Fixed access market reviews: Approach to setting LLU and WLR Charge Controls

Annexes

Redacted for publication [✂]

Updated 20 August 2013

Consultation

Publication date: 11 July 2013

Closing Date for Responses: 25 September 2013

Contents

Annex 1

Responding to this consultation

How to respond

A1.1 Ofcom invites written views and comments on the issues raised in this document, to be made **by 5pm on 25 September 2013**.

A1.2 Ofcom strongly prefers to receive responses using the online web form at http://stakeholders.ofcom.org.uk/consultations/llu-wlr-cc-13, 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.

A1.3 For larger consultation responses - particularly those with supporting charts, tables or other data - please email WLA2014.Review@ofcom.org.uk attaching your response in Microsoft Word format, together with a consultation response coversheet.

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

Chris Dodds
04.111
Competition Group
Riverside House
2A Southwark Bridge Road
London SE1 9HA

Fax: 020 7981 3333

A1.5 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.

A1.6 It would be helpful if your response could include direct answers to the questions asked in this document, which are listed together at Annex 4. It would also help if you can explain why you hold your views and how Ofcom's proposals would impact on you.

Further information

A1.7 If you want to discuss the issues and questions raised in this consultation, or need advice on the appropriate form of response, please contact Chris Dodds on 020 7981 3473.

Confidentiality

A1.8 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, www.ofcom.org.uk, 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.

A1.9 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.

A1.10 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

A1.11 Following consideration of responses to the consultation we would expect to publish our Statement in early 2014.

A1.12 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: http://ofcom.org.uk/static/subscribe/select_list.htm

Ofcom's consultation processes

A1.13 Ofcom seeks to ensure that responding to a consultation is easy as possible. For more information please see our consultation principles in Annex 2.

A1.14 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 consult@ofcom.org.uk . 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.

A1.15 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:

A1.16 Graham Howell
Ofcom
Riverside House
2a Southwark Bridge Road
London SE1 9HA

Tel: 020 7981 3601

Email Graham.Howell@ofcom.org.uk

Annex 2

Ofcom's consultation principles

A2.1 Ofcom has published the following seven principles that it will follow for each public written consultation:

Before the consultation

A2.2 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

A2.3 We will be clear about who we are consulting, why, on what questions and for how long.

A2.4 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.

A2.5 We will consult for up to 10 weeks depending on the potential impact of our proposals.

A2.6 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.

A2.7 If we are not able to follow one of these principles, we will explain why.

After the consultation

A2.8 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.

Annex 3

Consultation response cover sheet

A3.1 In the interests of transparency and good regulatory practice, we will publish all consultation responses in full on our website, www.ofcom.org.uk.

A3.2 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.

A3.3 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.

A3.4 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 www.ofcom.org.uk/consult/.

A3.5 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 cover sheet only, so that we don't have to edit your response.

Cover sheet for response to an Ofcom consultation

BASIC DETAILS

Consultation title: Fixed access market reviews: approach to setting any future LLU and WLR charge controls

To (Ofcom contact): Chris Dodds

Name of respondent:

Representing (self or organisation/s):

Address (if not received by email):

CONFIDENTIALITY

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

Nothing ☐

Whole response ☐

Part of the response ☐

Name/contact details/job title ☐

Organisation ☐

If there is no separate annex, which parts?

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

DECLARATION

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

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

Name

Signed (if hard copy)

Annex 4

Consultation Questions

Economic and regulatory background to the setting of cost-based charges for LLU and WLR

Question 3.1: *Do you agree with our proposal to impose an inflation indexed price cap? Please provide reasons to support your views.*

Question 3.2: *Do you agree with Ofcom's proposal to use a CCA FAC methodology to establish the cost base for the next LLU and WLR charge controls? Please provide reasons to support your views.*

Question 3.3: *Do you agree with our proposal that, for the purposes of these charge controls, BT's pre-1997 duct assets should continue to be valued on an indexed historic cost (RAV) basis? Please provide reasons to support your views.*

