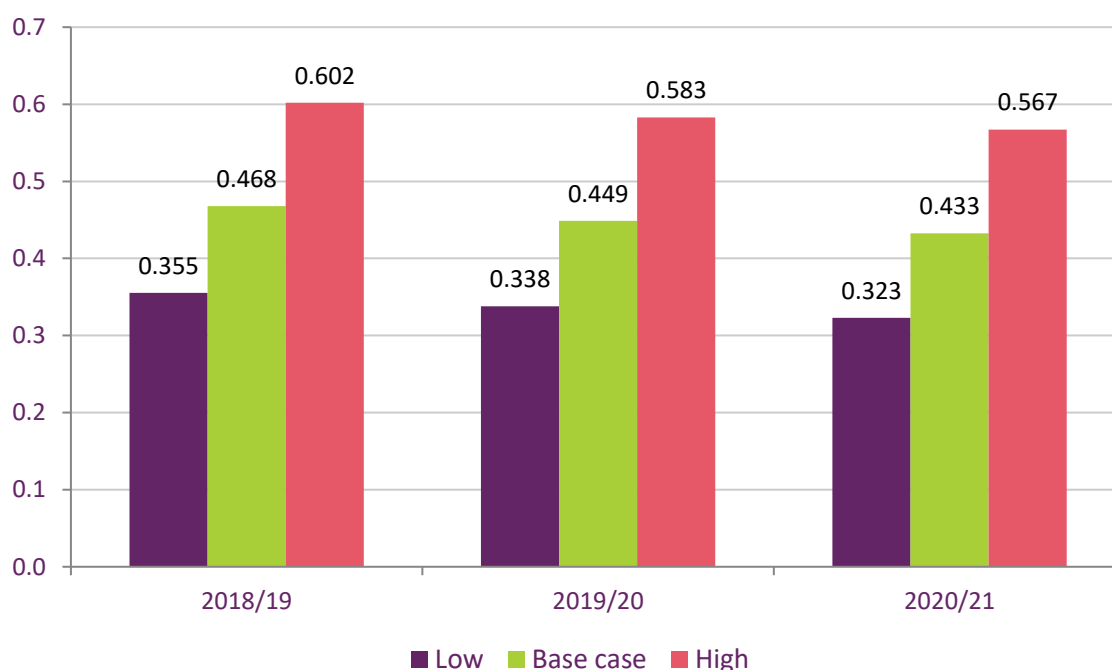
**Table A11.2: Assumptions used in the base case, high equipment cost and low equipment cost scenarios**

|                 | 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.

A11.25 The resulting LRIC unit costs under these combined scenarios are shown in Figure A11.8 below.

**Figure A11.8: Sensitivity analysis for combined low and high cost scenarios on the blended LRIC (ppm, 2015/16 prices)**



Source: 2018 MCT model.

## A12. List of MCT providers with SMP

| MCT provider designated with SMP  | Mobile number range/s allocated by Ofcom       |
|-----------------------------------|--|
| (AQ) Ltd                          | 75207  |
| 08Direct Ltd                      | 74068  |
| 24 Seven Communications Ltd       | 74066, 78931, 79112, 79118                     |
| Ace Call Ltd                      | 74186  |
| Airwave Solutions Ltd             | 74584, 77530                                   |
| Andrews & Arnold Ltd              | 74411  |
| Anywhere Sim Ltd                  | 73699  |
| AQL Wholesale Ltd                 | 78224, 78226, 78938                            |
| Bellingham Telecommunications Ltd | 74181  |
| BT OnePhone Ltd                   | 75201  |
| CFL Communications Ltd            | 75377  |
| Citrus Telecommunications Ltd     | 78939, 78744                                   |
| Cloud9 Mobile Communications Ltd  | 074409, 077000, 078722, 079245, 079782, 079783 |
| Compatel Ltd                      | 74653  |
| Confabulate Ltd                   | 75595  |
| Core Communication Services Ltd   | 75204, 7744(2-9), 7755(2-5)                    |
| Core Telecom Ltd                  | 74418, 74172, 74179, 75597                     |
| EE Ltd                            | Numbers in the 73, 74, 75, 77, 78 and 79 range |
| Esindex Ltd                       | 75205  |
| Flexitel Ltd                      | 78220, 78925                                   |
| Gamma Telecom Holdings Ltd        | 74580, 74581                                   |

