List of respondents to the Call for Inputs

- A1.1 On 21 April 2011 we published a Call for Inputs ('CFI') setting out our proposed approach to this market review and seeking stakeholder input¹.
- A1.2 The following stakeholders provided written responses to the Call for Input:
 - BT;
 - Cable and Wireless Worldwide;
 - The Communications Management Association;
 - Ericsson;
 - Everything Everywhere;
 - Fujitsu;
 - Geo Networks;
 - The Independent Networks Cooperative Organisation (INCA);
 - KCOM Group;
 - O2;
 - Sky;
 - SSE;
 - Talk Talk;
 - Three UK;
 - UK Competitive Telecommunications Association (UKCTA); and
 - Verizon; and
 - Three other communications providers who asked us not to publish their names or consultation responses.
- A1.3 We have published non-confidential versions of the responses from all the companies listed above. These can be found on our website².

¹ <u>http://stakeholders.ofcom.org.uk/consultations/bcmr-inputs/</u>

² <u>http://stakeholders.ofcom.org.uk/consultations/bcmr-inputs/?showResponses=true&pageNum=1#responses</u>

Responding to this consultation

How to respond

- A2.1 Ofcom invites written views and comments on the issues raised in this document, to be made **by 5pm on 24 August 2012**.
- A2.2 Ofcom strongly prefers to receive responses using the online web form at https://stakeholders.ofcom.org.uk/consultations/business-connectivitymr/howtorespond/form, as this helps us to process the responses quickly and efficiently. We would also be grateful if you could assist us by completing a response cover sheet (see Annex 3), to indicate whether or not there are confidentiality issues. This response coversheet is incorporated into the online web form questionnaire.
- A2.3 For larger consultation responses particularly those with supporting charts, tables or other data - please email business.review@ofcom.org.uk attaching your response in Microsoft Word format, together with a consultation response coversheet.
- A2.4 Responses may alternatively be posted or faxed to the address below, marked with the title of the consultation.

Matina Papadopoulou Competition Group 4th Floor Riverside House 2A Southwark Bridge Road London SE1 9HA

Fax: 020 7783 4109

- A2.5 Note that we do not need a hard copy in addition to an electronic version. Ofcom will acknowledge receipt of responses if they are submitted using the online web form but not otherwise.
- A2.6 It would be helpful if your response could include direct answers to the questions asked in this document, which are listed together at Annex 5. It would also help if you can explain why you hold your views and how Ofcom's proposals would impact on you.

Further information

A2.7 If you want to discuss the issues and questions raised in this consultation, or need advice on the appropriate form of response, please contact Matina Papadopoulou on 020 7783 4144.

Confidentiality

A2.8 We believe it is important for everyone interested in an issue to see the views expressed by consultation respondents. We will therefore usually publish all

responses on our website, <u>www.ofcom.org.uk</u>, ideally on receipt. If you think your response should be kept confidential, can you please specify what part or whether all of your response should be kept confidential, and specify why. Please also place such parts in a separate annex.

- A2.9 If someone asks us to keep part or all of a response confidential, we will treat this request seriously and will try to respect this. But sometimes we will need to publish all responses, including those that are marked as confidential, in order to meet legal obligations.
- A2.10 Please also note that copyright and all other intellectual property in responses will be assumed to be licensed to Ofcom to use. Ofcom's approach on intellectual property rights is explained further on its website at http://www.ofcom.org.uk/about/accoun/disclaimer/.

Next steps

- A2.11 Following the end of the consultation period, Ofcom intends to publish a statement in the first quarter of calendar 2013.
- A2.12 Please note that you can register to receive free mail Updates alerting you to the publications of relevant Ofcom documents. For more details please see: <u>http://www.ofcom.org.uk/static/subscribe/select_list.htm</u>.

Ofcom's consultation processes

- A2.13 Ofcom seeks to ensure that responding to a consultation is easy as possible. For more information please see our consultation principles in Annex 4.
- A2.14 If you have any comments or suggestions on how Ofcom conducts its consultations, please call our consultation helpdesk on 020 7981 3003 or e-mail us at <u>consult@ofcom.org.uk</u>. We would particularly welcome thoughts on how Ofcom could more effectively seek the views of those groups or individuals, such as small businesses or particular types of residential consumers, who are less likely to give their opinions through a formal consultation.
- A2.15 If you would like to discuss these issues or Ofcom's consultation processes more generally you can alternatively contact Graham Howell, Secretary to the Corporation, who is Ofcom's consultation champion:

Graham Howell Ofcom Riverside House 2a Southwark Bridge Road London SE1 9HA

Tel: 020 7981 3601

Email: Graham.Howell@ofcom.org.uk

Ofcom's consultation principles

A3.1 Of com has published the following seven principles that it will follow for each public written consultation:

Before the consultation

A3.2 Where possible, we will hold informal talks with people and organisations before announcing a big consultation to find out whether we are thinking in the right direction. If we do not have enough time to do this, we will hold an open meeting to explain our proposals shortly after announcing the consultation.

During the consultation

- A3.3 We will be clear about who we are consulting, why, on what questions and for how long.
- A3.4 We will make the consultation document as short and simple as possible with a summary of no more than two pages. We will try to make it as easy as possible to give us a written response. If the consultation is complicated, we may provide a shortened Plain English Guide for smaller organisations or individuals who would otherwise not be able to spare the time to share their views.
- A3.5 We will consult for up to 10 weeks depending on the potential impact of our proposals.
- A3.6 A person within Ofcom will be in charge of making sure we follow our own guidelines and reach out to the largest number of people and organisations interested in the outcome of our decisions. Ofcom's 'Consultation Champion' will also be the main person to contact with views on the way we run our consultations.
- A3.7 If we are not able to follow one of these principles, we will explain why.

After the consultation

A3.8 We think it is important for everyone interested in an issue to see the views of others during a consultation. We would usually publish all the responses we have received on our website. In our statement, we will give reasons for our decisions and will give an account of how the views of those concerned helped shape those decisions.

Consultation response cover sheet

- A4.1 In the interests of transparency and good regulatory practice, we will publish all consultation responses in full on our website, <u>www.ofcom.org.uk</u>.
- A4.2 We have produced a coversheet for responses (see below) and would be very grateful if you could send one with your response (this is incorporated into the online web form if you respond in this way). This will speed up our processing of responses, and help to maintain confidentiality where appropriate.
- A4.3 The quality of consultation can be enhanced by publishing responses before the consultation period closes. In particular, this can help those individuals and organisations with limited resources or familiarity with the issues to respond in a more informed way. Therefore Ofcom would encourage respondents to complete their coversheet in a way that allows Ofcom to publish their responses upon receipt, rather than waiting until the consultation period has ended.
- A4.4 We strongly prefer to receive responses via the online web form which incorporates the coversheet. If you are responding via email, post or fax you can download an electronic copy of this coversheet in Word or RTF format from the 'Consultations' section of our website at <u>www.ofcom.org.uk/consult/</u>.
- A4.5 Please put any parts of your response you consider should be kept confidential in a separate annex to your response and include your reasons why this part of your response should not be published. This can include information such as your personal background and experience. If you want your name, address, other contact details, or job title to remain confidential, please provide them in your coversheet only, so that we don't have to edit your response.

Cover sheet for response to an Ofcom consultation

BASIC DETAILS			
Consultation title: Business Connectivity Market Review			
To (Ofcom contact):			
Name of respondent:			
Representing (self or organisation/s):			
Address (if not received by email):			
CONFIDENTIALITY			
Please tick below what part of your response you consider is confidential, giving your reasons why			
Nothing Name/contact details/job title			
Whole response Organisation			
Part of the response If there is no separate annex, which parts?			
If you want part of your response, your name or your organisation not to be published, can Ofcom still publish a reference to the contents of your response (including, for any confidential parts, a general summary that does not disclose the specific information or enable you to be identified)?			
DECLARATION			
I confirm that the correspondence supplied with this cover sheet is a formal consultation response that Ofcom can publish. However, in supplying this response, I understand that Ofcom may need to publish all responses, including those which are marked as confidential, in order to meet legal obligations. If I have sent my response by email, Ofcom can disregard any standard e-mail text about not disclosing email contents and attachments.			
Ofcom seeks to publish responses on receipt. If your response is non-confidential (in whole or in part), and you would prefer us to publish your response only once the consultation has ended, please tick here.			
Name Signed (if hard copy)			

Consultation questions

Question 1: Do you agree with our approach to retail market definition and our proposed retail product market definition?

Question 2: Do you agree with our approach to wholesale product market definition and our proposed wholesale product market definitions? In particular, do you agree with our proposal to define a Multiple Interface Symmetric Broadband Origination (MISBO) market?

Question 3: Do you agree with our approach to geographic market definition and our proposed geographic market definitions? In particular do you agree with our proposal to define a larger geographic market in London (the WECLA)?

Question 4: Do you agree with our approach to product and geographic market definition for wholesale trunk and do you agree with our proposed market definitions for wholesale trunk?

Question 5: Do you agree with our approach to SMP assessment?

Question 6: Do you agree with our assessment of SMP for the retail low bandwidth TI market in the UK excluding the Hull area?

Question 7: Do you agree with our assessment of SMP for the wholesale TISBO markets in the UK excluding the Hull area?

Question 8: Do you agree with our assessment of SMP for the wholesale AISBO markets in the UK excluding the Hull area?

Question 9: Do you agree with our assessment of SMP for the wholesale MISBO markets in the UK excluding the Hull area?

Question 10: Do you agree with our assessment of SMP for the wholesale TI regional trunk market and the wholesale TI national trunk markets?

Question 11: Do you agree with our assessment of SMP for the retail low bandwidth TI market and the retail low bandwidth AI market in the Hull area?

Question 12: Do you agree with our assessment of SMP for the wholesale TISBO and AISBO markets in the Hull area?

Question 13: Do you agree with our approach to remedies and in particular our consideration of the case for imposing passive remedies?

Question 14: Do you agree with the remedies that we propose for BT in the low bandwidth TI retail market in the UK excluding the Hull area?

Question 15: Do you agree with the remedies that we propose for BT in the wholesale TISBO markets in the UK excluding the Hull area and the wholesale TI regional trunk market?

Question 16: Do you agree with the remedies that we propose for BT in the wholesale AISBO markets in the UK excluding the Hull area?

Question 17: Do you agree with the remedies that we propose for BT in the wholesale MISBO markets?

Question 18: Do you agree with the remedies that we propose for KCOM in the retail TI and AI markets? In particular, do you agree with our proposal that KCOM should be required only to publish maximum prices and to be permitted to offer bespoke discounts?

Question 19: Do you agree with the remedies that we propose for KCOM in the wholesale TISBO and AISBO markets? In particular, do you agree with our proposal that KCOM should be required only to publish maximum prices and to be permitted to offer bespoke discounts?

Regulatory framework

Introduction

- A6.1 This Annex provides an overview of the market review process, to give some additional context and understanding of the matters discussed in the main body of this document and the legal instruments (statutory notifications) published at Annex 14 and Annex 15.
- A6.2 Market review regulation is technical and complex, including the legislation and the recommendations and guidelines that we need to consider as part of the process. There may be many relevant documents depending on the market and/or issues in question. This overview does not purport to give a full and exhaustive account of all such materials that we have considered in reaching our preliminary views on this market. Key aspects of materials relevant to this market review are, however, discussed in this document.

Market review concept

- A6.3 The concept of a market review refers to procedures under which we at regular intervals identify relevant markets appropriate to national circumstances, carry out analyses of these markets to determine whether they are effectively competitive and then decide on appropriate remedies (known as Significant Market Power (SMP) obligations or conditions). We explain the concept of SMP below.
- A6.4 In carrying out this work, we act in our capacity as the sector-specific regulator for the UK communications industries, particularly relating to our role as the regulator for telecommunications. Our functions in this regard are to be found in Part 2 of the Communications Act 2003 (the Act)³. We exercise those functions within the framework harmonised across the European Union for the regulation of electronic communications by the Member States (known as the Common Regulatory Framework or the 'CRF'), as transposed by the Act. The applicable rules⁴ are contained in a package of five EC Directives, of which two Directives are immediately relevant for these 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).
- A6.5 The Directives require that 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.
- A6.6 Each market review normally has three stages, namely:

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

⁴ The Directives have recently been reviewed and amendments were adopted on 19 December 2009. The amendments have been transposed into the national legislation and applied with effect from 26 May 2011.

- the procedure for the identification and definition of the relevant markets (the market definition procedure);
- the procedure for the assessment of competition in each market, in particular whether the relevant market is effectively competitive (the market analysis procedure); and
- the procedure for the assessment of appropriate regulatory obligations (the remedies procedure).
- A6.7 These stages are normally carried out together.

Market definition procedure

- A6.8 The Act provides that, before making a market power determination⁵, we must identify the market, which is, in our opinion, the one which, in the circumstances of the UK, is the market in relation to which it is appropriate to consider making such a determination and to analyse that market.
- A6.9 The Framework Directive requires that NRAs shall, taking the utmost account of the EC's Recommendation⁶ and SMP Guidelines⁷ published by the European Commission, define the relevant markets appropriate to national circumstances, in particular relevant geographic markets within their territory, in accordance with the principles of competition law.
- A6.10 The EC's 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, seeking to achieve harmonisation across the single market by ensuring that the same markets will be subject to a market analysis in all Member States. Secondly, providing legal certainty by making market players aware in advance of the markets to be analysed. However, NRAs are able to regulate markets that differ from those identified in the EC's Recommendation where this is justified by national circumstances taking account of the three cumulative criteria referred to in the EC's Recommendation⁸ (the "three-criteria test") and where the European Commission does not raise any objections.
- A6.11 The fact that an NRA identifies the product and service markets listed in the 2007 Commission Recommendation or identifies other product and service markets that meet the three-criteria test does not mean that regulation is warranted. Market definition is not an end in itself but is a means of assessing effective competition.

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

⁶ Commission Recommendation of 17 December 2007 on relevant product and service markets within the electronic communications sector susceptible to ex ante regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communication networks and services.

⁷ <u>http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2002:165:0006:0031:EN:PDF</u>

⁸ The Recommendation states that, "[w]hen identifying markets other than those set out in the Annex, national regulatory authorities should ensure that the following three criteria are cumulatively met: (a) the presence of high and non-transitory barriers to entry. These may be of a structural, legal or regulatory nature; (b) a market structure which does not tend towards effective competition within the relevant time horizon. The application of this criterion involves examining the state of competition behind the barriers to entry; (c) the insufficiency of competition law alone to adequately address the market failure(s) concerned."

The three-criteria test is also different from the SMP assessment because the test's focus is on the general structure and market characteristics.

- A6.12 The relationship between the market definitions identified in this review and those listed in the 2007 Commission Recommendation is discussed in Section 7 of this consultation document⁹.
- A6.13 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 sector. As market analyses have to be forward-looking, the 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. They clarify that NRAs enjoy discretionary powers that 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.
- A6.14 The SMP Guidelines also describe how competition law methodologies may be used by NRAs in their analyses. 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 approaches adopted by the European Commission.
- A6.15 While such methodologies are being used in identifying the *ex ante* markets, they will not necessarily be identical to markets defined in individual competition law cases. This may be the case, especially as the former is 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 identified markets, is without prejudice to any analysis that may be carried out in relation to any investigation pursuant to the Competition Act 1998¹⁰ (relating to the application of the Chapter I or II prohibitions or Article 101 or 102 of the EC Treaty¹¹) or the Enterprise Act 2002¹².

Market analysis procedure

Effective competition

A6.16 The Act requires that, at such intervals as we consider appropriate, we carry out market analyses of identified markets for the purpose of making or reviewing market power determinations. In any event, such analyses are to be carried out as soon as reasonably practicable after recommendations are made by the European Commission that affect matters that were taken into account, or could have been taken into account, in the case of our last analysis of that market.

⁹ Where we set out how we consider the three criteria test is cumulatively satisfied for each of the relevant markets which are not included in the EC's Recommendation but which we propose are markets in which ex ante regulation is warranted.

¹⁰ <u>http://www.legislation.gov.uk/ukpga/1998/41/contents</u>

¹¹ Previously Article 81 and Article 82 of the EC treaty, <u>http://eur-</u> lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2010:083:FULL:EN:PDF

¹² <u>http://www.legislation.gov.uk/ukpga/2002/40/contents</u>

- A6.17 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. Namely, "[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".
- A6.18 The definition of SMP is equivalent to the concept of dominance as defined in competition law. The Framework Directive requires, however, that NRAs must carry out market analysis taking the utmost account of the SMP Guidelines. The latter 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 significant market power.
- A6.19 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 (a) overall size of the undertaking; (b) control of infrastructure not easily duplicated; (c) technological advantages or superiority; (d) absence of or low countervailing buying power; (e) easy or privileged access to capital markets/financial; (f) resources; (g) product/services diversification (e.g. bundled products or services); (h) economies of scale; (i) economies of scope; (j) vertical integration; (k) highly developed distribution and sales network; (l) absence of potential competition; and (m) barriers to expansion. A dominant position can derive from a combination of these criteria, which taken separately may not necessarily be determinative.

Sufficiency of competition law

- A6.20 As part of our overall forward-looking analysis, we also assess whether competition law by itself (without *ex ante* regulation) is sufficient to address the competition problems identified. Aside from the need to address this issue as part of the three-criteria test, we also 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. 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.
- A6.21 In considering this matter, we bear in mind the specific characteristics of communications markets. Generally, the case for *ex ante* regulation in communications markets is based on the existence of market failures, which, by themselves or in combination, mean that competition might not be able to become established, if the regulator relied solely on its *ex post* competition law powers that are established for dealing with more conventional sectors of the economy. Therefore, it is appropriate for *ex ante* regulation to be used to address these market failures and any entry barriers that might otherwise prevent effective competition from becoming established. By imposing *ex ante* regulation that promotes competition, it may be possible to reduce such regulation over time, as markets become more competitive, and place greater reliance on *ex post* competition law.
- A6.22 *Ex post* competition law is also unlikely in itself to bring about effective competition, as it prohibits the abuse of dominance rather than the holding of a dominant position. In contrast, *ex ante* regulation is normally needed to promote actively the

development of competition. *Ex ante* regulation attempts to reduce the level of market power in a market, thereby encouraging effective competition to become established. This is particularly the case when addressing the effects of network externalities, because the network externality effect generally re-enforces a dominant position and, as noted above, under general competition law there is no prohibition on the holding of a position of dominance in itself. Therefore, it is more appropriate to address the impact of network externality through *ex ante* obligations.