Question 3.4: *Do you agree with our proposal that, for the purposes of these charge controls, BT's post-1997 duct assets should be valued on a CCA basis based on capital expenditure indexed by RPI? Please provide reasons to support your views.*

Question 3.5: *Do respondents agree with our proposal to apply the anchor pricing principle by means of a model of hypothetical all-copper network? Please provide reasons to support your views.*

Question 3.6: *Do respondents agree with our proposal that the contribution to common costs should be the same for each wholesale access line service by the end of this control period? Please provide reasons to support your views.*

Question 3.7: *Do respondents agree that we should remove the TAMs price adjustment by the end of the charge control period? Please provide reasons to support your views.*

Question 3.8: *Do respondents agree that we should not make an adjustment to MPF charges to allow for shorter than average line length? Please provide reasons to support your views.*

Question 3.9: *Do you agree with our proposal to remove printed directory costs from WLR rental, and to do so immediately? Please provide reasons to support your views.*

Question 3.10: *Do you agree with Ofcom's proposal to set charge controls for LLU and WLR to expire on 31 March 2017? Please explain your reasoning and propose an alternative approach with supporting information if applicable.*

Question 3.11: *Do you agree with our proposal to use glide paths to align charges with costs for these charge controls? Please provide reasons to support your views.*

Question 3.12: *Do you agree that CPI and RPI are the main indices to consider for the LLU and WLR charge controls proposed in this consultation? Please provide reasons to support your views.*

Question 3.13: *Do you consider that we should use CPI to index the LLU and WLR charge controls proposed in this consultation? If not please explain why using the factors identified above, or any others you consider important.*

Charge control design

Question 4.1: *Do you agree that we should set separate line rental charge controls for (i) MPF rental, (ii) SMPF rental and (iii) WLR rental? Please provide reasons to support your views.*

Question 4.2: *Do you agree that the price differences between MPF and WLR/WLR+SMPF new connections should be equal to the difference in LRIC in the last year of the new charge control (i.e., 2016/17)? Please provide reasons to support your views.*

Question 4.3: *Do you agree with our proposed approach to estimating the costs of the simultaneous provision of WLR Conversion and SMPF New Provide? Please provide reasons to support your views.*

Question 4.4: *Do you agree with our proposed approach to estimating the costs of provision of a WLR Conversion? Please provide reasons to support your views and if applicable please explain your preferred approach.*

Question 4.5: *Do you agree that we should control WLR Conversion and its simultaneous provision with SMPF New Provide using an indexed type of control? Please provide reasons to support your views.*

Question 4.6: *Do you agree that we should charge control migration services at incremental cost? Please provide reasons to support your views.*

Question 4.7: *Do you agree that we should align all migration charges involving jumpering to a single target price ceiling from the beginning of the charge control period in 2014 and throughout the charge control period and set a separate target price ceiling for WLR Transfers to its incremental cost using glide paths? Please provide reasons to support your views.*

Question 4.8: *Do you agree that we should align MPF and SMPF Bulk Migration charges to a single target price based on the volume weighted average forecast LRIC by the end of the charge control period in 2016/17 using glide paths? Please provide reasons to support your views.*

Question 4.9: *Do you agree that the charge for MPF and SMPF cease should be zero and costs recovered from MPF and WLR rental charges on an equivalent per line basis? Please provide reasons to support your views.*

Question 4.10: *The complete list of ancillary services considered in the MPF, SMPF and Co-Mingling baskets for the charge control period 2014/17 is included in the "Legal Instruments" Annex. Do you agree with our proposal to control three ancillary services baskets and with the proposed lists of ancillary services for the MPF, SMPF and Co-Mingling baskets? Please provide reasons to support your views.*

Question 4.11: *Do you consider that X in CPI-X for the ancillary service baskets should be determined as: the same X for both SMPF and MPF ancillaries baskets based on the pooled costs and pooled revenues of SMPF Ceases, MPF Ceases and*

MPF New Provide; and X for Co-Mingling ancillaries basket based on the pooled costs and pooled revenues of Room Build, Hostel Rentals and Tie Cables? Please provide reasons to support your views. If you consider a different basis is more appropriate please set out what this approach would be and why.