| MCT provider designated with SMP  | Mobile number range/s allocated by Ofcom                       |
|---|--|
| Global Reach Networks Ltd   | 74655  |
| Globecom International Ltd  | 75593  |
| Globetouch AB   | 74880  |
| Hanhaa Ltd  | 73896  |
| Hutchison 3G UK Ltd   | Numbers in the 73, 74, 75, 77, 78 and 79 ranges                |
| IPV6 Ltd  | 75592  |
| IV Response Ltd   | 79789  |
| JT (Jersey) Ltd   | 7509(0-7), 7797(7-9), 7937                                     |
| Lanonyx Telecom Ltd   | 74886  |
| Lycamobile UK Ltd   | 7404, 7405, 7417(3-5), 7424, 7438, 7440(0-7), 7448, 7459, 7466 |
| Magrathea Telecommunications Ltd  | 78930  |
| Mars Communications Ltd   | 75590  |
| Mobile FX Services Ltd  | 75580  |
| Mobiweb Telecom Ltd   | 75329  |
| Nationwide Telephone Assistance Ltd   | 77001  |
| Nodemax Ltd   | 75598  |
| Premium Routing GmbH  | 74582  |
| QX Telecom Ltd  | 79781  |
| Resilient Plc   | 75599  |
| Secretary of State for the Foreign and Commonwealth Office in respect of the National Cyber Security Centre | 74881  |
| Secretary of State for the Home Office  | 73900  |

| MCT provider designated with SMP  | Mobile number range/s allocated by Ofcom  |
|-----------------------------------|---|
| Simwood eSMS Ltd                  | 75200   |
| Sky UK Ltd                        | 7488(2-3), 7368(2-3)  |
| Sound Advertising Ltd             | 74410, 75376  |
| Spacetel UK Ltd                   | 74577   |
| Stour Marine Ltd                  | 74413, 75371  |
| Swiftnet Ltd                      | 78221, 75373  |
| Synectiv Ltd                      | 7441(5, 7)  |
| Telecom2 Ltd                      | 74065   |
| Telecom 10 Ltd                    | 78727   |
| Telecom Cloud Networks Ltd        | 74408   |
| Telecom North America Mobile Inc. | 74185   |
| Teleena UK Ltd                    | 73680, 7418(7, 9)   |
| Telefónica UK Ltd                 | Numbers in the 71, 73, 74, 75, 77, 78 and 79 ranges                                   |
| Telet Research (N.I.) Ltd         | 73690   |
| Test2date B.V                     | 75898   |
| TGL Services (UK) Ltd             | 74067, 74182  |
| Tismi BV                          | 74183, 74414, 75206, 74512  |
| Truphone Ltd                      | 7408(0-2, 8-9), 74178, 75594, 79788   |
| Vectone Mobile Ltd                | 75202, 7451(0-1), 7451(3-4), 7451(8-9), 7457(0-3), 74575, 7465(0-1), 7589(4-7), 78921 |
| Virgin Mobile Telecoms Ltd        | 7305, 7306, 74583   |
| Vodafone Ltd                      | Numbers in the 73, 74, 75, 77, 78 and 79 ranges                                       |
| Voicetec Systems Ltd              | 74574   |

| MCT provider designated with SMP | Mobile number range/s allocated by Ofcom |
|----------------------------------|--|
| Voxbone SA                       | 74419                                    |
| Wavecrest (UK) Ltd               | 75370                                    |
| X-Mobility Ltd                   | 73780, 7458(7-8)                         |
| Ziron (UK) Ltd                   | 74888                                    |

## A13. How voice calls are delivered

- A13.1 There are many ways to deliver voice calls to a mobile handset, as handsets are increasingly becoming capable of making or receiving voice calls through various radio technologies. Below we describe the typical architecture used to carry voice calls over mobile networks and how this differs in the case of OTT and hybrid voice services. The network architecture is described at a high level, together with examples of the call path through the voice network.
- A13.2 Traditionally voice calls have been carried over public switched telephone networks (PSTNs) using circuit switched (CS) technology.<sup>179</sup> In CS networks the communication takes place over a dedicated circuit and as such the call quality can be fully controlled. Recently, some MCT providers have started using packet switched (PS) networks to carry voice. PS networks differ from CS networks in that they group all transmitted data – regardless of content, type, or structure – into suitably sized blocks, called packets, which are routed independently of their respective destinations. This means that in a PS voice call there is no single dedicated network path reserved for the call but, instead, various paths can be used in parallel while other services such as video or data may be carried over the same paths. A PS voice call is typically carried over Internet Protocol (IP) and more commonly referred to as a Voice over IP (VoIP) call.
- A13.3 When a PS voice call is used by MCT providers on managed networks the quality of service (QoS) of the call can be controlled. However, a PS call, in the form of VoIP, can also be delivered through an OTT service whereby the voice packets are carried over an existing data connection provided by a third party. Typically, the underlying data network will provide no prioritisation for the OTT voice packets relative to other data packets and so the OTT voice QoS cannot be guaranteed.
- A13.4 Typically, 2G and 3G technologies carry voice calls over a CS network, however 4G is a PS-only network which does not intrinsically support CS calls.<sup>180</sup> MCT providers have mainly been using circuit switched fall back (CSFB) where handsets are instructed to switch from 4G to 3G or 2G when making or receiving voice calls. Since the last review, some MCT providers have launched voice over 4G using the technology of Voice over LTE (VoLTE). MCT providers are also able to originate and terminate a call using Voice over WiFi (VoWiFi), in which case they do not use a 2G, 3G, or 4G RAN.
- A13.5 Figure A13.1 shows a simplified view of the call paths in both traditional PSTN networks and OTT services. An MTR is levied when a call is routed via a PSTN terminating switch.