A6.23 Additionally, unless we consider otherwise in relation to a specific obligation in this review, we generally take the view that *ex ante* regulation is needed to create legal certainty for the market under review. Linked to that certainty is the fact that the SMP obligations we have proposed are necessary to enable us to intervene in a timely manner. For some other specific obligations, we generally consider that they are needed as competition law would not remedy the particular market failure, or we believe that specific clarity and detail of the obligation is required to achieve a particular result.

Remedies procedure

Powers and legal tests

- A6.24 The Framework Directive prescribes what regulatory action NRAs must take depending upon whether or not the market in question 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 on that market and then impose appropriate obligations.
- A6.25 NRAs have a suite of regulatory tools at their disposal, as reflected in the Act. 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 identified, proportionate and justified in the light of the policy objectives as set out in Article 8 of the Framework Directive.
- A6.26 Specifically, for each and every proposed SMP obligation we explain why it satisfies the test that the obligation is: (a) objectively justifiable in relation to the networks, services, facilities, apparatus or directories to which it relates; (b) not such as to discriminate unduly against particular persons or against a particular description of persons; (c) proportionate to what the condition or modification is intended to achieve; and (d) in relation to what it is intended to achieve, transparent.
- A6.27 Additional legal requirements may also need to be satisfied depending on the SMP obligation in question, for example, for price controls where the NRA's market analysis must indicate that the lack of effective competition means that the operator concerned might sustain prices at an excessively high level, or apply a price squeeze, to the detriment of end-users. In that instance, NRAs must take into account the investment made by the operator and allow him a reasonable rate of return on adequate capital employed, taking into account the risks involved, 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. Where an obligation to provide third parties with network access is considered appropriate, NRAs must take into account factors including the feasibility of the proposed network access, the technical and economic viability of creating networks¹³ that would make the network access unnecessary, the investment of the network operator who is required to provide access¹⁴ and the need to secure effective competition¹⁵ in the long term.

A6.28 To the extent relevant to this review, we demonstrate the application of these requirements to the SMP obligations in question at Sections 9 to 14 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 is secured or furthered by our regulatory intervention, and that it is in accordance with the six Community requirements in section 4 of the Act. This assessment is also relevant to our assessment of the likely impact of implementing our proposals. A number of specific point should be noted in this regard.

Ofcom's general duties - section 3 of the Act

- A6.29 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.
- A6.30 In so doing, 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.
- A6.31 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. In this context, we consider that a number of such considerations are relevant, namely:
 - the desirability of promoting competition in relevant markets;
 - the desirability of encouraging investment and innovation in relevant markets; and
 - the desirability of encouraging the availability and use of high speed data transfer services throughout the United Kingdom.
- A6.32 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 the interest of consumers in respect of choice, price, quality of service and value for money.
- A6.33 Ofcom has, however, a wide measure of discretion in balancing its statutory duties and objectives. In so doing, we will take account of all relevant considerations, including responses received during our consultation process, in reaching our conclusions.

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

¹⁴ Taking account of any public investment made.

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

European Community requirements for regulation - section 4 of the Act

- A6.34 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.
- A6.35 In summary, these six requirements are:
 - to promote competition in the provision of electronic communications networks and services, associated facilities and the supply of directories;
 - to contribute to the development of the European internal market;
 - to promote the interests of all persons who are citizens of the European Union;
 - to take account of the desirability of Ofcom's carrying out of its functions in a manner which, so far as practicable, does not favour one form of or means of providing electronic communications networks, services or associated facilities over another – i.e. to be technologically neutral;
 - to encourage, to such extent as Ofcom considers appropriate for certain prescribed purposes, the provision of network access and service interoperability, namely securing efficient and sustainable competition, efficient investment and innovation, and the maximum benefit for customers of CPs;
 - to encourage compliance with certain standards in order to facilitate service interoperability and secure freedom of choice for the customers of CPs.
- A6.36 We considered that the first, third, fourth and fifth of those requirements are of particular relevance to the matters under review and that no conflict arises in this regard with those specific objectives in section 3 that we consider are particularly relevant in this context.

Impact assessment - section 7 of the Act

- A6.37 The analysis presented in the whole of this document represents an impact assessment, as defined in section 7 of the Act.
- A6.38 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 its proposals would be likely to have a significant effect on businesses or the general public, or when there is a major change in Ofcom's activities. However, as a matter of policy Ofcom is committed to carrying out and publishing impact assessments in relation to the great majority of its policy decisions. For further information about Ofcom's approach to impact assessment, which are on the Ofcom website: http://www.ofcom.org.uk/consult/policy_making/guidelines.pdf
- A6.39 Specifically, pursuant to section 7, an impact assessment must set out how, in our opinion, the performance of our general duties (within the meaning of section 3 of the Act) is secured or furthered by or in relation to what we propose.

- A6.40 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. Equality Impact Assessments (EIAs) also assist 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. Unless we otherwise state in this document, it is not apparent to us that the outcome of our review is likely to have any particular impact on race, disability and gender equality. Specifically, we do not envisage the impact of any outcome to be to the detriment of any group of society.
- A6.41 Nor are we envisaging any need to carry out separate EIAs in relation to race or gender equality or equality schemes under the Northern Ireland and Disability Equality Schemes. This is because we anticipate that our regulatory intervention will affect all industry stakeholders equally and therefore not have a differential impact in relation to people of different gender or ethnicity, on consumers in Northern Ireland or on disabled consumers compared to consumers in general. Similarly, we are not envisaging making a distinction between consumers in different parts of the UK or between consumers on low incomes. Again, we believe that our intervention will not have a particular effect on one group of consumers over another.

Regulated entity

- A6.42 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').
- A6.43 The Framework Directive requires that, where an NRA determines that a relevant market is not effectively competitive, it shall identify 'undertakings' with SMP on that market and impose appropriate specific regulatory obligations. For the purposes of EC competition law, 'undertaking' includes companies within the same corporate group (*Viho v Commission* Case C-73/95 P [1996] ECR I-5447¹⁶), for example, where a company within that group is not independent in its decision making.
- A6.44 We consider it appropriate to prevent a dominant provider to whom a SMP service 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.

¹⁶ <u>http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:61995CJ0073:EN:PDF</u>

Approach to market definition

- A7.1 This Annex supplements our proposals for identifying relevant leased lines markets set out in Sections 4 to 6 of this consultation by discussing in more detail the approach we have taken in defining these markets. This Annex also builds on our more general description of the market definition procedure explained in Annex 6, which provides an overview of the market review process.
- A7.2 Specifically, this Annex is divided into three parts to explain the approach we have taken in our analysis:
 - first, we provide an overview of the various stages involved in our analysis of the retail and wholesale markets, including the sequencing that conceptually needs to be followed for a proper assessment;
 - second, we discuss issues and criteria for defining the services market;
 - finally, we provide background to our analysis of the geographical dimension of the related services market.

Overview of analytical stages

Sequencing of retail and wholesale market definition

- A7.3 In defining markets for market review purposes, our main EU law obligation is to define relevant markets appropriate to national circumstances in accordance with the principles of competition law, taking the utmost account of the Commission's Recommendation and the SMP Guidelines.¹⁷
- A7.4 We explain in Section 4 how we have taken such account in analysing the markets in light of the market identified in the Recommendation as wholesale terminating segments of leased lines (irrespective of the technology used to provide leased or dedicated capacity), together with our reasons for why we consider the three criteria referred to in the Recommendation are met in relation to our proposals.
- A7.5 Our focus in this Annex is therefore on describing our analytical approach in applying the competition law principles relevant to the identification of markets. We focus in particular on explaining our approach in relation to specific aspects of those principles to assist stakeholders in considering our analysis and proposals. For a fuller explanation of the principles themselves, stakeholders will find a useful summary of them in the SMP Guidelines.
- A7.6 While we describe below our analytical approach to market definition, it should be borne in mind that this is not a mechanical or abstract process. The approach is a dynamic one based on our overall understanding of the leased lines markets taking account of available evidence of past behaviour as well as our forward-looking analysis over the forecast period reflecting the characteristics of the retail and wholesale leased lines markets and the factors likely to influence their competitive development. It should therefore be recognised that market definition is not an end

¹⁷ Article 15(3) of the Framework Directive.

in itself, but a means to an end. Market definition aids the assessment of whether competitors, customers and ultimate consumers of a product are protected by effective competition and so whether there is a requirement for the imposition of *ex ante* regulation.

A7.7 There is another introductory point to make for the purpose of explaining the approaches we discuss in this Annex. Under competition law principles, it is conventional to consider two dimensions to the definition of a relevant market: the products to be included in the same market and the geographic extent of the market. As such, it is practical to define the relevant product market before exploring the geographic dimension of the market. However, there is another aspect that often needs to be taken into account - especially in the electronic communications sector - in dealing with those two dimensions, namely the possible existence of retail and wholesale markets relating to the products/services in question. In that regard, our starting point for identifying markets where there may be a requirement for the imposition of ex ante regulation is the definition of retail markets from a forward-looking perspective (Stage 1). The wholesale market is defined subsequent to this exercise being carried out (Stage 2). This approach follows the approach set out in the Recommendation.¹⁸ Figure 71 below sets out the sequences of our market definition analysis.

Figure 71: Sequencing of market definition analysis



A7.8 The analysis of retail market definition is logically prior to the definition of wholesale markets because the demand for the upstream wholesale service is a derived

¹⁸ See Recital 4 of the EC's Recommendation and sections 2.1 and 4 of the Explanatory Note to the EC's Recommendation.

demand – i.e. the level of the demand for the upstream input depends on the demand for the retail service. Hence, if the upstream input accounts for a sufficiently large proportion of the downstream price, the range of available substitutes at the downstream (retail) level will inform the likely range of substitutes for the upstream (wholesale) service. This is because a rise in the price of a wholesale service which is passed through in the price of one retail service will cause retail customers to switch to substitute retail products, reducing demand for the wholesale input.

A7.9 Consequently, Stages 1 (retail market definition) and 2 (wholesale market definition) should be regarded as one exercise, the purpose of which is to define those wholesale markets in the UK where there may be a requirement for the imposition of *ex ante* regulation.¹⁹

Relevance of existing SMP regulation – the modified Greenfield approach

- A7.10 When we conduct our market definition, we assume that there is no SMP regulation in place in the market being considered.²⁰ This means we conduct Stage 1 in the absence of SMP regulation, both at the retail and at the wholesale level because, as stated above, Stages 1 and 2 have a single purpose which is to define the relevant wholesale markets. To do otherwise would mean that the subsequent wholesale market power assessment (Stage 3) would be informed by a previous retail market definition that itself relied on a wholesale regulatory remedy arising from the finding of wholesale market power. This would be a circular and incorrect approach to market definition.
- A7.11 We conduct Stage 2 of our market definition analysis in the absence of SMP regulation at the wholesale level. However, at Stage 2, it is appropriate to take into account *ex ante* regulation arising from SMP findings in separate, upstream markets such as the wholesale local access markets, in particular the existence of regulated LLU inputs.²¹

Stage 1 does not require defining the geographic scope of the retail markets

A7.12 As explained above, Stage 1 is conducted in the absence of SMP regulation, both at the retail and at the wholesale level. However, in the absence of SMP regulation, there would be no (or limited) voluntary sale of wholesale products to third parties²² which would mean, effectively, there would be no (merchant) wholesale market. As we cannot observe retail markets as they would be in the absence of SMP regulation in wholesale markets, Stage 1 is therefore conducted under a

¹⁹ Recital 4 of the EC's Recommendation states "[h]aving defined retail markets, it is then appropriate to identify *relevant* wholesale markets" (emphasis added).

²⁰ The so-called modified Greenfield approach. See also section 2.5 of the Explanatory Note to the EC's Recommendation.

²¹ E.g. the availability of LLU products could be used to provide symmetric DSL services and could potentially impact on operators' build or buy decisions regarding the particular retail products they provide and which may act as potential substitutes to leased lines services. The working assumption for the purpose of this market review is that such existing SMP regulation will remain for the period of this market review – i.e. for 3 years.

 $^{^{22}}$ As was the case before BT was required to offer PPCs. The current extent of retail competition reflects the impact of regulation in wholesale leased lines markets which makes it possible for multiple operators to offer retail leased line services – i.e. by enabling operators to use a wholesale product BT is obliged to supply which enables them to provide a retail service.

hypothetical scenario²³ where the competitive provision of leased lines at the retail level relies either on:

- vertically integrated operators supplying retail end-users based on their own network; or
- commercially negotiated supply of wholesale services from third party operators.
- A7.13 As explained below²⁴, regarding the commercially negotiated supply of wholesale services from third party operators, we consider incentives to provide wholesale services to rivals would be sufficiently weak as to have an insignificant impact on our assessment of competitive provision of leased lines at the retail level in our hypothetical scenario. Consequently, without access to a wholesale product from BT, competition at the retail level between BT and other operators would then be on the basis of end-to-end provision by operators with their own networks.
- A7.14 Since both Stages 1 and 2 are conducted in the absence of SMP regulation, it follows that for both Stage 1—where we consider the competitive provision of leased lines at the retail level between BT and other operators in our hypothetical scenario—and Stage 2—where we consider the competitive provision of leased lines at the wholesale level between BT and other operators—the provision of the service would be dependent on operators' own networks.
- A7.15 Consequently, given that competition would be between vertically integrated operators, the geographic pattern of retail competition in our hypothetical scenario would come to resemble the pattern of competition in the wholesale markets themselves. In the absence of SMP regulation and irrespective of whether a retail or wholesale service is being provided, the network used to provide the service will be deployed either directly to where the end-user is located or in sufficient proximity to where there is end-user demand for leased lines services.
- A7.16 Hence, at Stage 1, the retail geographic market definition is not necessary to inform the analysis of wholesale markets under Stage 2 and we proceed directly to our geographic market definition in wholesale markets once we have defined the retail product markets.

Stage 4 does require defining the geographic scope of the retail markets

- A7.17 Stage 4 is conducted where we consider that the imposition of SMP regulation in the relevant wholesale market(s) would be insufficient to address the lack of effective competition at the retail level.²⁵
- A7.18 Here the purpose is to identify a retail market, or markets, in which ex ante regulation may we warranted. It is done on the assumption all upstream i.e.

²³ This is consistent with the EC's Recommendation (see Recital 4).

²⁴ See our assessment of supply-side substitutability in the sub-section below Product market definition in this market review.

²⁵ See Recital 15 of the EC's Recommendation. See also Annex 6 on the Regulatory Framework which explains this in more detail. We set out in Section 7 our proposed findings on SMP in the relevant retail markets we propose to define. In Sections 9 and 14 we identify the competition problems in each of the relevant retail markets and how we consider Community and national competition law remedies are not sufficient to address those competition problems, which leads us to consider that competition in the relevant retail markets is not effective. In Sections 10 to 15 we also demonstrate why, in our view, the imposition of SMP regulation in the relevant retail markets.

wholesale – SMP regulation, including proposed upstream SMP regulation, applies. In carrying out this exercise we conduct both a product, using the product market definitions from Stage 1, and a geographic market definition.

Approach to services market

Main criteria for defining the services market

- A7.19 As explained above, markets should be defined in a way that is independent of the infrastructure being used²⁶, on a forward-looking basis and in accordance with the principles of competition law.
- A7.20 Market boundaries are determined by identifying constraints on the price setting behaviour of operators.²⁷ To identify the product market boundaries in this review, we consider the following²⁸:
 - demand-side and supply-side substitution; and
 - homogeneous competitive conditions.

Demand-side and supply-side substitution

- A7.21 This involves considering the following:
 - to what extent is it possible for end-users to substitute to other products or services for those in question (demand-side substitution); and
 - to what extent can operators switch, or increase, production to supply the relevant products or services (supply-side substitution) in response to a relative price increase.
- A7.22 The hypothetical monopolist test (HMT) is a useful tool to identify close demandside and supply-side substitutes. A product is considered to constitute a separate market if a hypothetical monopoly operator could impose a small but significant, non-transitory price increase (SSNIP) above the competitive level without losing sales to such a degree as to make this unprofitable (so-called SSNIP test). If such a price rise would be unprofitable, the market definition should be expanded to include the substitute products. We have used a price 5 to 10% above competitive levels as our small but significant price increase.²⁹
- A7.23 In applying the HMT, it is standard to begin with a fairly narrow view of the relevant market and then expand that market to include effective substitutes.

A7.24 We define markets first on the demand side.

²⁶ Excluding Stage 4 of the market definition analysis where, as explained above, the purpose is to define retail markets in which ex ante regulation may we warranted and as such this exercise includes an assumption that all upstream – i.e. wholesale – SMP regulation, including proposed upstream SMP regulation, applies.

²⁷ See, for example, paragraph 38 of the SMP Guidelines.

²⁸ The SMP Guidelines also identify potential competition as a source of competitive constraint on an operator's behaviour. Consistent with the SMP Guidelines, we examine the existence of potential competition for the purpose of assessing whether a market is effectively competitive, that it whether there exist operators with SMP (see paragraph 38 of the SMP Guidelines).

²⁹ Consistent with the EC's SMP Guidelines. See Annex 6] on the Regulatory Framework which explains the SMP Guidelines in more detail.

- A7.25 Demand-side substitution to one product is most likely to be a constraint on the price of another where the two products fulfil similar functions. They do not however have to be precisely the same: the question is whether there would be sufficient switching to act as a constraint on prices. For example, it may be appropriate to regard a number of broadly similar products which differ in price and quality as part of a single market. The relevant question is whether the price of higher quality variants is constrained to the competitive level by the lower quality product/service and vice versa.
- A7.26 In line with the SMP Guidelines we assume that prevailing prices are at the competitive level unless there is evidence that this is not the case.³⁰ This presumption applies both to unregulated prices and also to regulated, cost-based prices.³¹
- A7.27 Supply-side substitution possibilities are examined to assess whether other potential market players provide any additional constraints on the pricing behaviour of the hypothetical monopolist which have not been captured by the demand-side analysis. For this to be relevant operators will not be currently providing the product/service in question. First they must be able to enter the market quickly (e.g. up to 12 months) and at low cost by virtue of their existing position in the supply of other products or areas, and secondly, there must also be an additional competitive constraint arising from such potential entry into the supply of the service in question.
- A7.28 Therefore, in identifying potential supply-side substitutes it is important that operators supplying these services have not already been taken into consideration in the demand-side analysis. There might be operators 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 operators are not relevant to supply-side substitution since they supply services already identified as demand-side substitutes. As such, their entry has already been taken into account and so supply-side substitution from these suppliers cannot provide an additional competitive constraint on the hypothetical monopolist. However, the impact of expansion of such operators can be taken into account in the assessment of market power.