Question 4.12: *Do you agree that sub-caps applied to the ancillary services baskets should be tighter than CPI-X+7.5%? Please give views on the appropriate level of sub-caps in the range 5% to 7.5%. Please provide reasons to support your views.*

Question 4.13: *Do you agree that the sub-cap on MPF Stopped Line Provide should now be set at the same level as the sub cap for other services in the MPF ancillaries basket? Please provide reasons to support your views.*

Question 4.14: *Do you consider that LLU Expedite charges should be based on Option 1 (maintain MPF Expedite and SMPF Expedite in the respective ancillary baskets) or Option 2 (remove MPF Expedite and SMPF Expedite services from the ancillary baskets and impose a safeguard cap on each Expedite service charge)? Please provide reasons to support your views. If you consider a different basis is more appropriate please set out what this approach would be and why.*

Question 4.15: *Do you consider that MPF/SMPF single/bulk jumper removal charges should be based on Option 1 (status quo) or Option 2 (separate charge controls for single/bulk jumper removals)? Please provide reasons to support your views. If you consider a different basis is more appropriate please set out what this approach would be and why.*

Question 4.16: *Do you agree that the existing obligation to align LLU Enhanced Care service charges with WLR Enhanced Care service charges should be retained? Please provide reasons to support your views.*

Question 4.17: *Do you agree with our view that it is not necessary to impose a separate charge control on Special Fault Investigations? Please provide reasons to support your views.*

Question 4.18: *Do you agree that the charges for special fault investigations should remain aligned between MPF and SMPF? Please provide reasons to support your views.*

Question 4.19: *Do you agree that we should not align the SMPF and MPF services set out in Table 4.27? Please provide reasons to support your views.*

Question 4.20: *Do you agree that with basket controls coupled with sub-caps on individual services, a cost orientation obligation is unnecessary for the ancillary services? Please provide reasons to support your views.*

Quality of service review and fault rate effects

Question 5.1: *We would welcome the views of stakeholders on our proposed approach to estimating the cost of changes to service levels.*

Question 5.2: *We would welcome the views of stakeholders on our proposed approach to analysing fault rates. In particular do stakeholders believe that fault rates should differ between MPF, WLR and SMPF?*

Charge control cost modelling

Question 6.1: *Do you agree with our proposals for forecasting operating costs using CVEs based on BT's LRIC model? Please provide reasons to support your views. If you do not agree, please propose alternative approaches with supporting information.*

Question 6.2: *Do you agree with our proposals for forecasting capital costs? Please provide reasons to support your views. If you do not agree, please propose alternative approaches with supporting information.*

Question 6.3: *Do you agree with our proposed estimates of inflation for BT's pay, non-pay costs and asset price inflation? Do you consider that using a longer time series to analyse the correlation of input prices with general inflation indices would provide more robust estimates of input price inflation? Please provide reasons to support your views.*

Question 6.4: *(a) Do you consider that the broadband line testing unit cost figures for MPF and SMPF in BT's 2011/12 RFS are reasonable? (b) What should Ofcom assume for broadband line testing costs for 2016/17? Please give reasons to support your views.*

Question 6.5: *Do you agree with our proposed approach to estimating the LRIC for relevant services in 2016/17? Please provide reasons to support your views.*

Efficiency

Question A7.1: *Do you agree with our proposed approach to modelling efficiency, both in general and in particular in applying a single efficiency target to both operating costs and capital expenditure? Please provide reasons to support your views.*

Question A7.2: *Do you agree with our proposed net efficiency range of between 4% and 6% and base figure of 5%? Do you agree with the levels proposed? Please provide reasoning to support your views.*

Volume Forecasting

Question A8.1: *Do you agree with our proposed approach to forecasting volumes as set out in Annex 8 and Annex 9? Please provide reasons to support your views.*

Detailed cost modelling assumptions

Question A13.1: *Do you agree with our proposed approach to calculating SMPF unit costs? Please provide reasons to support your views.*