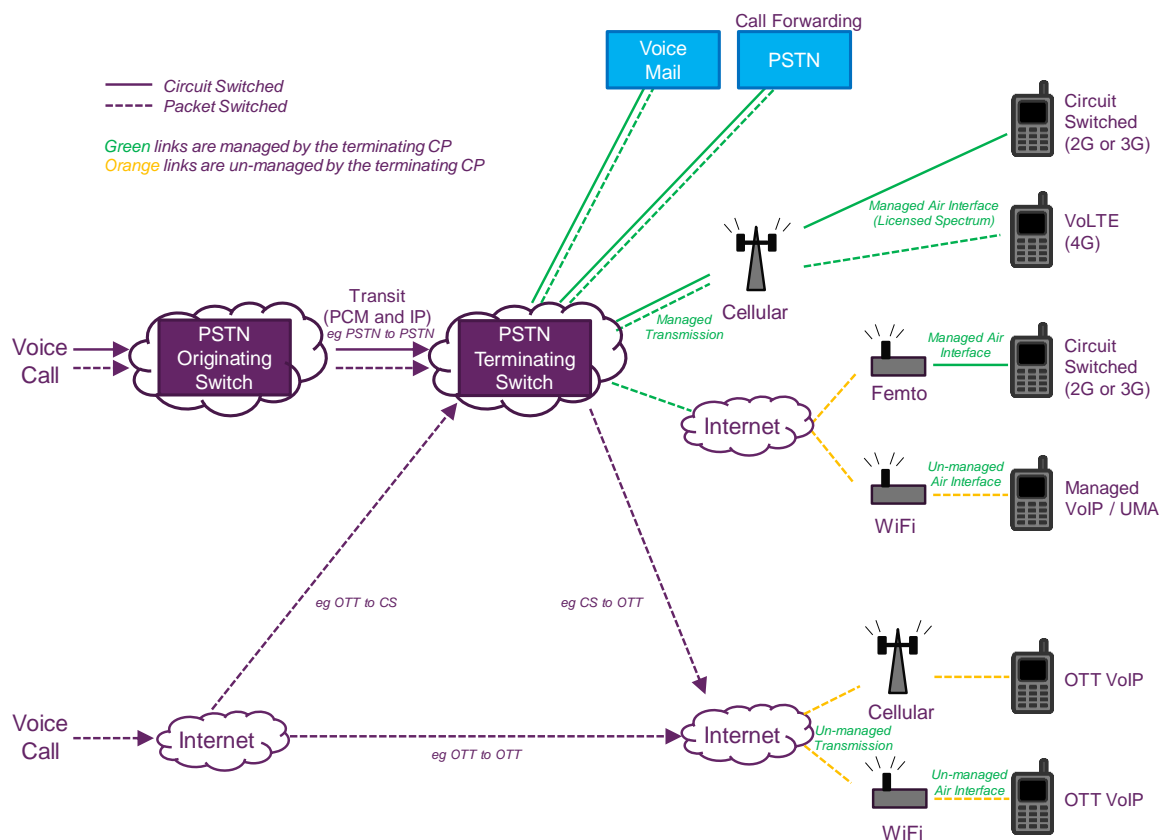
### Figure A13.1: Simplified PSTN and OTT Architecture

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<sup>179</sup> A Public Switched Telephone Network (PSTN) refers to a 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.

<sup>180</sup> 4G can be used to indicate technologies such as LTE and WiMAX, however LTE is the predominant 4G technology used in the UK. As such, where 4G is referred to in this document, we mean LTE unless otherwise specified.