Homogeneous competitive conditions

A7.29 In certain circumstances, it may also be appropriate to define a product market by grouping together services which are subject to homogeneous competitive conditions, despite the absence of demand- and supply-side substitutability. Homogeneity of competitive conditions is chiefly used in defining geographic markets to combine geographic areas in which competitive conditions are sufficiently homogeneous, into one market³², but it can also be used in the product

³⁰ See paragraph 42.

³¹ If the benchmark price is above the competitive price level then this may result in an over-estimation of the scope for substitution, resulting in an excessively broad market definition and vice versa. This is known as the 'cellophane fallacy' and is named after the US case US v EI Du Pont Nemours & Co, 1956. This effect occurs because if prevailing prices are already above the competitive level, even a monopolist reaches a point where further price increases become unprofitable and where competitive constraints come into action that would not have applied at competitive price levels. If this is not taken into account, the erroneous conclusion could be reached that a monopolist who has successfully exercised market power by raising price is subject to competitive constraints since, starting from monopoly price levels, it would be constrained from implementing further price increases.

³² See paragraphs A7.46 to A7.47 and A7.56 to A7.65 below.

market definition analysis. This approach 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.

A7.30 However, combining products and services based on homogenous competition conditions, is – by definition – only appropriate where this would not alter any subsequent findings on SMP (relative to defining those markets separately and making separate market power assessments accordingly). Provided this is the case, then we consider applying this criterion to both our product and geographic market definition analsyis is appropriate since market definition, as explained above, is a means to an end and the end is an assessment of the effectiveness of competition in the relevant market which involves carrying out the market power analysis.

Approach to services market definition

A7.31 We set out below our approach to product market definition in this market review. We note, in this respect, that our approach is consistent with the approach adopted in the 2007/08 Review.

Unsuitability of supply-side substitution

- A7.32 As discussed above, the Greenfield approach suggests that, absent regulation, competition in retail markets would be based on vertically integrated operators supplying retail end-users based on their own network. We consider that in this hypothetical scenario (i.e. where there is no regulated provision of leased lines services) the constraints arising from supply-side substitution in leased lines markets are likely to be weak.
- A7.33 The leased lines markets are characterised by the majority of operators providing a range of services so as to realise the benefits of economies of scale and scope in investing in network infrastructure which has high fixed sunk costs. Consequently, an analysis of a market defined on the basis of demand-side substitution will typically include any operators with the technical capability for supply-side substitution because they will either already be included in the initially narrow view of the product market adopted at the beginning of the product market definition analysis, and/or providing a demand-side substitutable service that causes that narrow view to be broadened.
- A7.34 If there are operators not present in the supply of demand-side substitutable services but which supply those services using sufficiently similar technology³³, then there could be a threat of entry. Absent regulation, supply-side substitution would require an operator to enter on the basis of either:
 - building necessary access (and any backhaul and core) networks (i.e. selfsupplying its own network); and/or
 - agreeing commercial terms with third-party suppliers to provide the necessary network inputs to deliver the retail service.
- A7.35 Unless operators can easily enter using existing physical infrastructure then this form of supply-side substitution based on self-supply is unlikely to be a strong

³³ Such that they already own the assets needed to switch to providing a demand-side substitutable service and can therefore enter the product market quickly and at low cost by virtue of their existing position.

constraint in response to a 5 to 10% increase in the price of leased lines. This is because the costs of providing network (especially digging and ducting) include significant sunk costs and there would also be likely to be a time delay in responding to the price increase. In most cases, these sunk costs mean that operators will not be willing to extend their networks by more than a short distance in response to a SSNIP.³⁴

- A7.36 With respect to operators being able to agree commercial terms for wholesale supply with third-parties, we have to take into account the fact that many wholesale leased lines providers would be vertically integrated operators. In these circumstances, there may be weakened incentives to provide wholesale services to rivals where this would deny the wholesale provider the opportunity to compete for the downstream end-user.
- A7.37 In our view therefore, we do not consider supply-side substitution would provide a sufficient competitive constraint on the price setting behaviour of operators and as such we do not consider it is relevant for defining leased lines product markets in this review.
- A7.38 We have instead focused on an analysis of demand-side substitution and homogeneous competitive conditions. Nonetheless, the impact of expansion by suppliers is something we have taken into account in the assessment of market power.
- A7.39 When assessing the relevance of demand-side substitution in retail markets for the purpose of informing our wholesale market definition, we take into account:
 - the service characteristics of the focal product and candidate substitutes (do different products have similar characteristics or are there service compromises in switching between products);
 - the importance of different service characteristics to consumers and the extent to which they would be willing to compromise on particular characteristics;
 - the extent to which pricing evidence suggests that different leased lines services provide competitive constraints on each other;
 - given observed price/quality trade-offs whether there is evidence of end-users switching between products; and
 - whether there are any barriers to switching that might explain the limited migration between products (e.g. long-terms contracts, inconvenience of changing products, the need to incur additional costs not reflected in retail prices, risks of switch-over).

Homogeneous competitive conditions

A7.40 The homogeneous competitive conditions criterion is relevant for our product market definition analysis because in leased lines market there are a number of closely related services which are not demand-side substitutes but which are

³⁴ As described in Section 5 Geographic market definition, in our analysis of competition in local geographic markets we consider that operators are unlikely to build more than 200 metres in order to connect to an end-user, except possibly in the case of very high value contracts.

supplied under homogeneous competitive conditions³⁵. As a result, we consider it is appropriate to use homogeneity of competitive conditions to define a single product market including two or more services, together with the application of this criterion to our analysis of the geographic definition of that product market, precisely because where competitive conditions are sufficiently similar, doing so would not affect the subsequent SMP finding.³⁶

Approach to geographic market

Main criteria for defining the geographic market

- A7.41 In addition to the services to be included within a market, market definition also requires the geographic scope of the market to be specified. The geographic market is the area within which demand-side and/or supply-side substitution can take place and is defined using a similar approach to that used to define the product market. In carrying out our geographic market definition, in addition to the SMP Guidelines, we have had regard to the ERG's Common Position.³⁷ We consider the following:
 - demand-side and supply-side substitution;
 - chains of substitution
 - common pricing constraints; and
 - homogeneous competitive conditions.

Demand-side and supply-side substitution

- A7.42 Rather than considering alternative products, the analysis using the SSNIP test assesses the effect on demand for the relevant product if there is a relative price change in a narrow geographic area. If products in the relevant product market in other areas are sufficient substitutes, such as to render the price rise unprofitable, then the geographic scope of the relevant market is widened to include these additional areas. On the demand-side, the objective is to identify producers located close enough so that they would constrain the behaviour of a hypothetical monopolist. If a substantial number of consumers would switch to producers in neighbouring areas then the geographic market should encompass those areas.
- A7.43 On the supply-side, consideration is given to whether producers can switch to supplying different areas within a relatively short period of time. As with product market definition such substitution should be able to occur within a relatively short period of time to present a sufficient competitive constraint.

Chains of substitution

A7.44 Chains of substitution can also be an important factor in defining geographic markets. Consumers in any one area might not be willing to travel any great distance to purchase a product (i.e. a consumer purchasing products in one city

³⁵ See Sections 3 and 4 where we identify those closely related services which are not demand-side substitutes but which, in our view and on the basis of our analysis, are supplied under homogeneous competitive conditions.

³⁶ i.e. irrespective of whether the services are defined as falling within separate relevant markets or as falling in one relevant market, the subsequent SMP analysis would be the same.

³⁷ ERG Common Position on Geographic Aspects of Market Analysis (definition and remedies), October 2008.

might be unwilling to travel to a nearby city to purchase those goods). However, if there are a number of suppliers located between two more distant areas (for example a market town that lies between the two cities), consumers' willingness to substitute to purchase services in another location (i.e. from the cities to the market town) can create a competitive constraint between suppliers of similar products in the more distant locations (the two cities), creating a wider geographic market.

Common pricing constraints

A7.45 The presence of common pricing constraints across geographic areas is also relevant for the purposes of defining the geographic scope of a market. If prices (of the incumbent and alternative operators) are geographically uniform – i.e. do not differ by geographic areas – then this may be indicative of there being insufficient geographic variations in competitive conditions to justify the definition of local geographic markets.

Homogeneous competitive conditions

A7.46 The SMP Guidelines state that in cases where there is a sufficient degree of variety in competitive conditions between areas (what a sufficient level might be is not specified), distinct local markets should be defined:

"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. The definition of the geographic market does not require the conditions of competition between traders or providers of services to be perfectly homogeneous, and accordingly, only those areas in which the conditions of competition are 'heterogeneous' may not be considered to constitute a uniform market."³⁸

- A7.47 Therefore, geographic areas can comprise a single relevant geographic market to the extent that:
 - · competitive conditions in these areas are sufficiently homogeneous; and
 - the areas can be distinguished from neighbouring areas where the competitive conditions are appreciably different.

Approach to geographic market definition

A7.48 We set out below our approach to geographic market definition in this market review. We note, in this respect, that our approach is consistent with the approach adopted in the 2007/08 Review.

³⁸ See paragraph 56.

Unsuitability of demand-side and supply-side substitution

- A7.49 As explained above, we define retail markets in order to inform our definition of wholesale markets. Retail leased lines, in keeping with communications networks more generally, have a fixed geographic location. This means that a retail consumer would only be able to switch its demand to an alternative area if it were willing to move to that alternative area. Thus, the relevant question is whether a sufficient number of retail customers would move location (business premise) in response to a SSNIP, such as to make the SSNIP unprofitable.
- A7.50 Given that the cost associated with moving location is likely to be significantly higher than a SSNIP on the price of a retail leased line, it is reasonable to consider that geographic demand-side substitution is either a very weak or a non-existent constraint in most cases. The cost and availability of connectivity options are only likely to be a driving factor in choice of location where connectivity forms a significant part of the total costs of a business and where it has not yet committed to a particular site. This may apply, for instance, to a new build data centre, which could choose to locate deliberately in an area where competitive networks exist³⁹. However, once a data centre has been built, its location is fixed in the same way as that of any other business, and in our view it is unlikely that a data centre would subsequently move in response to a SSNIP.
- A7.51 An analysis of demand-side substitution alone would lead to the definition of very narrow markets, which are unlikely to be practical to analyse or to be representative of competitive constraints that exist. We therefore consider that demand-side substitution is not relevant to assessing the geographic market definition.⁴⁰
- A7.52 Regarding supply-side substitution, the question being asked in this assessment is whether a supplier of retail leased lines which is operating in one geographic area would start supplying in another geographic area if this other area was subject to a SSNIP by a hypothetical monopolist, to the extent that it would render the SSNIP unprofitable. If the SSNIP would be unprofitable then these geographic areas should be grouped together for the purpose of defining the relevant market.
- A7.53 The point to note here is that, in applying the modified Greenfield approach, when we define retail markets in order to inform our definition of wholesale markets we assume an absence of regulated wholesale products which would, if available, allow an operator to supply-side substitute at the retail level.⁴¹ In leased lines markets, geographic supply-side substitution is generally considered to be a weak or non-existent constraint due to the high cost and long lead times associated with deploying new network infrastructure. Therefore, similar to geographic demand-side substitution, we consider that supply-side substitution is not relevant to assessing the geographic market definition⁴².

³⁹ We address the question of competition to supply data centres in our analysis of the geographic scope of the wholesale MISBO market in Section 5.

⁴⁰ This is consistent with the ERG Common Position (see section 2).

⁴¹ i.e. an operator could use the regulated wholesale product as the necessary input to enable it to switch to supplying the relevant retail product.

⁴² This is consistent with the ERG Common Position (see section 2).

Unsuitability of chains of substitution

A7.54 Because of the limitations associated with the use of demand-side and supply-side substitution when applied to leased lines markets (as discussed above), we consider chains of substitution are of limited relevance for defining the geographic scope of leased lines markets.

Common pricing constraints

A7.55 We assess the presence of common pricing constraints as part of our analysis of homogeneous competitive conditions.⁴³

Homogeneous competitive conditions

- A7.56 Given the unsuitability of demand-side and supply-side substitution, we consider an assessment of the homogeneity of competitive conditions is the most appropriate way for defining the geographic scope of lease lines markets. This is consistent with the ERG's Common Position.⁴⁴
- A7.57 When assessing the geographic scope of a market on the basis of the homogeneity of competitive conditions it is normal practice to start with a narrow definition (small area) and then to see how this can be augmented. This raises the question of what geographic unit should be used as the area for the geographic market assessment. That is, what is the smallest unit of area to be considered and how should it be defined? The ERG Common Position states that the geographic units should satisfy the following criteria:
 - they should be mutually exclusive and less than national;
 - the network structure of all relevant operators and the services sold on the market can be mapped onto the geographic units;
 - they should have clear and stable boundaries;
 - they should be small enough that competitive conditions are unlikely to vary significantly within the unit but at the same time large enough that the burden o operators and NRAs⁴⁵ with regard to data delivery and analysis is reasonable⁴⁶.
- A7.58 We explain our choice of geographic unit in Section 5 on Geographic market definition.
- A7.59 Having chosen the appropriate geographic unit, the ERG Common Position identifies criteria for the analysis of the homogeneity of competitive conditions in those units⁴⁷. It states that:

"market definition should be based on the actual conditions of competition, reflected by the behaviour of the market players (e.g.

⁴³ In applying the pricing and price differences criterion.

⁴⁴ See section 2.

⁴⁵ National regulatory authorities (such as Ofcom in the UK).

⁴⁶ See section 2 of the Executive Summary.

⁴⁷ In so doing, it recognises that the criteria it identifies "are those which are also of importance in an SMP analysis" (see section 4.1).

pricing) and the effect of their behaviour on market structure (e.g. market shares). As it is generally the case in ex ante regulation, the analysis of the criteria should also be forward-looking and should – as far as possible – take into account developments until the next review".⁴⁸

- A7.60 The most important criteria identified by the ERG Common Position are:
 - barriers to entry;
 - number of suppliers;
 - distribution of market shares⁴⁹; and
 - pricing and price differences.
- A7.61 As the ERG Common Position makes clear, which criteria are the most relevant will as in an SMP analysis depend on the circumstances and has to be decided by us as the relevant NRA. The relevant criteria should be applied cumulatively and such that differences in competitive conditions between different markets are large while differences in competitive differences within a market are small.⁵⁰
- A7.62 As set out in detail in Section 5 on Geographic market definition, the criteria we apply cumulatively to define the geographic scope of the wholesale markets are:
 - number of suppliers;
 - distribution of service shares; and
 - pricing and price differences.
- A7.63 The criteria we apply cumulatively to define the geographic scope of the retail markets which we identify as those in which ex ante regulation may be warranted are:
 - distribution of service shares;
 - pricing and price differences; and
 - the nature of demand, in particular the extent to which consumers source their retail leased lines services from multiple suppliers⁵¹.
- A7.64 We assess barriers to entry⁵² when we define the geographic scope of the wholesale markets as part of the application of the number of suppliers criterion⁵³.

⁴⁸ See section 4.1.

⁴⁹ The ERG Common Position notes "these are not market shares in the true sense as the precise scope of the market has not yet been defined" (see section 4.1). We refer to this criterion as the distribution of service shares however we apply the criterion in the same way as applied in the ERG Common Position.

⁵⁰ See section 4.2.

⁵¹ This is consistent with the ERG Common Position (see sections 2 and 4).

⁵² We note the ERG Common Position states that "barriers to entry are usually related to economies of scale and sunk costs" (see section 4.1).

⁵³ We do this by assessing the impact of operators' alternative infrastructure.

The reason for this is that the requirements for entry into wholesale leased lines markets are the same irrespective of the geographic area. An operator needs it own network to compete. Across geographic areas there will be variations in the costs of building a network resulting in varying levels of sunk costs and, in our view, more significant variations in the density of demand for leased lines services resulting in varying geographic areas where economies of scale can be realised. Entry is most likely to be economic where leased lines users are concentrated such as in the large urban centres – this is borne out by our assessment of the impact of operators' alternative infrastructure, in particular our network reach analysis.⁵⁴

A7.65 Consequently, the extent of barriers to entry is reflected in the locations in which operators have built their networks and these are identified in our network reach analysis. Our network reach analysis also shows where barriers to future expansion to connect to new consumers are lowest, so it is by its nature a forward-looking analysis of potential competition which complements the service share analysis we undertake to assess the extent of actual competition.⁵⁵

⁵⁴ See our resulting wholesale market definition proposals which include identifying the London area, referred to as the WECLA (Western, Eastern and Central London Area), as a separate market.

⁵⁵ See Section [Geographic market definition].

Data analysis process

Scope of the Annex

A8.1 This Annex provides further detail on the processes adopted in analysing data for the purposes of product and geographic market definition. It also provides additional information on the data analysis process which has already been set out in the main Sections of this consultation. Specifically, we provide further detail relating to the following issues, as set out in Table 89.

Table 89 Issues discussed within this Annex

Issue	Summary of issue being considered	Reference
Issue 1: Methodology of the service share analysis	What is the approach adopted in order to measure the share of leased lines supplied by each operator?	§ A8.2 – A8.31
Issue 2: Methodology of the network reach analysis	What is the approach adopted in order to measure the availability of alternative infrastructure across the UK?	§ A8.32 – A8.42
Issue 3: Competition in UK cities	What is the evidence on competitive conditions in urban areas outside the proposed geographic markets of London and Hull?	§ A8.43 – A8.44
Issue 4: Fibre providers and the information request process	What is the evidence on the supply of leased lines and on network infrastructure from the operators which have not been subject to a section 135 information request?	§ A8.45 – A8.51
Issue 5: Trunk service shares	What is the approach for measuring service shares for the provision of TI trunk services?	§ A8.52 – A8.72
Issue 6: Retail Low Bandwidth Traditional Interface services	What is the evidence on geographic variation in service shares for the retail market for traditional interface low bandwidth leased lines?	§ A8.73 – A8.79
Issue 7: MISBO	What additional steps have been taken in processing and analysing MISBO market data submitted to us in response to the S135 Information requests?	§ A8.80 – A8.90

Methodology of the service shares analysis

Introduction

- A8.2 The methodology to estimate operators' service shares consisted of the following steps:
 - i) assessment of operators' retail and wholesale circuit datasets;
 - ii) data cleansing;
 - iii) operator-by-operator review and clarification;
 - iv) aggregation by postcode sector;
 - v) apportionment of partially incomplete entries; and
 - vi) calculation of operators' service share.