Question A13.2: *Do you agree with our proposed approach to BT's pension deficit repair payments? Please provide reasons to support your views.*

Question A13.3: *Do you agree with our proposed approach to adjusting BT's linecard costs? Please provide reasons to support your views.*

Question A13.4: *Do you agree with our proposed approach to calculating dropwire costs for the purposes of forecasting to 2016/17? Please provide reasons to support your views.*

Question A13.5: *Do you agree with our proposed approach to allocating repair costs to services in the Cost Model? Please provide reasons to support your views.*

Question A13.6: *Do you agree with our proposed approach of excluding any pair gain adjustment for the purposes of forecasting D-side and E-side copper capital costs to 2016/17? Please provide reasons to support your views.*

Treatment of cumulo rates within the charge control

Question A14.1: *Do you agree with our proposed approach to the treatment of BT's cumulo costs in the calculation of regulated charges for WLR and MPF? If not please explain why and tell us how you would propose to treat these costs and outline the calculations that would be involved.*

Cost of capital

Question A15.1: *Do you agree with our proposed approach to estimating the cost of capital of BT Group, Openreach and Rest of BT? Please provide reasons to support your views.*

Annex 5

Copper and duct valuation (Regulatory Asset Value)

Summary of proposals

A5.1 The basis of valuation for BT's access copper and duct assets on which we are consulting is summarised in Table A5.1 below.

Table A5.1 Basis of access assets valuation

	Basis of valuation for pre-1997 assets (from 2004/05 onwards)	Basis of valuation for post-1997 assets (from 2004/05 onwards)
Access Duct	Historic Cost Accounting (HCA) indexed by RPI	Current Cost Accounting (CCA): Capital expenditure indexed by RPI
Access Copper	HCA indexed by RPI	CCA: Absolute valuation[1]

The RAV adjustment for pre-1997 copper and duct assets

A5.2 The regulatory asset value (RAV) adjustment was first established by the 2005 Valuing BT's Copper Network decision (the 2005 Cost of Copper Review) [2] which specified that pre-1997 access duct and copper investment should be valued on an HCA basis indexed by RPI from 2005. Post-1997 access assets were to be valued on a CCA basis.

A5.3 The RAV adjustment has been applied for each LLU and WLR charge control since 2005as well as in other charge controls covering assets making significant use of copper and/or duct (such as the leased lines charge control published in March 2013).[3]

A5.4 We reviewed the continued application of the RAV adjustment in the March 2012 Statement and decided that it was still appropriate in the form specified in the 2005 Cost of Copper Review.

A5.5 The application of the RAV adjustment in the 2012 Statement was subject to appeal by BT, who argued that Current Cost Accounting (CCA) should be used to value pre-1997 duct. Our position was upheld by the CC who found that we did not err in

[1] The "absolute valuation" approach is described later in this annex under the heading "Determining a valuation of post 1997 duct assets".
[2] Ofcom: "Local loop unbundling: setting the fully unbundled rental charge ceiling", November 2005: "Wholesale line rental: reviewing and setting charge ceilings for WLR services", January 2006; "A new pricing framework for Openreach", May 2009; "Charge controls for wholesale line rental and related services", October 2009; Charge control review for LLU and WLR services", March 2012.
[3] http://stakeholders.ofcom.org.uk/consultations/business-connectivity-mr/final-statement/.

the use of a RAV adjustment to value BT's pre 1997 duct assets.[4] Below we explain why we propose that the RAV adjustment remains appropriate for the charge control to apply from April 2014 to March 2017. For the purposes of this review we have considered whether the principles of the RAV adjustment as previously set out by Ofcom remain valid in current market circumstances and we are consulting on our view that they do.

Background to the RAV adjustment

A5.6 In 2004-05, Ofcom undertook a detailed review of the value of BT's copper access network.[5] The purpose of the review was to determine how much BT should be able to charge for the use of its local access network to allow it to recover its costs including the cost of capital, but avoid over-recovery. This followed an earlier 1997 decision to change the valuation methodology for BT's entire asset base from HCA to CCA.