Source: Ofcom.

A13.6 As shown in Figure A13.1 (left part), calls to UK mobile numbers<sup>181</sup> can be originated either on a PSTN or over the Internet. The call can then be delivered using a variety of different technologies (right part). These include (from top to bottom of the picture):

- *By forwarding to another PSTN or voice mail.*
- *Over a traditional cellular network (CS or PS) to a mobile handset with a SIM card.*

If the destination handset is attached via a SIM card to the terminating MCT provider’s cellular network, then the voice call can be routed over the cellular network. Typically, the network links used for terminating these calls will be fully managed by the provider at all times.

- *Over the internet via a femtocell to a mobile handset with a SIM card.<sup>182</sup>*

<sup>181</sup> Note that not all mobile numbers are allocated for use in the UK. Some are allocated to mobile providers providing services to customers in the Channel Islands and Isle of Man.

<sup>182</sup> A femtocell is a small low power cellular base station. Femtocells are typically used inside buildings and are connected to a broadband line.

In this situation, the network between the terminating MCT provider and the femtocell may not be managed by the terminating MCT provider, so it may not be possible to fully control the QoS of the voice call.

- *Over the internet via VoWiFi to a mobile handset with a SIM card.*

VoWiFi which delivers voice calls over WiFi connectivity is available. Similar to the femtocell scenario above, the MCT provider may not be able to fully control the QoS of the voice call when the call is delivered over a broadband network not directly managed by the same MCT provider.

- *Over the internet to a mobile handset using an application.*

Mobile providers may offer an application for use on smartphones and tablets in which the application receives a voice call if the device is connected to the internet, for example over WiFi. In this situation the call is made to a mobile number and the terminating switch directs the call over the internet as an OTT service.

## **Calls originating over the internet and terminating on a mobile PSTN**

A13.7 VoIP calls originating over the internet and terminating on a mobile PSTN are known as 'VoIP Out' services and can be terminated to a UK mobile number. Examples of these services include Skype calls to mobile numbers, BT's SmartTalk, and various SIP based applications.<sup>183</sup> These calls are carried as OTT VoIP until they reach an IP/PSTN gateway from where they are carried as a PSTN managed voice call to the terminating switch. The terminating PSTN switch can terminate the call in any of the ways described above. For these type of calls (which are to a UK mobile number), the terminating MCT provider charges an MTR.

## **Calls carried over the Internet not involving a UK mobile number (OTT VoIP)**

A13.8 VoIP calls originating over the internet and terminating via the internet without using telephone numbers are known as OTT VoIP services. Such calls are not terminated to a UK mobile number and as such we are not aware of them incurring a termination rate. The whole voice path is OTT via third party IP providers and so, as with any OTT service, the call quality cannot be fully managed or guaranteed. Examples of these services include Skype over the Internet, Viber and Facetime.

## **Calls originating over a PSTN and terminating via the Internet**

A13.9 'VoIP In' refers to services which allow voice calls originating on a PSTN to be received via VoIP over the Internet. Such calls will pass to a PSTN terminating switch and from there to a PSTN/IP gateway where they are converted to OTT VoIP. Examples of these services

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<sup>183</sup> Session Initiation Protocol (SIP) is a signalling protocol that is commonly used for calls over IP networks.

include Skype and various SIP based applications. The call is routed to the terminating switch using a telephone number and either a fixed or mobile termination rate may apply depending on the type of number used.

## A14. Sources of Evidence

- A14.1 We have noted throughout this statement the evidence we have relied upon in relation to our findings and how we have relied upon that evidence. This annex lists the main sources of evidence used, including all responses to our consultations and to our formal information notices.
- A14.2 While this annex lists the main evidence we have relied upon, the list is for convenience only and is not intended to be exhaustive.

### Responses to June 2017 Consultation

- A14.3 On 27 June we published our main MCT Consultation to gather stakeholders' views on the work we had undertaken in assessing the state of competition in the MCT markets in the UK and our proposals for regulating these markets in the next MCT review period.
- A14.4 13 stakeholders provided written responses to the June 2017 Consultation:
- An individual
  - BT/EE
  - Colt Technology Services
  - Core Telecom Ltd
  - [redacted]
  - H3G
  - Manx Telecom Trading Ltd
  - Swiftnet Ltd
  - Telecom 2
  - Telefónica UK Ltd
  - Vectone Mobile Ltd
  - Verizon Enterprise Solutions
  - Vodafone
- A14.5 We have published non-confidential versions of the responses from the stakeholders listed above. These can be found on our website.<sup>184</sup>