Assessment of operators' retail and wholesale circuit datasets

A8.3 In order to obtain service share results by postcode sectors we first calculated the number of circuit ends in each postcode sector. Responses to information requests allowed us to assess in which areas each circuit starts and ends. One circuit end in each of those two areas (i.e. postcode sectors) was counted for the operator providing that circuit.

Retail services

- A8.4 We have identified two main different types of retail leased line services:
 - A Type X retail leased line is a point-to-point circuit connecting two business customer sites (i.e. both ends are business customers' ends); and
 - A Type Y retail leased line is a network service circuit connecting a business customer site into the operator's network node (i.e. one end is a network node).

Figure 72 Retail leased line services



A8.5 A point-to-point retail leased line (Type X) used to connect two business customer sites contributes two customer end-points to the total service end counts (one to each of the postcode sectors where its two ends are located). A retail leased line (Type Y) used to connect a business customer site to an operator's network contributes one end-point to the total service end count (as we do not include network ends when assessing an operators' share of retail supply). We adopt this approach irrespective of the technology or interface of the circuit.

Wholesale services

- A8.6 The wholesale service share analysis is driven directly by the count of customer ends of circuits. This is in order to make the calculation of circuit numbers independent of the topology of a CPs' network. We treat Type X and Type Y circuits differently to reduce the risk of biased wholesale service counts, given that operators with different business strategies may provide mainly Type X, mainly Type Y or a more even mix of circuit types. The example below clarifies why a bias may occur if no distinction were to be made between Type X and Type Y circuits.
- A8.7 We identified two types of wholesale leased lines services, based on the Type X and Type Y retail circuits discussed above:
 - For Type X retail circuits (i.e. both ends of the circuit are customer ends), we treated each of the two customer sites as connected to a different terminating segment. Each segment has one customer and one network end. Thus a Type X retail circuit yields in total four ends (two customer and two network ends).⁵⁶
 - For Type Y retail circuits, at the wholesale level this corresponds to a single terminating segment. Thus a Type Y retail circuit yields in total two ends (one customer and one network end).



Figure 73 Wholesale leased lines services

A8.8 We consider an approach based on circuit ends is appropriate because it makes the service counts independent of the topology of the CP's network. Otherwise, calculation may yield different results even where two CPs supply the same service to a customer simply because the two CPs use a different method of routing a circuit between two customer ends.

⁵⁶ Separately, a trunk segment will be imputed when the ends of the two terminating segments are located in different TAN areas. The analysis of trunk markets is discussed in the Section on wholesale product market definition, as well as in part later on in this annex.

- A8.9 For example, consider a customer which has the requirement to link site A in one postcode sector to site B in another postcode sector. One CP (CP1) may choose to provide connectivity between customer sites A and B with a direct link and report this as a single circuit in the database submitted to us. Another CP (CP2) may instead route the connection serving the same sites via one or more network points and report this connection as multiple entries in its circuit database as illustrated below:
 - i) site A to network node X;
 - ii) network node X to node Y; and
 - iii) node Y to site B.
- A8.10 If we were to calculate the number of circuits directly as reported to us, CP2 would gain three counts compared to one count for CP1, which would inaccurately represent the actual service delivered, which is the same in each case. Since the end service supplied in both cases is identical, we have to ensure we do not over-count the number of ends delivered by CP2 and hence overestimate CP2's service share.
- A8.11 For this reason, we consider it appropriate to focus on customer site ends to assess the share of supply for each CP. Thus the unit of measure of our service share calculation is circuit ends rather than circuits. In the above example, regardless of how the two CPs decide to route circuits linking sites A and B, each CP will gain one customer end count in the postcode sector of site A, as well as one customer end count in the postcode sector of site B.
- A8.12 It is necessary to add network ends back into count, but in a way which is independent of the individual CP's network design. We do this by associating one network end to each customer end. This leads in the example above to a total of four ends, irrespective of the network topology or reporting convention in the CPs datasets. It is these four ends which will contribute to the end counts used in the service share assessment.
- A8.13 Our calculation of service shares of terminating segments of leased lines is based on data provided to us regarding CPs' wholesale and retail activities. Our estimates of market share are based on the following calculation:

Total terminating market = BT self-supply + BT sales to OCPs + OCP self-supply + OCP sales to CPs

- A8.14 Although self-supply data was part of the information request sent to CPs, most CPs were unable to produce robust self-supply data because their operational systems are not designed to hold this type of information. To address this, where a CP was unable to produce self-supply data, we derived the wholesale presence of CPs from their retail sales. To do so, we first subtracted from the CP's retail sales any circuits that the CP purchases from other CPs. We then added any sales by the CP to other CPs.
- A8.15 Therefore, the wholesale service share for each operator is arrived at by using the following calculation:

CP X net wholesale service count = Retail sales - Wholesale Purchases + Wholesale Provisions

- A8.16 The above formula therefore does not require the use of information on self-supply (which not all CPs were able to provide). We have applied this formula to BT where it does not report internal and external supply separately. This applies mostly to TI markets. In the case of AI markets, EOI obligations apply and this means that BT distinguishes between circuits supplied to external CPs and those supplied to its own downstream businesses.
- A8.17 Consequently in the case of wholesale service shares for BT's AI products, we applied the following calculation:

BT (AI) net wholesale service count = Self-supply (i.e. the OR Internal sales) + Wholesale Provisions (i.e. the OR external sales)

Data cleansing

- A8.18 The data submitted by CPs following information requests were not fully consistent with each other because of differences in the ways operators capture and store data. These differences arise because OCPs maintain different datasets and consequently devise ad hoc queries interrogating their billing and expenditure systems in order to extract the data requested that may not be wholly consistent.
- A8.19 Therefore, we carried out the following tasks to ensure consistency of presentation of the data received:
 - We removed circuits labelled as services considered to be outside the leased line markets defined within this market review.⁵⁷
 - We checked the circuit bandwidths, to ensure that they were all consistently recorded in the same unit. We then converted bandwidths to the common Mbit/s (megabits per second) format. We allocated circuits to each product market on the basis of information on the interface / technology and the circuit bandwidth.
 - Where errors in the postcode provided by operators were detected by means of a search algorithm, we carried out postcode correction. This remedies common, detectable errors which operators' data may be prone to as a result of relying upon automated batch processing techniques to record postcode data.⁵⁸
 - Where operators had not provided data on the type of end-point being served (at a by-circuit level), we engaged with CPs in order to obtain further information to support our analysis (as discussed in greater detail below). In many cases this resulted in the identification of a circuit end as a network end-point on the basis of matching with the operators' network points information (i.e. postcodes).

Operator-by-operator review and clarification

A8.20 We engaged with each of the CPs to follow up the information requests that we sent to them and their responses. For each CP, we reviewed the data submitted and

⁵⁷ These included PSTN telephony, ISDN, ADSL or Cable Modem circuits; IP VPNs (the VPN itself rather than a leased line input underpinning it, which is in the market and counted), ATM, Frame Relay, Dark fibre services, CCTV interface circuits, Broadcast access interface circuits and Street access interface circuits.

⁵⁸ For instance, the postcode SE1 9HA may have been recorded in a CP's system as SEI 9HA.

discussed with them any issues we encountered with their data submissions which required further clarification.

- A8.21 We sent each OCP (that is, CPs apart from BT) a request for a second review of the circuit type information provided to us. The circuit type data were recorded in 'fields' designed to capture circuit by circuit whether each circuit end (A-end and B-end) was a network rather than a customer end (or whether it was an international location). In some cases, an OCP had not provided such information, for instance by failing to label a circuit end as either a customer or network end. On the basis of the responses received from the follow up, we updated the OCP datasets to complete these fields.
- A8.22 We performed a similar exercise with respect to the BT data submission. BT provided us with a second submission (in December 2011), where it sought to complete and clarify the circuit end type fields. We then audited the new BT data. As with other CPs, we performed a further check in order to establish which BT circuit ends were network ends. This involved first matching circuit end locations to a database of local exchange locations (by postcode): any circuit ends at those locations have been considered network ends. A second check was then undertaken to match BT's circuit ends against locations where OCPs interconnect with BT. This check was based not only on the data provided by BT but also on data that we obtained from OCPs as to the location of their network nodes (which BT is not necessarily in a position to be able to observe). Specifically, for TI circuits, this involved a cross-check against the set of network locations (postcodes) reported to us by OCPs.⁵⁹
- A8.23 For each CP, we sought to ensure as far as possible that the data submitted to us as part of its sales and purchases datasets could be reconciled. In a few cases, we established an apparent mismatch and alerted the affected CP to this. This was the case, for instance, where a CP reported to us that it was buying wholesale circuits delivered to a certain postcode sector, but not selling any circuits ending at that postcode sector. We sought and received further clarification from BT and OCPs on such matters and adjusted our data records accordingly. Where an OCP indicated to us that incomplete records were the cause for this type of mismatch between sales and purchases, we relied on the purchasing evidence and impute sales in every postcode sector where that OCP appeared to buy but not sell circuits. This approach is appropriate as it avoids instances of negative OCP service shares (where an OCP appears to buy wholesale services but not sell retail services), while minimising the risk of underestimating the OCP's service share and thus overestimating BT's service share.

Aggregation by postcode sectors

Table 90 UK Postcode Components

Geographic Unit	Number	Example
Postcode Unit	1,752,003	SE1 9HA

⁵⁹ In the 2007/8 Review, we performed a similar step for TI circuits but not for AI circuits. For this reason, the comparison between 2007 and 2011 AI service share results would not be like-for-like unless some adjustments are made.
Postcode Sector	10,043	SE1 9
Postcode District	3,064	SE1
Postcode Area	124	SE

- A8.24 We associated circuit ends to postcode sectors on the basis of the postcode information provided by CPs. Where postcode information was partial or missing but other address data was present, we searched for the postcode associated with the address provided, which in some cases has allowed us to complete the CP missing data entry.
- A8.25 On this basis, each of these ends contributes to the counts in its postcode sector. As a result, within each postcode sector we calculate each operator's presence, distinguishing each of the separate product markets defined.

Apportionment of partially incomplete entries

- A8.26 We completed the analysis by imputing data to those service ends which we knew were supplied by an operator but for which the geographic, product or bandwidth information were incomplete. We did so by allocating these entries in proportion to the distribution of circuits with complete information. So, if a CP supplied 100 circuit ends for which we knew the exact postcode, and also a further end where the address and postcodes were missing, we spread the end count for the latter end across the 100 locations observed. In general, we distributed the circuit ends with unknown geographic data across the postcode sectors in proportion to the CP's geographic distribution.
- A8.27 This approach is appropriate since the alternative would be dropping the observations with partially incomplete data, which would have compromised the accuracy of total counts per operator.
- A8.28 As a further check, we performed a sensitivity test by assessing what the high-level results would have been had we not performed the apportionment and instead dropped all partially incomplete observations. The results of this check are shown in the table below.

Product	Apportionment of	Number of	BT service share
market	incomplete entries	circuit ends	(UK-wide)
	On	898,017	85%
LD HISDU	Off	759,702	90%
	On	10,295	59%
	Off	8,583	68%
HB TISBO	On	5,534	50%
	Off	4,004	50%
	On	571	5%
VHR LIZBO	Off	350	8%
	On	288,856	62%
LB AISBU	Off	231,566	69%
MICDO	On	10,662	47%
IVIISBO	Off	9,153	52%

Table 91 Sensitivity test on the impact of the apportionment of partially incomplete circuit entries

A8.29 The results in the above table show that, in all product markets, the effect of the apportionment on the BT service share is limited. In general, however, had we chosen not to apportion any partially incomplete entry, we would have found a slightly higher BT service share at the UK-wide level. This is because partially incomplete entries were found mainly within OCPs sales datasets. If we were to exclude them (instead of apportioning them), we would then risk underestimating the OCPs service share and overestimating BT's.

Operators' service share calculation

- A8.30 Once we were able to determine service counts by operator, we could then determine each operator's service share in each postcode sector. We did this for every product market.
- A8.31 When displaying service shares, we focus on the BT share. In this case, the service share bands that are used throughout the figures are as follows:
 - 0% to 30%
 - 30% to 40%
 - 40% to 50%
 - 50% to 70%
 - Above 70%

Methodology of the network reach analysis

Introduction

A8.32 We took a number of steps in order to ensure the highest possible accuracy for the analysis of alternative infrastructure. In order to perform this analysis we requested

data from OCPs on their infrastructure in actual or potential use (i.e. irrespective of whether the OCPs' fibre was lit or not).

- A8.33 As part of our information gathering, we asked OCPs to provide the location of the flexibility points in their networks by supplying the Easting and Northing coordinates for each flexibility point.⁶⁰
- A8.34 We defined flexibility points (or flex points) as the points:
 - a) where an OCP can access its existing infrastructure in order to connect an enduser premise; and
 - b) from which an OCP would consider, within its current network planning practice, extending its network reach in order to provide services to additional end-user premises.
- A8.35 For example, flexibility points may be buildings where fibre terminates on an Optical Distribution Frame or underground chambers where fibre can be accessed, such as where ducts meet at a junction in a footway box.

Review of the data

- A8.36 Prior to receiving the flexibility point data sets, we looked at the data from the 2007/8 Review to familiarise ourselves with the quantity of data and the previous extent of OCPs' networks.
- A8.37 On receipt of the flexibility point data, we checked each flexibility point data set to confirm whether it conformed to our format. Where possible, we made a set of appropriate corrections, such as:
 - converting text to numbers;
 - removing leading zeros;
 - splitting 12 digit references into two 6 digit Eastings and Northings;
 - converting two letter based 4 digit references to 6 digit references;
 - requesting missing and incomplete references;
 - checking the total number of flexibility points against the last BCMR totals; and
 - checking the total number of flexibility points against artificial limits e.g. 65k lines for older Excel.⁶¹
- A8.38 As a second step, we plotted the data received and we performed a set of visual checks, which involved:

⁶⁰ Eastings and Northings provide the coordinates of any given location in the UK in meters East and North of an origin just to the South West of the Scilly Isles.

⁶¹ We noticed that a database submitted to us was incomplete since it appeared truncated at 65k entries. This number is the limit number of entries that can be copied in an excel spreadsheet if using an older version of Excel. This matter was raised with the OCP, which then provided the full dataset.

- converting any flexibility points expressed in terms of latitude and longitude coordinates into a format that allows us to plot the data on maps;
- querying with the OCP obvious mistakes such as flexibility points in the sea or exact linear arrangements of flexibility points;
- checking each data set against the last BCMR to compare coverage;
- comparing the network coverage plot to any information available from the operators' websites regarding network coverage;
- performing a further sense-check by asking our internal experts to compare the network coverage as arrived at through our analysis with their knowledge of the topology of different operators' networks; and
- contacting the OCP in all cases where the above checks raised concerns so as to discuss the matter until the concern was dealt with.
- A8.39 Where the OCP confirmed to us that data was not available in a format that we could easily use, we then asked the operator to provide data in the format available to them and we then performed the conversion ourselves to the format needed for our visual mapping software (MapInfo Professional).

Data analysis

- A8.40 In practical terms, there are a number of different steps of the analysis:
 - the flex points for each operator (excluding BT) are plotted on a map;
 - the locations of businesses with more than 250 employees UK-wide are also plotted on the map;⁶²
 - a buffer area of 200m is drawn around each business site; and
 - the number of different OCPs that fall within the 200m buffer area around each business site (counting each OCP only once) is calculated. This gives the number of OCPs from which each business location could seek supply, given the 200m build distance assumption.
- A8.41 This process is illustrated in Table 92 below. In the example below there are 5 business locations in the postcode sector each with between 2 and 4 different operators with a flexibility point within 200m.

⁶² As discussed in the Section on geographic market definition, we performed as a sensitivity check a set of further network reach analyses where we plotted instead the locations of: i) MNOs base stations, ii) MDF/LLU sites, and iii) data centres.

	OCP1	OCP2	OCP3	OCP4	OCP5	OCP6	OCP7	OCP8	Total
Business site 1	Y	Y	N	N	N	N	Y	Y	4
Business site 2	Y	N	Y	N	N	N	N	Y	3
Business site 3	N	N	N	Y	Y	Y	Y	N	4
Business site 4	N	N	Y	Y	Y	N	N	N	3
Business site 5	N	N	N	N	N	N	Y	Y	2
Total									16

Table 92 Example calculation of average number of OCPs that can serve business sites in a postcode sector

A8.42 From this information, the average number of OCPs per business location in each postcode sector can be calculated. This is calculated by summing the number of OCPs within reach at each business location and dividing through by the number of business locations. For the postcode sector in the example above the network reach indicator calculated equals 3.2 (16/5). Because 3.2 is greater (or equal) than a value of two OCPs, this postcode sector would be considered as presenting a high network reach.

Competition in UK cities

- A8.43 In Section 5, we presented and discussed the key evidence which led us not to define separate geographic markets in areas other than the London area and Hull. In this subsection we present further results which shed light on the state of competitive conditions in the key UK cities considered in Section 5. We do so by displaying a set of figures which represent the variations in the network reach indicator across these cities.
- A8.44 We produced figures highlighting those postcode sectors which have a high network reach. In those postcode sectors, the average business site has access to the infrastructure of at least two alternative operators within reach of 200m.



Figure 74 Distribution of areas with high network reach - Birmingham

Note: the high network reach postcode sectors are in blue, motorways in grey, the Birmingham Metro area outlined in black, while Openreach Handover points are displayed as stars and postcode sectors containing a data centre are hatched.



Figure 75 Distribution of areas with high network reach - Manchester

Note: the high network reach postcode sectors are in blue, motorways in grey, the Manchester Metro area outlined in black, while Openreach Handover points are displayed as stars and postcode sectors containing a data centre are hatched.



Figure 76 Distribution of areas with high network reach - Leeds

Note: the high network reach postcode sectors are in blue, motorways in grey, while Openreach Handover points are displayed as stars and postcode sectors containing a data centre are hatched.

Fibre providers and the information request process

A8.45 As mentioned in Annex 13, we sent formal information requests to CPs that, to the best of our knowledge, are the major suppliers of leased lines in the UK. However, we are aware that there are other CPs that have fibre networks which are not covered by our information requests and which might be active in the supply of business connectivity services. We have therefore undertaken a higher level / qualitative assessment of these providers to determine their likely materiality to our network reach and SMP assessment.