A5.7 The background to the review was the fact that competition to BT's copper access network had not developed to the extent anticipated and the belief that this was unlikely to change in the near term. In the light of this, wholesale access services were seen as an important mechanism for introducing sustainable competition in downstream markets, and it was also then important to ensure that the copper loop cost was correctly determined.

A5.8 As a result of the 2004-05 review, Ofcom decided to create a RAV to represent the value of those copper access network assets which had been in situ, and hence re-valued (from HCA to CCA), in 1997. The value of the RAV for those assets was set to equal their closing HCA value for the 2004/5 financial year, and was less than the CCA value by an amount known as the RAV adjustment. The RAV has been increased in each year since 2005 by the increase in the Retail Price Index (RPI).

A5.9 Ofcom implemented the results of this review via consultations on the fully unbundled local loop (MPF) rental charge and the WLR charge later in 2005.

Comparison between the RAV and CCA approaches

A5.10 The main alternative to the RAV adjustment would be to value the pre-1997 local access assets at their full CCA value. This was the option favoured by BT for the 2012 LLU and WLR charge controls. The discussion below therefore draws on earlier documents, in particular, the March 2012 Statement.[6]

A5.11 The main arguments that BT advanced in support of a reversion to CCA were as follows:[7]

- In its view, there had been no windfall gain from the switch to CCA in 1997 and the RAV adjustment would lead to under-recovery of costs;

[4] The CC's final determination of these appeals was made on 27 March 2013 and non-confidential versions have been published on its website. On 29 April 2013, the CAT published its ruling on disposal of the appeals, deciding the appeals in accordance with the CC determinations, the parties having confirmed that they were not challenging any aspect of the CC's determination.
[5] Ofcom, *Valuing Copper Access,* 18 August 2005: http://stakeholders.ofcom.org.uk/binaries/consultations/copper/statement/statement.pdf
[6] Ofcom, *Charge control review for LLU and WLR services*, 7 March 2012, Annex 1 http://stakeholders.ofcom.org.uk/binaries/consultations/wlr-cc-2011/statement/annexesMarch12.pdf
[7] See A1.18 of the March 2012 Statement.

- CCA asset values provide appropriate price signals for suppliers, consumers and entrants;
- the RAV adjustment would reduce BT's incentives to invest and postpone competitive entry;
- Ofcom should take account of the incentives to invest in adjacent markets, particularly mobile broadband access;
- increases in LLU and WLR charges would affect all operators, including BT Retail, equally and so would not distort competition;
- market conditions had changed and the goal of promoting downstream competition had been achieved;
- incentives for productive efficiency were provided by the charge control and do not depend on the way assets are valued; and
- changes to the basis of asset valuation in 1997 and 2005, and the fact that Ofcom in 2005 signalled its intention to review the decision again by 2009/10, indicated that regulatory stability was "a secondary consideration".

A5.12 We did not accept the arguments advanced by BT in 2012. We also consider that our reasons for preferring the RAV approach continue to apply to the new charge control on which we are now consulting. In summary, these reasons are:

- we consider that setting charges based on the RAV would allow BT a reasonable return on pre-1997 investment, while a return to full CCA valuation would lead to over-recovery of costs by BT. The model we used to demonstrate this in 2012 remains applicable;
- a return to a CCA valuation would raise LLU and WLR charges further above their forward-looking costs than is necessary, reducing the efficiency of price signals rather than increasing it as BT argued. The forward-looking costs associated with the use of duct are less than the costs of replacement because BT's ducts are sunk assets;
- the RAV adjustment does not reduce the strength of BT's incentives to invest because it only applies to assets which were in place before 1997;
- correct signals for investment by other operators (the "build/buy" decision) are given when the charge for use of BT's duct reflects the forward-looking costs of that duct. This is the case whether the alternative investment is in another fixed network or in a mobile network. Even if the full CCA value of BT's duct assets were reflected in charges, material additional competing investment would still be unlikely to occur, and any which did occur could be inefficient in any case;
- a return to full CCA valuation would not be competitively neutral because it would signal that regulatory decisions might not be consistent over time, and this could lead to "regulatory risk" which would stifle competing investments (i.e. those made by CPs using MPF or WLR). Evidence gathered for the current Fixed Access Market Review suggests that the extent of competition to BT in the relevant markets remains limited. Increased competition based on LLU and WLR, to which BT drew attention