### Responses to the November 2017 Further Consultation

- 1.1 On 17 November we published a further consultation that updated our list of providers that we proposed had SMP following a process of gathering information from companies that have been allocated mobile number ranges by Ofcom. Two stakeholders provided written responses to the consultation:
- An individual

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<sup>184</sup> <https://www.ofcom.org.uk/consultations-and-statements/category-1/mobile-call-termination-market-review>

- [X]

A14.6 We have published non-confidential versions of the responses from the stakeholders listed above. These can be found on our website.<sup>185</sup>

## Information gathering using statutory powers (s.135)

A14.7 During this market review, we have issued a series of notices under s.135 of the Act ('Notices') requiring various providers to provide specified information as set out in the notice. These included:

A14.8 Notices of 16 February 2017 requesting information for our cost modelling, market definition and SMP assessment. We requested information regarding use of technologies, numbers of subscriptions, network traffic, financial information, retail call allowances and termination of calls from outside the EEA. We also requested clarification regarding informal submissions made by mobile providers regarding calls outside the EEA. Requests addressed to and response received from:

- BT Group – response received in two tranches on 3 March and 10 March 2017.
- H3G – response received in three tranches on 3 March, 7 March and 10 March 2017.
- Telefónica UK – response received in three tranches on 5 March, 13 March and 20 March 2017.
- Vodafone – response received on 3 March 2017.

A14.9 Notices sent on various dates between January 2017 and April 2017 to the 87 providers holding mobile number ranges allocated by Ofcom. We requested information about the use of these numbers, whether MCT was offered on these numbers, the level of MTRs charged and other information in relation to the business of these providers.

A14.10 Notices of 14 June 2017 sent to four providers holding number ranges allocated by Ofcom who are not offering MCT over these number ranges. We requested information about whether these numbers are used for international call forwarding services.

A14.11 Notices sent on various dates between October and December 2017 to the 17 providers with future plans to offer MCT, the three providers that had previously informed us that they intend to cease offering MCT, two notices to the one provider that had acquired number ranges since the June 2017 Consultation and to the nine providers who had previously said they did not offer MCT. We requested information about whether the providers' plans had changed.

A14.12 Notices of 16 November 2017 to the four largest mobile providers requesting information for our assessment of calls originated outside the EEA.

- BT Group – response received on 30 November 2017.
- H3G – response received on 30 November 2017.
- Telefónica UK – response received on 4 December 2017.

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## A15. 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 Ltd v Office of Communications Case 1182/3/3/11, Vodafone Ltd v Office of Communications, Case 1183/3/3/11 and Telefónica UK Ltd, 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 Statement’:** The Final Statement of the 2015 MCT Review was published on 17 March 2015 and contained our conclusions on the regulation of MCT for the period 2015-2018.

**‘2015 MCT Model’:** The cost model Ofcom used to calculate the charge control for the period of the previous market review (2015-2018).

**‘2018 MCT Model’:** The cost model Ofcom is using to calculate the charge control for the period of this market review (2018-2021).

**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 MCT providers would not operate, or directly incur the costs of operating, a radio access network.

**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:** EE 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.

**‘February 2018 WLA Statement’:** The Draft Statement published on 22 February 2018 contains our decisions for the regulation of the market for the provision of wholesale local access services for the period April 2018 to March 2021 for notification to the EC.

**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.

**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.

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

**Home Location Register (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.

**‘June 2017 Consultation’:** The consultation published on 27 June 2017 contained our proposals for the regulation of MCT for the period 2018-2021.

**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.

**‘March 2017 WLA Consultation’:** The Consultation published on 31 March 2017 contained our proposals for the regulation of the market for the provision of wholesale local access services for the period April 2018 to March 2021.

**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 MCT provider to allow an OCP to connect a caller with the intended mobile call recipient on that MCT provider’s network.

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

**Mobile Network Operator (MNO):** A provider which owns a cellular mobile network.

**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.

**‘November 2017 Consultation’:** The consultation published on 17 November 2017 contained our proposals for the regulation of MCT for the period 2018-2021.

**NTNP:** National Telephone Numbering Plan.



**O2:** Telefónica UK Ltd.

**OCP:** Originating Communications Provider.

**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 MCT provider, used by an end-user who has since become a subscriber of that MCT provider (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 MCT provider, used by an end-user who has since become a subscriber of another MCT provider (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.

**TCP:** Terminating Communications Provider.

**Telefónica:** Telefónica UK Ltd.

**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 Ltd.

**Vodafone:** Vodafone Ltd.

**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.