BT's list of CPs with fibre access networks in London

- A8.46 BT provided us with a list of 23 providers that it believed owned fibre network assets in the London area that might be relevant to this review. From our own industry knowledge, we were able to determine the following:
 - twelve CPs received our information request in July 2011 or have been subsumed by CPs that received our information request, so their networks and service shares are taken into account in our analysis;
 - one CP (Internet Tech) appears to no longer exist;

- another CP (Hyperoptic) is in the early stages of deploying a fibre network in London having launched in September 2011 and appears to currently have negligible market presence;
- four CPs (Core, Edge, Storm and Syntec) are not active in the business connectivity market and we have found no indication that they have their own fibre networks; and
- one CP (Stripe21) is active in the business connectivity market but makes clear on its website that it buys 'tail circuits' from BT and there is no indication on its website that they have their own fibre network.
- A8.47 We interviewed the remaining four CPs from this list that appeared to operate fibre networks in London. They provided the following information to us about their networks and businesses:

•	Gamma Telecom – [⊁ ⊁ ⊁	≫];		$_{\varkappa}$
•	AboveNet - [⊁ ⊁			\times
•	Venus – [≻ ≻ ≻]; and	Ł		\times
•	VTL Wavenet (part of Viate \gg	əl) — [🔀	⊁].	\times

A8.48 Our initial view is that it is unlikely that the fibre networks operated by these four operators would materially affect our network reach analysis because [>
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The assessment of operators with Code Powers

- A8.49 For completeness, we also researched each of 117 UK organisations to whom Ofcom has allocated Code Powers.⁶³ Our review led to following observations:
 - 40 are now part of companies that received our information request in July 2011;
 - 4 were the CPs that we interviewed from BT's list;
 - 4 appeared to be insolvent or dissolved. We were unable to locate any information about a further 3 organisations and have concluded that they are no longer trading or have been subsumed into other organisations;
 - 16 are regional water utilities which as far as we can determine are not active in the business connectivity market;

⁶³ Code powers allow operators to benefit from certain exemptions under Town and Country Planning legislation and also entitle them to carry out street works under the New Road and Street Works Act 1991 without needing to apply for a licence to do so.

- 11 are regional operators (some with fibre networks) only one of which had a presence in London at a single London telehouse;
- 13 are telecoms operators that are not active in the business connectivity market (resellers, 08X operators, MVNOs etc);
- 9 fell into a miscellaneous category including private network operators, street lamp operators, facilities management companies, public bodies, all of which have presumably deployed telecoms cables at some point but are apparently not public telecoms operators; and
- 16 are international/foreign carriers with a presence in London, of which eight have a telehouse presence in London but their presence is limited to one or two POPs. Six have a presence at multiple telehouses in London (typically 4-5). With one exception, the international carriers appeared not to have UK networks, other than to provide international connectivity to their POPs in London.
- A8.50 We subsequently interviewed one of the international carriers, EU Fiber Networks and two other operators, Fibrespan UK and Arqiva, to determine the nature of their activity in the business connectivity market. [>
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Conclusion

A8.51 On the basis of our analysis of the 23 operators provided by BT and the operators with Code Powers, our view is that it is unlikely they would materially affect our geographic analysis. On this basis, our analysis of network reach conducted in Section 5 (on geographic market definition) is based on data provided by operators who submitted responses to us as part of the formal information requests. The latter are included in the List of evidence in a previous Annex.

Trunk service shares

- A8.52 As set out in Section 6, we propose to identify separate TI trunk markets for regional and national trunk segments at all bandwidths. In this subsection, we set out our approach to measuring market shares for these markets.
- A8.53 As per our assessment of market shares for terminating segments (AISBO, TISBO and MISBO markets), we rely on CP per circuit data (retail requirements and wholesale purchases) to derive market shares for trunk markets. We followed four main analytical steps to derive market shares, namely:
 - i) We identify TI circuits that contain trunk segments;
 - ii) We determine whether those circuits are used for national or regional trunk;
 - iii) We apply adjustments to trunk circuit counts to take into account the bandwidth of the trunk circuits sold; and
 - iv) We estimate (bandwidth weighted) market shares for the national and regional trunk markets. We combine a CP's self-supply and its sales of trunk to other CPs to compute its total trunk supply.

We use Trunk Aggregation Node 'catchment areas' to identify terminating and trunk segments

- A8.54 As explained in Section 6, we identify the boundary between TI trunk and terminating segment markets based on the location of trunk aggregation nodes (TANs).
- A8.55 We identified 46 such TAN locations based on key urban centres where CPs were likely to locate (at least) one of their key interconnect points to pick up termination traffic. The catchment areas associated with each TI TAN are shown in Figure 77 below.





- A8.56 The catchment areas shown in Figure 77 are based on the information BT has provided on its PPC logical routing model⁶⁴:
 - each address in the UK is served by a particular local exchange;
 - every local exchange is parented to one of BT's 67 Tier 1 nodes;
 - we then assigned every Tier 1 node to the TAN grouping to which it belongs .

⁶⁴ BT applies this logical routing model for charging purposes to determine the proportion of circuits that contain trunk or terminating segment.

- A8.57 So for example, the Southampton/Portsmouth TAN includes all addresses associated with local exchanges served by the Southampton and Portsmouth Tier 1 nodes.⁶⁵
- A8.58 Having established these TAN catchment areas, for our analysis, we counted a circuit as a terminating segment where both ends of a TI circuit fell entirely within a defined TAN catchment area. Consistent with our market definition proposals in Section 6, we assumed that any TI circuit that links different TAN catchment areas contains a trunk segment.

We determine TI trunk segments that are national or regional circuits

- A8.59 Having identified that the TI circuit in question contains a 'trunk segment', we then identify whether the trunk segment falls within our 'national' or 'regional' trunk markets. Again, we use TAN catchment areas to determine the boundary between national and regional trunk:
 - a regional trunk segment is a circuit between adjacent TANs; and
 - a national trunk segments is a circuit between non-adjacent TANs.
- A8.60 Figure 78 shows the adjacent TAN catchment areas based on the information BT has provided on its logical parenting of local exchanges back to its Tier 1 nodes.



Figure 78 Adjacent and non-adjacent trunk aggregation nodes

A8.61 Figure 78 shows for example that we would count circuits between the Aberdeen and Edinburgh and between Aberdeen and Glasgow/Clyde TANs as regional trunk,

⁶⁵ For each TAN, we rely on BT's routing of local exchanges to Tier 1 nodes which in turn fall within particular TAN.

whereas all remaining circuits for Aberdeen to another TAN would be counted within the national trunk market (e.g. Aberdeen to London Docklands).

A8.62 We therefore generated for each CP a count of TI circuits that contained a trunk segment and the count of circuits that were either national or regional trunk.

We apply bandwidth weights to trunk circuit counts

- A8.63 As set out in Section 6, in our market definition for regional and national TI trunk services we do not propose to identify breaks in the market by bandwidth. However, if we were simply to count each trunk circuit without adjusting for the bandwidth provided over that link, we may end up with a bias in our market share estimates. This is because a CP may purchase a 155 Mbit/s trunk circuit in the wholesale market and use that trunk segment to deliver a number of lower capacity retail circuits (e.g. a number of 2Mbit/s retail circuits). If we did not adjust for these differences in bandwidth then we would not be assessing circuit sales on a comparable basis. We therefore adjust our trunk counts by assigning greater weight to higher speed circuits relative to lower speed circuits.
- A8.64 The bandwidth weightings we apply use the Commission's recommendation on retail leased lines prices as referred to in Ofcom's disaggregated markets statement⁶⁶ and as used in the 2007/8 Review (see paragraphs 7.358-7.359). The weightings we use are shown in Table 93 below.

RANGE	WEIGH TING FAC TOR
Range 1(>0 <=0.064Mbps)	1
Range 2 (>0.064 <=0.512 Mbps)	1
Range3 (>0.512 <=1.5Mbps)	4
Range 4(>1.5 <=2.5Mbps)	4
Range 5(>2.5 <=8.2Mbps)	4
Range 6(>82 <=40Mbps)	18
Range 7 (>40 <=50Mbps)	18
Range 8 (>50 <= 110 Mbps)	22
Range 9 (>110 <=160 Mbps)	26
Range 10 (> 160 <=623Mbps)	50
Range 11 (>623 <=15000Mbps)	50

Table 93 Bandwidth weightings applied to trunk circuits (mbps = Mbit/s)

Source: Ofcom 2006

A8.65 Hence, in our circuit counts, if a CP sold two circuits at 155 Mbit/s (which has a weight of 26) and ten trunk circuits at 64 kbit/s (which has a weight of 1), we would have a weighted average count of 62 trunk circuits.⁶⁷

⁶⁶ See page 98: "Disggregated markets – leased lines", Ofcom, Discussion document, March 2006 <u>http://stakeholders.ofcom.org.uk/binaries/consultations/disagg/summary/consultation.pdf</u>

⁶⁷ 2 x 26 (the weighting factor for 155 Mbit/s circuits) plus 10 x 1 (the weighting factor for 64 kbit/s circuits) = 62.

We estimate wholesale market shares using retail and wholesale circuits

A8.66 As is the case in other wholesale markets, we based our calculation of trunk market shares on data provided to us regarding CPs' wholesale and retail activities. Our estimates of market share are based on the following calculation:

Total trunk market = BT self-supply + BT sales to OCPs + OCP self-supply + OCP sales to CPs

A8.67 In order to calculate market shares, we therefore required data on sales of trunk circuits and data on self-supply. The data on 'BT's sales to OCPs' and 'OCP sales to CPs' was directly provided to us by CPs. However, we did not obtain direct information on CPs' self-supply and hence we have had to estimate the amount of self-supplied trunk.

We inferred self-supplied trunk from retail requirements

- A8.68 We estimated a particular CP's self-supply by examining the total trunk requirements that corresponded to its activities in the various retail leased line markets.
- A8.69 Specifically, in line with the analytical steps set out above, we assessed a CP's trunk requirements by identifying the physical location of each of the 'terminating ends' of the retail circuits supplied by that CP to its retail customers. As BT has data which enabled us to match each circuit in the UK to a particular aggregation node, it was then possible to assess whether a particular retail circuit required a trunk segment (i.e. whether it linked ends in different TAN catchment areas).
- A8.70 In order to calculate the CP's self-supply, we subtracted its purchases of trunk segments (i.e. trunk purchases from other CPs including BT) from its total trunk retail requirements.

We combined CP's self-supply and sales of trunk to derive wholesale shares

A8.71 We then calculated each CP's trunk market share by adding its self-supply and any sales it made to other CPs and dividing this by the overall number of trunk segments in the market.

Outputs of our trunk analysis

A8.72 In light of the above calculation steps, we present in our SMP analysis our estimates of BT's overall trunk market share for regional trunk and national trunk markets.⁶⁸

Retail Low Bandwidth Traditional Interface services

A8.73 In the Section on geographic market definition, we presented and discussed the key evidence which has informed our proposal to define, for retail low bandwidth TI leased lines, a geographic market in Hull and a further geographic market in the

⁶⁸ For regional trunk markets we have also presented evidence showing market shares on individual regional trunk routes. This individual route-by-route analysis is less appropriate for national markets, however, due to the greater degree of substitution that is possible for national routes (using indirect or parallel routes). For a further discussion of substitution for national routes see section 6.

rest of the UK (excluding Hull). In this subsection, we present further results which shed light on the state of competitive conditions in this product market.

- A8.74 As mentioned in the Section on geographic market definition, we have performed a supplementary analysis of variation in competitive conditions in the retail market for low bandwidth TI leased lines. This analysis is based on the assessment of service shares.
- A8.75 We have produced below Figures displaying the variation in BT service share first throughout the UK and then focusing on the London area.

Figure 79 BT's service share in the low bandwidth TI retail market: UK





Figure 80 BT's service share in the low bandwidth TI retail market: London

Note: Service share values are coloured as per the previous legend. The WECLA contour is in blue, the London Metro is outlined in black, the 2007/8 CELA outlined in green and motorways are in grey.

A8.76 We have evaluated the average service shares in the key areas proposed as separate geographic markets for other (wholesale) product markets. The average service share for LB TI retail services UK-wide is 72%; in the WECLA it is 60%; while in the UK excluding the WECLA and Hull it is 75%. We interpret the comparison between these two latter shares as not indicating significant differences in competitive conditions between those two areas because both average shares are well above the SMP threshold.



Table 94 Distribution of BT LB TI retail service shares UK-wide

- A8.77 Table 94 displays a distribution of the BT share across all the UK postcode sectors. BT's share differs across postcode sectors, with extreme values of 100% and 0%. However, such variations are to be expected where the number of sites in an individual postcode sector may be very low. Indeed, we frequently find the same maximum and minimum in all the product markets and this indicates that these extreme values tell us little or nothing about competition in the area. Notwithstanding that, the variance of the BT share UK-wide stands at 6%.⁶⁹ This is reflected by the distribution of shares shown in Table 94.
- A8.78 The above figures show that there is very little variation in BT's service share in the LB TI retail market when assessed on a postcode sector basis. This analysis shows that, throughout the UK, BT holds a significantly high share of services supplied, which signals limited variation in competitive conditions by geography, with the exception of Hull.
- A8.79 We also note that the above share estimates are of direct relevance for the purpose of the geographic market analysis, insofar as they allow to highlight the presence of heterogeneous competitive conditions between different areas. In identifying apparently significant differences in market shares, we have taken into account both the difference between the shares and the level of the shares relative to the conventional 40% and 50% thresholds used in the assessment of market power. Further analysis of the low bandwidth TI retail market is in the Section 7, which includes a set of supplementary analyses which fall outside the scope of the geographic market definition.

MISBO

Characteristics of MISBO products

- A8.80 The purpose of this subsection is to provide further information on the steps taken to perform the service share analysis of the MISBO market. As discussed in the Section on wholesale product market definition, MISBO is a combined market for terminating segments with any interface and delivering any service faster than 1Gbit/s, and for terminating segments delivered with WDM equipment at the customer's premises (providing services at any bandwidth). In this subsection, we focus specifically on our analysis of the terminating segments delivered with WDM equipment at the customer's premises.
- A8.81 A service delivered over a WDM link to a customer's premises is generally associated with a wavelength. A single WDM bearer can convey multiple wavelengths, which is the source of its ability to deliver high amounts of information over a single fibre.
- A8.82 In providing us with data on WDM circuits sold, CPs have reported to us the number of wavelengths supplied. In certain cases, we have also obtained information on the bearers underpinning those wavelengths. We have chosen to focus the service counts on wavelengths rather than bearers for a number of reasons. First, wavelengths constitute the closest proxy to services provided. Given that the purpose of this analysis is to assess service shares, this favours counting wavelengths rather than bearers. Second, CPs may differ in their approach to installing multiple bearers to allow for capacity expansion even when supplying

⁶⁹ The variance is a statistical measure of the extent to which observations – in this case service shares in individual postcode sectors – are spread around the mean. The low variance in this case indicates that service shares in most postcode sectors tend to be close to the UK-wide mean of 72%.

the same amount of services. Given that we strive to ensure comparability between the supply of different CPs, we prefer the measure which is more likely to allow us to compare CPs on a like-for-like basis. On this basis, we consider wavelengths to be a more appropriate basis of comparison than bearers.

Steps taken to ensure the robustness of MISBO service counts

- A8.83 The nature of circuits delivered to the customer over WDM links is such that, in analysing the MISBO market, we have taken additional steps to mitigate any risks that could result in a bias of our service share analysis, particularly given the low volumes of circuits in this market.
- A8.84 We have engaged with OCPs in order to clarify the definition of WDM circuits and ensure their correct reporting of any circuits which would fall under our proposed MISBO market definition. This resulted in a further two submissions from OCPs (in November and December 2011) which allowed us to identify additional WDM circuits, which had not been reported as such within those OCPs' sales databases already provided to us.
- A8.85 As explained in the subsection on service share methodology, since we can observe the BT AI self-supply data, we compute the BT AI service count as follows:

BT (AI) net wholesale service count = Self-supply (i.e. the OR Internal sales) + Wholesale Provisions (i.e. the OR external sales)

- A8.86 We have used the above approach to establish the count of BT AI circuits above 1Gbit/s.
- A8.87 We have also engaged with BT to ensure a correct understanding of its supply of WDM links. BT submitted further data on WDM circuits in March 2012, which we have used to refine the MISBO service share analysis. An important characteristic of the BT portfolio of WDM circuits sold is that they are only in part provisioned and reported in line with EOI requirements. This is because WDM circuits installed up until 2008 (by either BTGS, BTW or BTR) were exempt from EOI requirements. Services sold over those non-EOI circuits (including additional services over the same WDM links) do not use Openreach inputs. In addition, in the case of WDM circuits with a radial distance greater than 100km, BT continues to be exempt from EOI requirements.
- A8.88 As a consequence of the above, we do not fully observe BT's self-supply of WDM circuits. In order to include all non-EOI circuits, we have modified the service count formula as follows:

BT (WDM) net wholesale service count = Self-supply (i.e. the OR Internal sales) + Wholesale Provisions (i.e. the OR external sales) – Self-supply to BTGS, BTW, BTR (in the OR Internal dataset) + Retail sales by BTGS, BTW, BTR - BT purchases from OCPs

A8.89 As shown by this formula, in practice, for BT's WDM counts we have taken the same starting point as for AI counts. As a next step, we removed from the Openreach internal database any WDM circuits sold to either BTGS, BTW or BTR. Finally, we added all WDM sales by BTGS, BTW and BTR (net of any inputs that they may have purchased from OCPs). This last step implies that we are able to

account for all BT wholesale circuits ultimately sold by BTGS, BTW or BTR – irrespective of whether their input was reported on an EOI basis or not. For this reason, the application of the above formula ensures that no double counting or undercounting occurs when assessing the BT WDM service counts.

A8.90 As a final step in the wholesale service count, for each CP we pool the WDM circuit counts together with the counts for its terminating segments with any interface and delivering any service faster than 1Gbit/s.