in 2012, does not affect its position of SMP in the markets for the supply of copper loop-based, cable-based and fibre-based wholesale local access and wholesale fixed analogue exchange lines services as LLU and WLR rely on the use of BT's local access network rather than providing competition to it; and

- incentives for productive efficiency are not only provided by the price cap mechanism. For productive efficiency, the charges for wholesale services which are substitutes (such as MPF and WLR or WLR+SMPF), need to be consistent with each other so that CPs are induced to choose wholesale service to minimise costs. Consistency between charges can be achieved by reflecting the RAV adjustment in the charges for all services that use BT's local access ducts.

A5.13 Below, we set out in more detail our reasoning on the following key points:

- whether using the full CCA valuation would lead to charges that are more economically efficient;
- whether returning to full CCA valuation would also lead to a windfall gain (i.e. over-recovery of costs);
- we then consider the RAV adjustment in the light of incentives to invest in the provision of NGA services, which may now have greater significance than in previous reviews; and
- finally we explain why we consider that making the RAV adjustment is consistent with our statutory duties.

Economically efficient charges

A5.14 We consider that BT's duct network is, in economic terms, a "sunk asset"; that is, one that will not require replacement in order for BT to remain in the market. As it is a sunk asset, we consider that setting charges on the basis of CCA asset values would not achieve allocative efficiency. This is because, for allocative efficiency, charges should reflect only forward-looking costs and, as duct does not need replacement, the cost of replacing it is not part of forward looking costs.

A5.15 In the March 2012 Statement, we drew on a report by Analysys Mason to highlight two points which also remain valid for this review. First, we noted that, because duct is a sunk asset, the true forward looking costs of BT's duct network are likely to be very low. The forward-looking incremental costs of creating a new duct network will therefore almost certainly be higher than the forward-looking incremental costs of using BT's existing network. Second, BT's economies of scale and scope are such that, even if duct were valued on a full CCA basis, it would still be difficult for a new competing fixed network operator to achieve lower costs. In practice therefore, we consider that making the RAV adjustment is unlikely to postpone efficient competitive entry to a material degree.

A5.16 On appeal, the CC agreed with Ofcom that:

- duct costs are largely sunk and that this means that "increasing the price would reduce allocative and productive efficiency, as Ofcom said" [8];

- Ofcom was correct to place some weight on the benefits for regulatory stability of keeping the RAV adjustment[9];

- although the RAV could deter some investment, "this should only be a concern if *efficient* investment would be deterred" (emphasis in original).[10]

A5.17 The CC concluded that "the main issue here again appears to be whether the current charging methodology captures the forward-looking costs better than BT's alternative and…we think that it does".

A5.18 We consider that these arguments apply equally to our assessment of the new charge control on which we are consulting. There has been no change to the sunk nature of BT's duct assets. Reverting to a full CCA valuation for the pre-1997 local access assets would mean that charges were raised further above forward-looking costs, thereby reducing allocative and productive efficiency.

A5.19 Moreover, our view is that removing the RAV adjustment could harm dynamic efficiency and reduce future investment in the sector as a whole, not just in LLU, if it signalled that regulation might not be stable. The CC said "this seems to us an important point".[11] Making the RAV adjustment in the current review is consistent with maintaining the stability of regulation and will enhance dynamic efficiency.[12]

A5.20 We therefore consider that, on efficiency grounds, the RAV adjustment remains justified.

Over-recovery of costs

A5.21 In the 2005 review, we explained why, in the absence of the RAV adjustment, BT would over-recover the costs of pre-1 August 1997 duct using a simple illustrative diagram. The diagram is reproduced below at Figure A5.1.