Annex 9

Replicability of low bandwidth digital leased lines

Introduction

- A9.1 In the Telecoms Strategic Review statement⁷⁰ we decided to consider how we could introduce more deregulation in retail business markets. Business users, along with BT, claimed that relaxing pricing restrictions applying to BT for those business services subject to SMP conditions would allow bespoke pricing and more aggressive competition on prices. Relaxation of certain pricing obligation could also potentially reduce price-following behaviour by BT's competitors, which could contribute to some extent to muted price competition.
- A9.2 Consequently in April 2006, we published a Statement entitled "The replicability of BT's regulated business services and the regulation of business markets" (the Replicability Statement).⁷¹ This considered whether its competitors could technically and commercially replicate BT's retail low bandwidth leased lines.
- A9.3 In the Replicability Statement, we indicated that, once replicability had been achieved in relation to BT's retail low bandwidth digital leased lines provided with a traditional interface we would consider relaxing the pricing restrictions which apply to BT as a result of its SMP in this market. In particular, we said that we would consider granting BT the freedom to set bespoke prices for these services and relaxing the presumption that bundles of SMP and non SMP products are anti-competitive.
- A9.4 Replicability is an important regulatory threshold. It reflects the availability of fit for purpose wholesale inputs from BT which allow its competitors to replicate effectively BT's retail prices, terms and conditions of supply. Therefore, in the presence of replicability we would expect competition to improve significantly, with benefits for customers in terms of lower prices and more choice of services and providers.
- A9.5 In the Replicability Statement, Ofcom identified nine issues that constituted a bar to replicability of retail low bandwidth digital leased lines on which we expected BT to act upon before we could consider replicability had been achieved. In brief, these were:
 - Addressing cost disparities between retail leased lines and PPCs as a result of the PPC pricing model;
 - Implementation of revised forecasting penalties;
 - Implementation of an option to re-designate/grandfather multiplexers on costoriented terms;
 - Successful conclusion of the Master Services Agreement (MSA) or PPC contract review process;

⁷⁰ <u>http://stakeholders.ofcom.org.uk/binaries/consultations/752417/statement/statement.pdf</u>

⁷¹ <u>http://www.ofcom.org.uk/consult/condocs/busretail/statement/</u>

- Prove adequate billing accuracy and bill verifiability;
- Implement relevant price changes for In Span Handover (ISH) extension circuits;
- Introduce Key Performance Indicators (KPIs) to allow the performance of the BT Retail Customer Management Centre (CMC) to be compared to the wholesale CMCs;
- Availability of Priority Prompt and Total Care Service Level Agreements (SLAs) on PPCs designated for use in safety of life or defence of the realm applications; and
- Potential double payment for equipment cancelled after the Firm Order Confirmation (FOC) point and subsequently deployed in fulfilment of another order.

The June 2009 Consultation

- A9.6 In November 2008, BT wrote to Ofcom setting out how it considered it had addressed the replicability issues identified in the Replicability Statement. Consequently, in June 2009 we published a consultation entitled "Replicability and the regulation of BT's low bandwidth leased lines" (the 2009 Replicability Consultation).⁷² The 2009 Replicability Consultation reviewed the nine issues in light of BT's submission and set out our provisional view that BT's low bandwidth digital leased lines could be replicated by its competitors. Consequently we proposed that BT should be given greater pricing freedom, and in particular BT should:
 - no longer be obliged to publish its prices for low bandwidth digital leased lines;
 - be permitted to offer bespoke prices for low bandwidth digital leased lines provided that prices do not fall below the LRIC price floor; and
 - be required to implement an internal governance mechanism to ensure that the LRIC price floor is not breached.

Subsequent Developments

A9.7 Ofcom subsequently suspended work pending the outcome of the Leased Lines Charge Control Appeal (LLCC Appeal).⁷³ In light of this delay and subsequent developments in the market, in 2011 Ofcom decided to defer consideration of the replicability proposals to this market review.

Responses to the 2009 Replicability Consultation

- A9.8 There were four respondents to the consultation. The main points raised were:
 - C&WW considered that Ofcom's proposals were flawed and that as a point of principle, Ofcom should wait for evidence that replicability had eroded BT's retail market share before removing retail regulation;

⁷² http://stakeholders.ofcom.org.uk/consultations/low_bandwidth/

⁷³ http://www.catribunal.org.uk/237-4334/1112-3-3-09-Cable--Wireless-UK.html

- C&WW also thought that Ofcom should not implement the replicability proposals, arguing that two of the major obstacles to replicability (PoH charging and circuit routing) had not been fully resolved, though it acknowledged that progress had been made with PoH charging;
- Virgin Media were sceptical about the prospects for competition and argued against implementing the proposals. They also had concerns about the LRIC price floor and the governance arrangements;
- The CMA and the ENA representing users of these circuits were both sceptical about the likelihood of replicability leading to greater retail competition and the ENA was concerned that retail prices would rise.

CFI Responses

- A9.9 There were also several comments about the replicability proposals in the CFI responses:
 - C&WW said that Ofcom should not implement the replicability proposals, arguing that two of the major obstacles to replicability (PoH charging and circuit routing) had not been fully resolved, though it acknowledged that progress had been made with PoH charging;
 - C&WW also raised concerns about relying on BT's internal governance processes as part of the replicability proposals; and
 - UKCTA also argued that the replicability proposals should not be implemented until its concerns about PoH rental charges, circuit routing, BT's internal governance and the provision of a managed CP-to-CP circuit transfer process had been addressed.

Ofcom comments

A9.10 We have considered the two points raised by stakeholders about the barriers to replicability but have not considered the points about the price floor and the governance arrangements as they are not relevant to our current proposals. We consider the strength of retail competition in Section 9.

PoH Charging

A9.11 C&WW's concerns about PoH charging were central to the LLCC Appeal and have been addressed in our work stemming from the Competition Appeals Tribunal's ruling on the appeal.⁷⁴ In light of the ruling, in September 2011 we revised the charge control for TI services setting certain PoH charges on a LRIC basis.

Circuit routing

A9.12 In relation to circuit routing we acknowledge that because CPs need to route their circuits via their nearest point of handover with BT's network their circuit routings are sometimes less direct than BT's. From the point of view of establishing equivalence and supporting replicability, the critical point is that the cost allocation system treats internal and external circuits in the same way. As discussed in the

⁷⁴ <u>http://stakeholders.ofcom.org.uk/consultations/revision-points-handover-pricing/final-statement/</u>

January 2008 Consultation⁷⁵, this should not translate into a commercial disadvantage for CPs since under the terms of its SMP obligations, BT is required to charge its downstream services for the use of PPCs on the same basis that it would charge a CP. In the 2009 Replicability Consultation we reported that BT had confirmed that this is indeed the case and that costs are allocated to PPCs and BT's downstream services on a circuit volume basis that gives an equitable allocation.⁷⁶

Conclusion

A9.13 Having considered the points raised by stakeholders about the barriers to replicability, we remain of the view that BT's low bandwidth digital circuits can be replicated by its competitors.

⁷⁵ See paragraph A13.8

⁷⁶ See paragraph 3.43 of the 2009 Replicability Consultation

Annex 10

Summary of exemptions from BT's Undertakings in relation to Wavestream National

Introduction

- A10.1 In this Annex we outline the arrangements under which BT Global Services currently provides its WDM-based retail product, Wavestream National, and summarise the history that led to them.
- A10.2 On 22 September 2005 BT offered, and Ofcom accepted, a set of undertakings (the Undertakings) pursuant to section 154 of the Enterprise Act. The Undertakings addressed issues that had been raised by Ofcom as it considered whether to refer certain markets to the Competition Commission in relation to the provision of fixed telecommunications. The Undertakings were accepted by Ofcom in lieu of making such a reference at that time. Ofcom's reasons for accepting the Undertakings, together with the Undertakings themselves, are set out in full in the document entitled "Final statements on the Strategic Review of Telecommunications, and undertakings in lieu of a reference under the Enterprise Act 2002" (the TSR).⁷⁷
- A10.3 In the TSR we concluded that there were enduring bottlenecks in fixed telecoms, and adopted the principle that regulation should promote competition as deep in the network infrastructure as was likely to be effective and sustainable. We noted that where CPs competing on this basis need access to parts of BT's network where competition is not sustainable, BT would need to provide such access on the same terms as it makes it available to itself.
- A10.4 To achieve this, the Undertakings were designed to deliver equality of access through the principles of equivalence at the product level and functional separation of the organisation of BT. Specifically, the Undertakings require BT to separate its delivery and systems functions to ensure that certain wholesale products and services are delivered by BT on the basis of equivalence of inputs (EOI).
- A10.5 To meet the separation requirement, BT created a new organisation, Openreach that is intended to be operationally distinct from the rest of the BT Group and which provides most of the wholesale EOI products. Importantly, where BT delivers a specified wholesale offering of EOI network products, it must do so to the same timescales, terms and conditions and using the same systems and processes in providing such services to both BT's downstream businesses and to other CPs. This is to ensure that downstream competitors use a common and equivalent set of inputs when offering competing services to residential and business customers.

BT's Wavestream National product

A10.6 BT Global Services provides the following three retail products which use WDM equipment at the customer's premises to deliver leased lines services:

⁷⁷ http://www.ofcom.org.uk/consult/condocs/statement_tsr/

- Wavestream Connect, with a maximum radial distance of 35km
- Wavestream Regional, with a maximum radial distance of 70km, and
- Wavestream National (WN), where the radial distance exceeds 70km.
- A10.7 While Wavestream Connect and Wavestream Regional, consume on the basis of EOI Openreach's OSA and OSEA respectively, WN does not currently consume an input product on the basis of EOI.
- A10.8 BT Global Services has provided WN using two different architectures: a) point-topoint or dedicated-fibre infrastructure; and b) shared-fibre infrastructure. The former provides a dedicated fibre link between the end-customer's premises, whilst the latter multiplexes wavelengths over BT's shared core network. These architectures are illustrated in Figure 81 below.

Figure 81 Wavestream National solution architectures



Wavestream National Dedicated Solution

Wavestream National Shared Solution



A10.9 Neither of these solutions facilitates consumption of EOI inputs by BT. Circuits delivered with the point-to-point solution use a fibre splice to interconnect the access fibre to the core fibre without any active equipment, so there is no handover point between the access/backhaul and core, and it was therefore not possible for BT to separate the segments and to consume an active EOI access segment. With the shared infrastructure architecture the NTE and core WDM equipment use proprietary interfaces that do not conform fully to industry standards and, furthermore, the equipment is no longer supplied or developed. Currently BT only uses the point-to-point architecture to support new requirements.

The 2008 Wavestream National Exemption

- A10.10 In view of these issues and the immature state of the market, from both commercial and technical standards perspectives, after BT's Undertakings were agreed, in 2008 we agreed to a request from BT for exemption from EOI (the 2008 WN Exemption).⁷⁸ In this we:
 - Secured a commitment from BT to provide an input product, and to deploy a shared infrastructure solution for WN that would consume it, based on Optical Transport Network (OTN) standards;79
 - Granted an exemption from EOI requirements for the shared infrastructure • solution until 31 December 2010:
 - Granted an exemption permitting the completion of migration of services from the existing shared infrastructure solution to the EOI solution to be completed by 2015; and
 - Exempted the point-to-point solution from EOI requirements subject to biennial review.

A10.11 The OTN architecture is illustrated in Figure 82 below.



Figure 82 OTN WDM architecture

A10.12 Openreach proposed at that time that its new product would be:

- based on the Optical Transport Network (OTN) standard as defined by the ITU-T, and therefore required the development of OTU1 (2.5Gbit/s) and OTU2 (10Gbit/s) interfaces; and
- developed by extending the capabilities of the existing OSA and OSEA access products.

⁷⁸ Variation to and exemption from BT's Undertakings under the Enterprise Act 2002 related to IPStream in certain geographic markets and Wavestream National

http://stakeholders.ofcom.org.uk/binaries/telecoms/policy/bt/wavestream1208.pdf ⁷⁹ ITU Standard G.709 is commonly called Optical Transport Network (OTN). It is defined as set of Optical Network Elements connected by optical fibre links, able to provide functionality of transport, multiplexing, switching, management, supervision and survivability of optical channels carrying client signals.

The 2010 Wavestream National Exemption

- A10.13 In 2010 we agreed a further request for exemption from EOI for WN (the 2010 WN Exemption) for both the shared infrastructure solution and the point-to-point solutions pending the current review.⁸⁰
- A10.14 In its request, BT argued that there was no evidence of consumer harm, and that there was no firm demand for an EOI product, in part because the OTN technical standards had taken longer to mature and gain acceptance than had been expected. A further problem was that BT was unable to deliver the OTN solution by 31 December 2010 because the development process had taken longer than expected due to both external and internal factors.
- A10.15 BT also claimed that consuming a wholesale input product based on OTN technology would increase its costs of delivering WN significantly, because it would require more equipment in its core network relative to the point-to-point architecture and would entail significant associated costs to upgrade operational support systems (OSS). It argued therefore that requiring it to consume this wholesale product would be disproportionate.
- A10.16 We concluded that it would be disproportionate to insist on the application of EOI in the absence of evidence of a competition problem. We therefore granted the exemption request pending completion of the current review, which was expected to provide the opportunity for a detailed assessment of competitive conditions. However we secured BT's firm commitment that Openreach would continue to develop the wholesale product.

⁸⁰ Exemption from BT's Undertakings under the Enterprise Act 2002 relating to Wavestream National <u>http://stakeholders.ofcom.org.uk/binaries/consultations/bt-wavestream/statement/wavestream-statement.pdf</u>

Annex 11

Mapping of Openreach legacy to new Ethernet services

Legacy Openreach Ethernet Services (No longer available for new supply)	New Openreach Ethernet Services
Wholesale Ethernet Extension Service (WES)	Ethernet Access Direct (EAD)
Connects end-user to CP Provided using point to point fibre with a radial range of 25km Supports symmetrical uncontended bandwidths of 10Mbit/s, 100Mbit/s and 1Gbit/s	Connects end-user to end-user or CP Provided using point to point fibre with a radial range of 25km EAD extended has a radial range of 35km EAD Local Access ('EAD LA')
Wholesale End to End Ethernet Extension Service (WEES)	Connects end-user to Openreach Access Serving Node (ASN) Provided using point to point fibre with a radial
Connects end-user to end-user Provided using point to point fibre with a radial range of 25km Supports symmetrical uncontended bandwidths of 10Mbit/s, 100Mbit/s and 1Gbit/s	range of 25km All EAD variants support symmetrical uncontended bandwidths of 10Mbit/s, 100Mbit/s and 1Gbit/s except EAD extended which only supports 1Gbit/s

WES and WEES for 2.5Gbit/s and 10Gbit/s

Continues to be available for new supply

WES aggregation

Continues to be available for new supply

Aggregates up to ten end-users onto a single backhaul link to a CP The ten 'spokes' have a radial range of 25km and the aggregated link has a radial range of 25km Supports symmetrical uncontended 'spoke' bandwidths of 10Mbit/s and 100Mbit/s

Backhaul Extension Service (BES) Connects CP equipment in a BT site with a CP site Provided using point to point fibre with a radial range of 25km Supports symmetrical uncontended bandwidths of 100Mbit/s, 155Mbit/s, 622Mbit/s, 1Gbit/s, 2.5Gbit/s and 10Gbit/s	Ethernet Backhaul Direct (EBD) Connects an ASN and an Openreach Handover point (OHP) Provided using WDM with no distance limitations Supports symmetrical uncontended bandwidths of 1Gbit/s and 10Gbit/s
BES (Daisy Chain) Connects CP equipment in a BT site with CP equipment in another BT site Provided using point to point fibre with a radial range of 25km Supports symmetrical uncontended bandwidths of 100Mbit/s, 155Mbit/s, 622Mbit/s, 1Gbit/s, 2.5Gbit/s and 10Gbit/s	No specific daisy chain option offered. BES daisy chain can be replaced by EAD. Note however that EAD is only available up to 1 Gbit/s
No equivalent legacy product was offered by Openreach because all of the legacy services were point to point and so did not provide	Bulk Transport Link (BTL)

aggregation	Connects an OHP and a CP site Provided using WDM with a radial range of 35km Supports symmetrical uncontended bandwidth at 1Gbit/s for up to 32 channels

Annex 12

The case for differential remedies for data centres

Introduction

- A12.1 In response to the CFI and subsequently, BT has presented a case to Ofcom that data centres should be treated as a distinct market reflecting the view that there is more competition to supply data centres than other leased line users.
- A12.2 BT has framed its argument as an alternative to our approach to geographic market definition; in other words, BT considers we should identify a separate, specific competitive market for connections at data centres in all bandwidths using any type of interface. We do not consider this is an appropriate way to approach questions of geographic market definition for reasons set out in Section 5.
- A12.3 Hence, we have also considered whether it may be possible to identify data centres as a distinct category of customer within the markets we propose to define in this consultation, and if so whether it is appropriate to apply a lighter-touch set of remedies to services provided to the types of customer in question, in areas where BT is found to have SMP.
- A12.4 Our analysis is set out in this Annex. We first consider whether it may be possible to define 'data centres' in a clear and precise way based on the characteristics of the services they purchase, their business model or the function they perform. We conclude that there are significant difficulties in producing a definition which would be clear enough for us to take a different approach to data centres when compared with other businesses demanding leased lines.
- A12.5 Secondly, we consider whether data centres can be distinguished from other leased line users by their scale, measured by the total bandwidth and the number of circuits purchased. We do so by analysing 151 data centres outside the WECLA which have been identified by BT or by Ofcom research into organisations describing themselves as 'data centres'. However, we find that it is not possible to identify a distinct category of customer on the basis of scale alone.
- A12.6 We then combine the results of this analysis with our network reach analysis. The network reach analysis is a way of assessing the extent of potential competition in a geographic area by counting the number of operators able to supply leased lines to customers in that area using their own infrastructure.⁸¹
- A12.7 This part of our analysis has the following steps:
 - 12.7.1 We identify those data centres with 2+ OCPs within reach on the basis of a 200m build distance. The 2+ OCPs and 200m criteria are consistent with the network reach analysis we use to identify potentially competitive areas for the purposes of geographic market definition set out in Section 5.

⁸¹ See Section 5 for a full description.

- 12.7.2 We graph the distribution of sites by circuit count and bandwidth for this subset of data centres.
- 12.7.3 We graph the proportion of sites meeting the network reach criterion by circuit count and bandwidth.
- 12.7.4 We repeat the above steps using a 1km build distance. As explained in Section 5, BT has argued that a 1km build distance is realistic for high value sites such as data centres. The data on actual build distances which we have obtained from CPs show that they are, on occasion, prepared to build 1km or more, although the average distance is much lower.
- A12.8 We then examine the results for any systematic variation by circuit count or bandwidth in the number and proportion of sites meeting the network reach test. Applying this test, we find some evidence that competition at data centre sites increases as total bandwidth and circuit numbers increase, but we do not find a scale above which competitive conditions are clearly and materially different to those below it.
- A12.9 Finally we consider whether, when and how it might be appropriate to reflect this pattern of competition in our proposals for remedies in the markets in which we have found BT to have SMP. In formulating our proposals, we have taken into account the absence, currently, of an effective WDM interconnection product. This means that operators will need to provide an end-to-end service using their own networks, and will therefore need to have access network presence at both ends of a circuit connecting two sites, not just at a single data centre site in order to compete. The presence of competing infrastructure at a data centre site will not therefore, currently and of itself, be sufficient to demonstrate that the provision of leased line services to that site is competitive. Together with the inability to identify a clearly more competitive segment, the absence of an effective WDM interconnection product means that we do not propose variations to remedies now. However, once an interconnection product is available, the competitive situation may become clearer, and this may permit differential remedies to be applied in future.

Defining data centres

A12.10 We have proposed to define a market for MISBO services, the very high bandwidth services which are frequently used by data centres and other customers who need to transfer very large amounts of data. To put data centres in the context of the MISBO market, we have analysed the MISBO services supplied by BT and six major competing suppliers (C&WW, COLT, Virgin Media, Level 3 / Global Crossing, Geo, and Verizon), together accounting for more than 90% of OCP-provided MISBO services, to identify the number of locations served. In addition, we have looked at any sales of dark fibre on the assumption that these may be used to support self-supplied MISBO services. Sites are identified by postcodes on the assumption that larger buildings will have a unique postcode. The table below shows the number of unique postcodes served by MISBO and dark fibre services inside and outside the WECLA.⁸²

⁸² There are no MISBO services supplied in the Hull area, and so the area outside the WECLA is equivalent to the geographic market for MISBO services in the UK excluding the Hull area and the WECLA.

A12.11 Table 95 below shows that there are around [≫] sites supplied with MISBO services in the area outside the WECLA.⁸³ This is a far greater number than the 151 sites that have been identified as data centres. The last row shows that, as we would expect, BT supplies a higher proportion of sites requiring MISBO services outside the WECLA than inside.⁸⁴

Table 95 Number of sites to which MISBO services and dark fibre are currently supplied – first by all major CPs including BT and then by BT alone

	The WECLA	UK excluding the WECLA
MISBO only	\times	\times
MISBO + dark fibre	⊁	\times
BT MISBO installed base	⊁	\times

- A12.12 This shows that data centres cannot be distinguished from other businesses simply on the basis that they are supplied using MISBO services.
- A12.13 BT has suggested that there should be a separate market for all connectivity services supplied to 'data centres'. Very broadly, 'data centres' can be seen as locations primarily designed to house communications and computing equipment.
- A12.14 There are practical difficulties with this suggestion, however, in particular because the housing of communications or computing equipment is not by any means unique to sites commonly described as 'data centres'. In the absence of a sufficiently clear and precise definition, there is a risk of uncertainty and of inappropriate differential treatment were we to create an arbitrary distinction.
- A12.15 Table 96 below provides some examples of the functions and business models which may be associated with data centres. It should also be noted that many different ownership structures for the underlying infrastructure are possible.

Type of data centre Examples		Services and functions typically provided at these sites	
Carrier neutral data centre	Telehouse North (London); Scolocate (Edinburgh); Telecity	CP interconnection (especially for internet transit & peering);	
	(Manchester)	Hosting of applications, websites and	

Table 96 Examples of functions and services provided by data centres

⁸³ There are a number of caveats to this analysis. We considered approximately [\gg] circuits or wavelengths. Of these [\gg] are missing A-end postcodes and [\gg] are missing B-end postcodes. Some are international circuits, but many of these entries ought to have a UK postcode. As a result, we may be underestimating the number of sites served by MISBO services by about 10%.

However, CPs have sometimes recorded different postcodes for the same site, e.g. due to typos. For example, we have B10 0HJ, B10 0HP and B10 0HQ all appearing separately and therefore being counted as separate sites. Given the services being supplied, it is likely that these are all refer to the same building. This suggests our figures might be slight overestimates.

⁸⁴ Note that this should not be used to infer market shares: OCPs will also supply MISBO services to the same sites as BT.

CP network nodes	BT exchange	other content;	
CP data centre	COLT 'London 3'	Storage and backup; Caching content	
	Data centre Fareham	5	
IT service provider data centre	IBM disaster recovery; Sungard availability services	Hosting of applications, websites and other content; Storage and backup;	

Source: Ofcom research

- A12.16 The table illustrates the variety of services provided in facilities which are referred to generically as 'data centres'. If different treatment of data centres is to be justified (and they were to form a distinct sub-market) then data centres would need to have largely homogeneous supply and demand characteristics which are distinct from other business premises. Given the range of functions and business models associated with data centres, we consider that it is unlikely that they will have homogeneous characteristics. For example, some data centres may be used exclusively to house content servers or storage and backup, whereas others may offer all of the functions and services listed above. Equally, some data centres are run exclusively for a single corporate customer, whereas others provide services to a wide range of businesses.
- A12.17 Equally, we think it is unlikely that any set of characteristics which are common to data centres would also be unique to data centres. As a result, any definition on the basis of those characteristics is likely to include sites which are not data centres. For example, functions such as hosting of content may be carried out by servers housed in the communications rooms of large offices as well as at dedicated data centre sites.

Analysing variations in competitive conditions

- A12.18 We have considered whether, notwithstanding the definitional issues, if we assess a set of end-users who have been identified as data centres, either by BT or through our research, these are sufficiently distinct from other leased line customers to justify a different approach. We first consider whether it is possible to identify a distinct set of data centres on the basis of total bandwidth demand and number of circuits purchased.
- A12.19 To inform our analysis, BT supplied a set of 101 UK postcodes which it believes correspond to the location of data centres. This has been supplemented by our own research to produce a consolidated list of 201 postcodes, 151 of which are outside the WECLA.
- A12.20 We have looked at the connectivity services supplied to these sites by BT and six large competing CPs (C&WW, COLT, Virgin Media, Level 3 / Global Crossing, Geo, and Verizon). Of these 151 sites, BT appeared to be the only supplier at 59, and there was only one competitor at another 60 of the sites.
- A12.21 It is also important to consider potential supply. If there were enough demand from these sites, then CPs would be more likely to undertake the investments necessary to extend their networks to reach them. Using the same circuit data and the same set of CPs, we have calculated the total number and total bandwidth of circuits sold

to each site. As shown Table 97 and Table 98 below, the distribution of demand is highly skewed.

<10 circuits	>=10, <100	>=100, <1000	>=1000 circuits
\times	\times	\times	\times

Table 97 Circuit count distribution (number of sites)

Table 98 Bandwidth distribution

<1Gbps	>=1Gbps, <10Gbps	>=10Gbps, <100Gbps	>=100 Gbps
\times	\times	${}^{\times}$	\times

- A12.22 This evidence suggests that there are a small number of very large sites which will be most attractive to OCPs wishing to offer competing services, and a relatively long tail of much smaller sites. The connectivity demand from many of these smaller sites is still considerably larger than the average business, but not sufficiently different to warrant special treatment.
- A12.23 Initially, we have attempted to find a breakpoint in the distributions of sites by bandwidth and circuit count, without considering network reach. However, no such breakpoint is obvious, as the charts below show. The two charts show the distribution of the number of sites (outside the WECLA⁸⁵): the first shows the distribution of sites by circuit count for different given levels of total bandwidth demand; the second chart shows the distribution of sites by total bandwidth for various given levels of the circuit count. Thus each of the different lines in Figure 83 represents a different level of total bandwidth. Similarly, in Figure 84, each line represents a different given level of the circuit count.
- A12.24 In the first part of this analysis, we consider whether there are any discontinuities in the curves on the charts which could indicate the presence of a distinct group of 'large' data centres. However, our conclusion from this analysis is that no such clear breakpoints exist. Competitive conditions vary widely between the sites, with some sites appearing little different from other business premises and not appearing to offer the prospect of the very high volume (either in terms of circuits or bandwidth) which could tempt OCPs to invest in network infrastructure to reach the site.

⁸⁵ We base our analysis on sites outside the WECLA. Our geographic market analysis shows that markets in the WECLA are much more competitive than elsewhere, but this reflects the characteristics of the WECLA, in particular the high density of business customers. In order to identify the specific characteristics of data centres which make them competitive (if any), we concentrate on those sites outside the WECLA, in areas where markets generally are not effectively competitive. But we intend our conclusions to apply to all data centres meeting the relevant criteria, including those in the WECLA.



Figure 83 Distribution of sites by circuit count



Figure 84 Bandwidth distribution of sites

Data centre characteristics and network reach

- A12.25 Because we are unable to distinguish data centres from other users on the basis of scale alone, we have also combined the above results with our network reach analysis. The network reach analysis shows where OCPs have their own network infrastructure, and therefore are more likely to be able to compete with BT. We consider whether it is possible to distinguish those data centres for which there is potential competition, according to the network reach criteria, from others on the basis of total bandwidth and number of circuits purchased. If we can, we may in future be able to devise some simple scale-based criteria to identify a more competitive market segment in which to apply lighter-rouch remedies.
- A12.26 We begin by considering the number of competing networks at the locations of the largest data centres, defined by total bandwidth and circuit numbers. We have performed this analysis for the 151 data centres (identified in the manner set out above) outside the WECLA.
- A12.27 As a first step in this analysis, we identify which data centres in this set of 151 pass the standard network reach test which we used to identify potentially competitive postcode sectors in our geographic market definition analysis set out earlier. That is, we identify those data centres which have two or more OCPs with a network flexpoint within 200 metres (representing the economic build distance) of the site. This produces a subset of 70 sites.
A12.28 We have then graphed the distribution of sites by circuit count (see Figure 85) and bandwidth (Figure 86) for this subset of data centres, in the same way as for the whole set of 151 data centres in the charts above.







Figure 86 Distribution of sites by bandwidth – sites outside the WECLA with 2+ OCPs within 200 metres

- A12.29 The size distribution of these sites is broadly similar to that for the set of all 151 data centres. It is not possible on the basis of this analysis alone to identify a group of 'competitive' sites.
- A12.30 In the next two charts, we repeat the above analysis using a 1km build distance to define potentially competitive sites. As explained in the geographic market definition Section, BT has argued that a 1km build distance is realistic for high value sites such as data centres.⁸⁶ This produces a subset of 129 sites.
- A12.31 As can be seen, the size distribution of sites is again similar to the earlier charts, with no clear break point emerging.

⁸⁶ Our analysis of actual distances dug is set out in Section 5. This shows that OCPs are prepared to dig beyond 1km on occasion but that this has occurred only to a very limited extent in practice.



Figure 87 Distribution of sites by circuit count – sites outside the WECLA with 2+ OCPs within 1km



Figure 88 Distribution of sites by bandwidth – sites outside the WECLA with 2+ OCPs within 1km

A12.32 In the final part of this analysis, we have graphed the proportion of sites passing the two versions of the network reach test against circuit count and bandwidth. We then examine the results for any systematic variation in the proportion of sites meeting the network reach test by circuit count and/or bandwidth. As can be seen from the charts below, this analysis appears potentially somewhat more informative than an analysis of the distribution of the absolute number of sites.





- A12.33 It can be seen from the above that there is some tendency for larger data centres to be more likely to meet the network reach criterion. That is, data centres which demand a larger number of circuits tend to have more OCP network infrastructure within reach. The proportion of sites with more than two OCPs within 200m is naturally smaller than the proportion having more than two OCPs within 1km, but the same pattern of competition increasing with size is displayed in each case. This suggests that there will tend to be greater competition in the supply of connectivity to data centres which demand a greater volume of circuits.
- A12.34 There is however no very clear break point in either data set, and the build distance assumption seems to be more important to the outcome than the size of the data centre. This is indicated by the fact that the lines on the graph are rather flat whilst the gap between them is relatively large.





- A12.35 A broadly similar pattern emerges when the size of the data centre is measured by total bandwidth supplied to the site. It can be seen from Figure 89 above that the proportion of sites meeting either of the network reach criteria rises as total bandwidth increases, with some suggestion of a plateau at above about 5Gbit/s. As before, the proportion of sites meeting the 200 metres version of the criterion is naturally lower than if 1km is used, and the build distance assumption seems to dominate the results.
- A12.36 BT has argued that a 1km build distance assumption is appropriate, at least for the largest sites, but this seems less plausible for smaller sites and our analysis of actual dig distances suggests that digs of 1km or more are rare. The fact that the build distance assumption seems to have more impact on the proportion of sites which might be regarded as competitive as the size of the data centre (however measured) then makes it difficult to identify a competitive segment based on scale. Thus the observed relationship between total bandwidth per site, circuit count and the results of the network reach analysis appears weak, and we also do not know how robust it is likely to be over time.
- A12.37 In addition, those operators already serving a data centre site may have a first mover advantage over other operators even when the latter have network within 1km of the site. This means that, even if operators would be prepared to dig 1km or more to reach a new data centre site, existing data centres may realistically face a more limited choice of potential suppliers when issuing a new tender. On this basis, we do not consider it possible to define a more competitive market segment at present.

Regulatory remedies

A12.38 Where competition is in the relatively early stages, it is often necessary to require BT to adhere to standard published tariffs, with limited scope for variations in the form of published discount schemes. Where there is already significant competition, it may be appropriate to allow BT a significant amount or pricing freedom. In this situation, allowing BT to offer bespoke discounts could benefit customers by enabling BT to meet prices offered by its rivals, eliminating price-following by other operators, hence intensifying competition.

- A12.39 We think that the level of competition to supply large data centres and similar businesses could, in principle, be sufficient to justify a significant degree of pricing freedom for BT. However, for reasons explained above, a necessary condition for this to happen is that there should be an effective interconnection product for WDM services. Together with the inability to identify a clearly more competitive segment at present, the absence of an effective WDM interconnection product means that we do not propose variations to remedies now. However, once an effective interconnection product is available, the competitive situation may become clearer, and this may permit differential remedies to be applied in future.
- A12.40 In the next market review some three years from now, we will be able to see the effect of any new interconnection products on the market and it may then be appropriate to consider some relaxation of regulation, even if BT still has SMP in relevant markets.

Annex 13

Sources of evidence

Introduction

- A13.1 We have noted throughout the consultation 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 that evidence. We also list all responses to our various consultations and to our various notices under section 135 of the Communications Act 2003.
- A13.2 Whilst the Annex lists the main evidence we have relied upon, the list is for convenience only and is not intended to be exhaustive.

Ofcom Documents

- A13.3 Oftel's market review guidelines: criteria for the assessment of significant market power, Issued by the Director General of Telecommunications, August 2002. www.ofcom.org.uk/static/archive/oftel/publications/about_oftel/2002/smpg0802.htm
- A13.4 Imposing access obligations under the new EU Directives, September 2002. <u>http://www.ofcom.org.uk/static/archive/oftel/publications/ind_guidelines/acce0902.ht</u> <u>m</u>
- A13.5 Review of the retail leased lines, symmetric broadband origination and wholesale trunk segments markets, a consultation by the Director General of Telecommunications, Consultation, April 2003. http://www.ofcom.org.uk/static/archive/oftel/publications/eu_directives/2003/eu_leased_lines/llmr0403_1.pdf
- A13.6 Review of the retail leased lines, symmetric broadband origination and wholesale trunk segments, Markets, Final Statement and Notification, 2004. <u>http://stakeholders.ofcom.org.uk/binaries/consultations/llmr/statement/state_note.pd</u>
- A13.7 Strategic Review of Telecommunications, Phase 2 consultation document, November 2004. <u>http://stakeholders.ofcom.org.uk/binaries/consultations/telecoms_p2/summary/main_condoc.pdf</u>
- A13.8 Better Policy Making, Ofcom's approach to Impact Assessment, Consultation, July 2005. http://stakeholders.ofcom.org.uk/binaries/consultations/ia_guidelines/summary/cond oc.pdf
- A13.9 Final statements on the Strategic Review of Telecommunications, and undertakings in lieu of a reference under the Enterprise Act 2002, Statement, September 2005. http://www.ofcom.org.uk/static/telecoms_review/final_statement.htm
- A13.10 The replicability of BT's regulated retail business services and the regulation of business retail markets, Statement, April 2006. <u>http://www.ofcom.org.uk/consult/condocs/busretail/statement/</u>

- A13.11 Complaint from Thus Plc and Gamma Telecom Limited against BT about alleged margin squeeze in wholesale call pricing, Case Reference: CW/00988/06/08. <u>http://stakeholders.ofcom.org.uk/enforcement/competition-bulletins/open-cases/all-open-cases/cw_988/</u>
- A13.12 Business Connectivity Services Review, Market research, January 2008. http://stakeholders.ofcom.org.uk/binaries/consultations/bcmr/statement/research.pdf
- A13.13 Service level guarantees: incentivising performance, Statement and Directions, March 2008. <u>http://stakeholders.ofcom.org.uk/binaries/consultations/slg/statement/statement.pdf</u>
- A13.14 Business Connectivity Market Review, Review of the wholesale very high bandwidth traditional interface symmetric broadband origination markets, Consultation, July 2008. <u>http://stakeholders.ofcom.org.uk/binaries/consultations/bcmr_tisbo/summary/consult ation.pdf</u>
- A13.15 Variations to BT's Undertakings under the Enterprise Act 2002 in respect of BT's NGN, Space and Power and OSS separation, Statement, October 2008. <u>http://stakeholders.ofcom.org.uk/binaries/consultations/variations_bt/statement/statement071008.pdf</u>
- A13.16 Variation to and exemption from BT's Undertakings under the Enterprise Act 2002 related to IPStream in certain geographic markets and Wavestream National, Statement, December 2008. http://stakeholders.ofcom.org.uk/binaries/telecoms/policy/bt/wavestream1208.pdf
- A13.17 Business Connectivity Market Review, Review of the retail leased lines, wholesale symmetric broadband origination and wholesale trunk segments markets, Statement and Consultation, December 2008. <u>http://stakeholders.ofcom.org.uk/binaries/consultations/bcmr08/summary/bcmr08.pd</u> f
- A13.18 Leased Lines Charge Control, A new charge control framework for wholesale traditional interface and alternative interface products and services, Consultation, December 2008. <u>http://stakeholders.ofcom.org.uk/binaries/consultations/llcc/summary/leasedlines.pd</u> <u>f</u>
- A13.19 Business Connectivity Market Review, Review of the retail leased lines, wholesale symmetric broadband origination and wholesale trunk segments markets, Statement, February 2009. <u>http://stakeholders.ofcom.org.uk/binaries/consultations/bcmr08/statement/statement</u>. <u>.pdf</u>
- A13.20 Replicability and the regulation of BT's retail low bandwidth digital leased lines, Draft Consent, Consultation, June 2009. <u>http://stakeholders.ofcom.org.uk/consultations/low_bandwidth/</u>

Leased Lines Charge Control, A new charge control framework for wholesale traditional interface and alternative interface products and services, Statement, July 2009. <u>http://stakeholders.ofcom.org.uk/consultations/llcc/statement/</u>

- A13.21 Re-prioritising BT's remaining Undertakings commitments on information systems separation, Statement, September 2009. http://stakeholders.ofcom.org.uk/consultations/btundertakings/statement/
- A13.22 Business Connectivity Market Review, Review of the retail leased lines, wholesale symmetric broadband origination and wholesale trunk segments markets, Statement, February 2009. <u>http://stakeholders.ofcom.org.uk/binaries/consultations/bcmr08/statement/statement</u> <u>.pdf</u>
- A13.23 Review of the wholesale broadband access markets, Consultation on market definition, market power determinations and remedies, March 2010. <u>http://stakeholders.ofcom.org.uk/binaries/consultations/wba/summary/wbacondoc.p</u> <u>df</u>
- A13.24 Review of the wholesale broadband access markets, Second consultation on market definition, market power determinations and remedies, Consultation, August 2010. <u>http://stakeholders.ofcom.org.uk/binaries/consultations/wholesale-broadbandmarkets/summary/WBA_condoc.pdf</u>
- A13.25 Leased Lines Charge Control, Adoption of Revised SMP Services Conditions following the Competition Appeal Tribunal's Directions of 20 September 2010, September 2010. <u>http://stakeholders.ofcom.org.uk/binaries/consultations/llcc/statement/LLCC_decision_n_final.pdf</u>
- A13.26 Review of the wholesale local access market, Statement on market definition, market power determinations and remedies, Statement, October 2010. <u>http://stakeholders.ofcom.org.uk/binaries/consultations/wla/statement/WLA_statement_MLA_statement_mLa_statement_MLA_statement_MLA_statement_MLA_statement_mLa_statement_mLa_statement_mLa_statement_statemen</u>
- A13.27 Exemption from BT's Undertakings under the Enterprise Act 2002 related to Wavestream National, Statement, December 2010. <u>http://stakeholders.ofcom.org.uk/binaries/consultations/bt-</u> <u>wavestream/statement/wavestream-statement.pdf</u>

Changes to BT and KCOM's regulatory and financial reporting 2010/11 update, Consultation, February 2011. <u>http://stakeholders.ofcom.org.uk/consultations/bt-kcom-reporting/</u>

- A13.28 Business Connectivity Market Review, Call for Inputs, Consultation, April 2011. http://stakeholders.ofcom.org.uk/consultations/bcmr-inputs/?a=0
- A13.29 Business Connectivity Market Review Renewal of BT's analogue and low bandwidth digital leased lines undertakings, Statement, May 2011. <u>http://stakeholders.ofcom.org.uk/consultations/bcmr08/renewal/</u>
- A13.30 LLCC PPC Points of Handover pricing review, Final Statement on modification of SMP Conditions, September 2011. <u>http://stakeholders.ofcom.org.uk/binaries/consultations/revision-points-handover-pricing/statement/final-statement.pdf</u>

UK Legislation

- A13.31 The Communications Act 2003, as amended. http://www.legislation.gov.uk/ukpga/2003/21/contents
- A13.32 The Privacy and Electronic Communications (EC Directive) Regulations 2003. http://www.legislation.gov.uk/uksi/2003/2426/contents/made
- A13.33 The Electronic Communications and Wireless Telegraphy Regulations 2011. http://www.legislation.gov.uk/uksi/2011/2949/made?view=plain
- A13.34 The Competition Act 1998. http://www.legislation.gov.uk/ukpga/1998/41/contents
- A13.35 The Enterprise Act 2002. <u>http://www.legislation.gov.uk/ukpga/2002/40/contents</u>

Competition Commission/Office of Fair Trading Documents

A13.36 Office of Fair Trading, Market Definition – Understanding Competition Law, OFT 403, December 2004. http://www.oft.gov.uk/shared_oft/business_leaflets/ca98_guidelines/oft403.pdf

Competition Appeal Tribunal Documents

A13.37 Cable & Wireless UK supported by Verizon UK Limited v Office of Communications supported by British Telecommunications PLC, Case No: 1112/3/3/09 – September 2010. <u>http://www.catribunal.org.uk/237-4334/1112-3-3-09-Cable--Wireless-UK.html</u>

http://www.catribunal.org.uk/files/1112 Cable Wireless Ruling 200910.pdf

A13.38 British Telecommunications plc v Office of Communications supported by Everything Everywhere Limited, Hutchison 3G UK Limited (Case No: 1171/3/3/10) and by Virgin Media Limited, Everything Everywhere Limited, Talk Telecom Group plc and British Sky Broadcasting Limited, (Case No: 1172/3/3/10). http://catribunal.org/files/1171-72_BT_Judgment_030511.pdf

Other Judgements

- A13.39 United States v. E. I. du Pont de Nemours & Co., 351 U.S. 377 (1956). http://supreme.justia.com/cases/federal/us/351/377/case.html
- A13.40 Judgment of 24 October 1996, Viho / Commission (C-73/95 P, ECR 1996 p. I-5457). <u>http://eur-</u> <u>lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:61995CJ0073:EN:PDF</u>

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- A13.41 The Treaty of the European Union and the Treaty establishing the European Community (Consolidated Versions). <u>http://eur-</u> <u>lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2006:321E:0001:0331:EN:PDF</u>
- A13.42 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), 11.7.2002. <u>http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2002:165:0006:0031:EN:PDF</u>

- A13.43 Commission Recommendation of 11 February 2003 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, (2003/311/EC). <u>http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:114:0045:0045:EN:PDF</u>
- A13.44 Commission Recommendation of 17 December 2007 on relevant product and service markets within the electronic communications sector susceptible to ex ante regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services (2007/879/EC). <u>http://eur-</u> lex.europa.eu/LexUriServ/site/en/oj/2007/1 344/1 34420071228en00650069.pdf
- A13.45 Commission Staff Working Document, Accompanying document to the Commission Recommendation 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 {(C(2007) 5406)}. <u>http://ec.europa.eu/information_society/policy/ecomm/doc/library/proposals/sec200</u> <u>7_1483_final.pdf</u>
- A13.46 Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services (Framework Directive). <u>http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2002:108:0033:0033:EN:PDF</u>
- A13.47 Directive 2002/19/EC of the European Parliament and of the Council of 7 March 2002 on access to, and interconnection of, electronic communications networks and associated facilities (Access Directive). <u>http://eur-</u> <u>lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2002:108:0007:0007:EN:PDF</u>
- A13.48 Directive 2002/20/EC of the European Parliament and of the Council of 7 March 2002 on the authorisation of electronic communications networks and services (Authorisation Directive). <u>http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2002:108:0021:0021:EN:PDF</u>
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- A13.50 Directive 2002/58/EC of the European Parliament and of the Council of 12 July 2002 concerning the processing of personal data and the protection of privacy in the electronic communications sector (Directive on privacy and electronic communications). <u>http://eur-</u> lex.europa.eu/LexUriServ.do?uri=OJ:L:2002:201:0037:0047:en:PDF
- A13.51 Directive 2009/140/EC of the European Parliament and of the Council of 25 November 2009 amending Directives 2002/21/EC on a common regulatory framework for electronic communications networks and services, 2002/19/EC on access to, and interconnection of, electronic communications networks and associated facilities, and 2002/20/EC on the authorisation of electronic

communications networks and services. <u>http://eur-</u> lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:337:0037:0069:EN:PDF

A13.52 Directive 2009/136/EC of the European Parliament and of the Council of 25 November 2009 amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services, Directive 2002/58/EC concerning the processing of personal data and the protection of privacy in the electronic communications sector and Regulation (EC) No 2006/2004 on cooperation between national authorities responsible for the enforcement of consumer protection laws. <u>http://eur-</u> lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:337:0011:0036:En:PDF

ERG-BEREC Documents

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- A13.54 Revised ERG Working paper on the SMP concept for the new regulatory framework, ERG (03) 09rev3, September 2005. <u>http://erg.eu.int/doc/publications/public_hearing_concept_smp/erg_03_09rev3_smp_common_concept.pdf</u>
- A13.55 Revised ERG Common Position on the approach to Appropriate remedies in the ECNS regulatory framework, ERG (06) 33, May 2006. http://erg.eu.int/doc/meeting/erg_06_33_remedies_common_position_june_06.pdf
- A13.56 ERG Common Position on Best Practice in Remedies imposed as a consequence of a position of Significant Market Power in the relevant markets for Wholesale Leased Lines, ERG (07) 54 final 080331, 2007. http://www.erg.eu.int/doc/publications/erg_07_54_wll_cp_final_080331.pdf
- A13.57 ERG Report on the Public Consultation of the ERG Common Position on Geographic Aspects of Market Analysis (definition and remedies), ERG (08) 20b final CP Geog Aspects cons report 081016, September 2008. <u>http://erg.ec.europa.eu/doc/publications/erg_08_20b_final_cp_geog_aspects_cons_report_081016.pdf</u>

Ofcom Research

- A13.58 Jigsaw research Business Connectivity Services Review October 2011. http://stakeholders.ofcom.org.uk/binaries/consultations/businessconnectivity/annexes/business-review.pdf
- A13.59 Ofcom's research report on UK fixed-line broadband performance, November 2011 - The performance of fixed-line broadband delivered to UK residential consumers – February 2012. <u>http://stakeholders.ofcom.org.uk/binaries/research/broadband-</u> research/Fixed_bb_speeds_Nov_2011.pdf
- A13.60 CSMG, Economics of Shared Infrastructure Access Final Report, Prepared for Ofcom, February 2010. <u>http://stakeholders.ofcom.org.uk/binaries/consultations/wla/annexes/csmg.pdf</u>

Other Research

- A13.61 Analysys-Mason, Bonded copper business broadband access services have good mileage yet to come, Viewpoint, October 2011. <u>http://www.analysysmason.com/Research/Content/Viewpoints/RDTW0_RDME0_Bonded_copper_Oct2011/</u>
- A13.62 CMA, Internet Opportunity Survey 2011, Executive summary, 2011. http://www.thecma.com/content_pdf/press/Internet_Opportunity_Survey_2011.pdf
- A13.63 Ralph Santitoro, Metro Ethernet Services A Technical Overview, 2003. http://metroethernetforum.org/metro-ethernet-services.pdf
- A13.64 MEF Synchronization for Mobile Backhaul December 201. <u>http://www.ixiacom.com/pdfs/library/white_papers/MEF-</u> <u>MBH_Synch_HaughHirdRam-Draft_101208_1725_1.pdf</u>
- A13.65 Royal Mail Door to Door FAQ. <u>http://www.royalmail.com/marketing-</u> services/campaign-delivery/door-door/faqs#29600259.

Stakeholder Responses to our Call for Inputs

- A13.66 Stakeholder responses are published on the Ofcom website, grouped together by consultation. Due to the large number of responses links to the responses landing page are provided only (for the full list of respondents to the Call for Inputs, see also Annex 1 of the Consultation).
- A13.67 Responses to the Business Connectivity Market Review Call for Inputs April 2011. <u>http://stakeholders.ofcom.org.uk/consultations/bcmr-inputs/?showResponses=true&pageNum=1#responses</u>

Information Requests

- A13.68 We issued a series of notices under section 135 of the Communications Act 2003, requiring various CPs to provide specified information as set out in the Notice. These information requests and the responses received are listed below.
- A13.69 Information request of 23 May 2011 covering specified information about network and network reach, business connectivity retail services, provision of wholesale services to OCPs, purchases of wholesale services from OCPs and internal selfsupply. Information received from:
 - Response from BT Group.
- A13.70 Information request of 23 May 2011 covering specified information about network and network reach, business connectivity retail services, provision of wholesale services to BT and OCPs, purchases of wholesale services from BT and other OCPs. Information received from:
 - Response from AT&T;
 - Response from BSkyB;
 - Response from Colt Technology Services;

- Response from Cable and Wireless Worldwide;
- Response from Easynet Global Services;
- Response from Exponential-e Limited;
- Response from Geo Networks Limited;
- Response from Global Crossing UK Telecommunications Ltd;
- Response from KCOM Group;
- Response from Level 3 Communications Limited;
- Response from MLL Telecom Limited;
- Response from Neos Networks (Scottish and Southern Energy Limited);
- Response from Newnet (c/o Timico Limited);
- Response from Orange Business Services;
- Response from TalkTalk Group;
- Response from Verizon Global Solutions UK Ltd;
- Response from Virgin Media;
- Response from Vtesse.
- A13.71 Information request of 23 May 2011 covering specified information about network and network reach and about leased lines volumes and revenues, in particular about purchases of wholesale services from BT and other CPs and self-supplied circuits used to deliver MNO's mobile network connectivity requirements. Information received from:
 - Response from Everything Everywhere Limited;
 - Response from Vodafone Limited;
 - Response from Telefonica O2 UK Ltd;
 - Response from Hutchison 3G UK Limited.
- A13.72 Information request of 10 August 2011 covering specified information related to the identification of the telecommunications markets for retail leased lines, any other forms of retail business connectivity services and associated wholesale services and the assessment of market power within them (In particular information about typical Ethernet purchasing scenarios, the new Openreach Ethernet network and optical spectrum products). Information received from:
 - Response from British Telecommunications plc.
- A13.73 Information request of 13 September 2011 covering specified information about OCP's network extension practice . Information received from:

- Response from AT&T;
- Response from BSkyB;
- Response from Colt Technology Services;
- Response from Cable and Wireless Worldwide;
- Response from Easynet Global Services;
- Response from Exponential-e Limited;
- Response from Geo Networks Limited;
- Response from Global Crossing UK Telecommunications Ltd;
- Response from KCOM Group;
- Response from Level 3 Communications Limited;
- Response from MLL Telecom Limited;
- Response from Neos Networks (Scottish and Southern Energy Limited);
- Response from Newnet (c/o Timico Limited);
- Response from Orange Business Services;
- Response from TalkTalk Group;
- Response from Verizon Global Solutions UK Ltd;
- Response from Virgin Media;
- Response from Vtesse.
- A13.74 Information request of 5 October 2011 covering specified information related to the identification of the telecommunications markets for retail leased lines, any other forms of retail business connectivity services and associated wholesale services and the assessment of market power within them (in particular additional information on Wavestream products). Information received from:
 - Response from British Telecommunications plc.
- A13.75 Information request of 3 November 2011 covering specified information related to the identification of the telecommunications markets for retail leased lines, any other forms of retail business connectivity services and associated wholesale services and the assessment of market power within them (in particular information on retail traditional interface leased line services at 8Mbit/s and below). Information received from:
 - Response from British Telecommunications plc.
- A13.76 Information request of 22 December 2011 covering specified information related to the identification of the telecommunications markets for retail leased lines, any other

forms of retail business connectivity services and associated wholesale services and the assessment of market power within them (in particular information on the equipment costs associated with the provision of new wholesale Ethernet-based leased line services and information on the relative costs of provisioning WDM services). Information received from:

• Response from British Telecommunications plc.

Other BT Information

- A13.77 BT Group Press Releases, BT holds successful trial of "FTTP on demand" and sets timeframe for doubling of FTTC broadband speeds, DC12-037, February 3, 2012. <u>http://www.btplc.com/News/Articles/Showarticle.cfm?ArticleID=14863CF1-DD70-4D79-83F8-2CDA88B3E51B</u>
- A13.78 BT Group Press Releases, Openreach to transform broadband speeds, DC11-234, October 5, 2011. <u>http://www.btplc.com/News/Articles/Showarticle.cfm?ArticleID=7E309437-6929-442F-8F25-CDD388518C64</u>
- A13.79 BT Group, Regulatory financial statements. <u>http://www.btplc.com/Thegroup/RegulatoryandPublicaffairs/Financialstatements/ind</u> <u>ex.htm</u>
- A13.80 BT Group Financial results, Results for the third quarter and nine months to 31 December 2011, 3 February 2012. http://www.btplc.com/News/ResultsPDF/q312release.pdf
- A13.81 BT Group, BT Wholesale, Annual Analyst Briefing, 15 December 2011. http://www.btplc.com/thegroup/industryanalysts/industryanalystspresentations/down loads/annualanalystbriefing15dec2011.pdf
- A13.82 BT Group, Q2 2012 results, 3 November 2011. <u>http://www.btplc.com/Sharesandperformance/Quarterlyresults/PDFdownloads/q211</u> <u>slides.pdf</u>

BT, SINet. http://www.sinet.bt.com/

- A13.83 BT Global services, TDM services, Product portfolio review. <u>http://www.globalservices.bt.com/CampaignDetailAction.do/Campaigns/tdm-</u> <u>services/param/Record/tdm_services_campaign_all_en-</u> <u>gb/fromPage/Furl/chapterKey/1</u>
- A13.84 BT Wholesale, Consult21 briefing, 21CN Deployment Strategy (Plan of record and 21CN product plans) Briefing number C21-MG-015 (incorporates C21- MG-016), Issue: 17, Date: 13 January 2012. https://www.btwholesale.com/shared/document/21CN Consult21/c21 MG 015 DS P Jan12 Issue17.pdf
- A13.85 BT Wholesale Inspire (Access requires subscription). <u>http://www.btwholesale-inspire.com/products2/data/ethernet</u>
- A13.86 Openreach, GEN109/11 EMP Release R1900 scope notification EIP1, Date: 19/10/2011.

http://www.openreach.co.uk/orpg/home/updates/briefings/generalbriefings/generalb riefingsarticles/gen10911.do

- A13.87 Openreach's Factsheet on Ethernet Access Direct. http://www.openreach.co.uk/orpg/home/products/ethernetservices/ethernetaccessdi rect/ead/downloads/eadfactsheet.pdf
- A13.88 Openreach, Street Access product description. <u>http://www.openreach.co.uk/orpg/home/products/ethernetservices/streetaccess/streetaccess/streetaccess.do</u>

Other Operator Information

A13.89 Easynet Connect

http://www.easynetconnect.net/products/sdsl.aspx

http://www.easynetconnect.net/products/sdsl.aspx

http://www.easynet.com/gb/en/about/pressRelease.aspx?SecondaryNavID=52&pre ssreleaseid=1461

A13.90 Virgin Media

http://mediacentre.virginmedia.com/Stories/Virgin-Media-boosts-Britain-sbroadband-speeds-2322.aspx

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A13.93 IDNet

http://www.idnet.net/solutions/uncontendedadsl.jsp

A13.94 Managed Communications

http://www.managedcomms.co.uk/products/business-sdsl

A13.95 Data Center Map

www.datacentermap.com