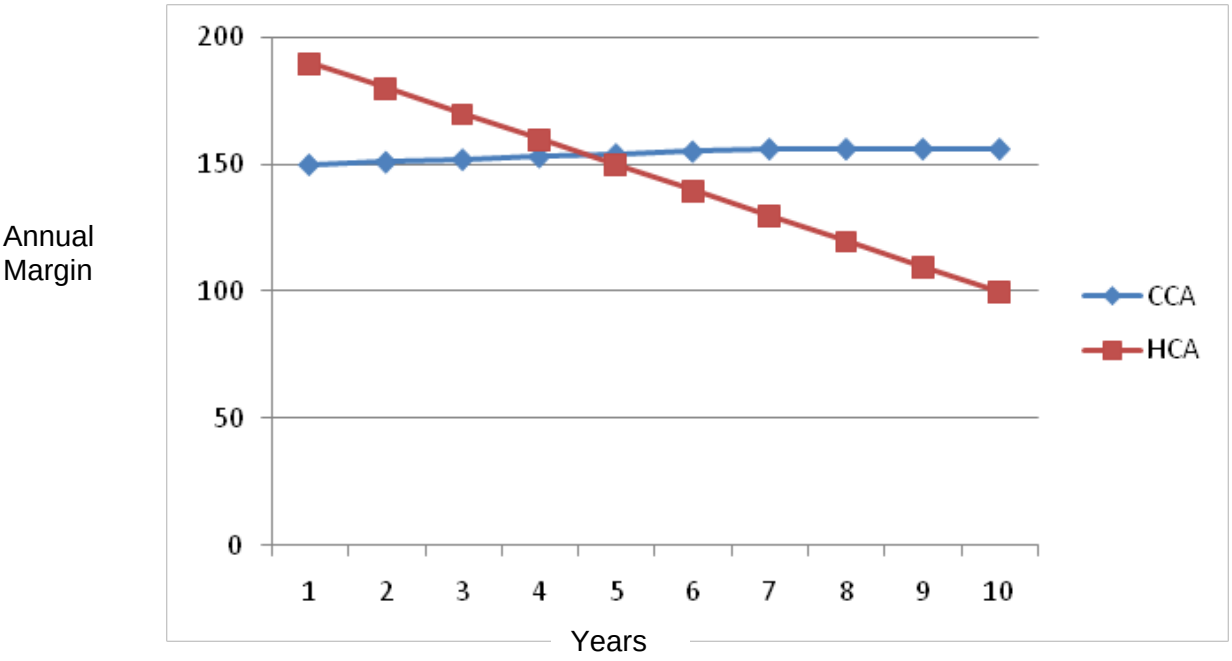
A5.22 We repeated the explanation using the same diagram in the March 2012 Statement. On appeal, the CC found that this "theoretical model" was sufficient to demonstrate that over-recovery would occur in the absence of the RAV adjustment.

A5.23 Figure A5.1 shows two alternative price paths, one based on CCA and one on HCA. Both allow recovery of the initial cost of the asset over its lifetime, including the required return on capital. In the case of assets with rising values, such as duct, CCA costs are initially below HCA costs because CCA depreciation is reduced by the amount of the holding gain (the increase in the value of the asset) in each year. In later years, CCA costs are higher than HCA costs, reflecting the higher CCA valuation of the assets. This means that, as the diagram shows, a change from HCA to CCA during the lifetime of the asset, as happened in 1997, would result in windfall gains for BT. In short, if charges are set to recover HCA costs when HCA

[8] At paragraph 8.235 of the 2013 LLU and WLR Determination.
[9] At paragraph 8.236 of the Determination.
[10] At paragraphs 8.240 – 8.242 of the Determination.
[11] At paragraph 7.128(d) of the Determination
[12] The CC's decision is itself likely to have influenced CPs expectations about Ofcom's approach to the charge control in this review.

costs are above CCA costs, and set to recover CCA costs when CCA costs are above HCA costs, the result will necessarily be over-recovery.

Figure A5.1: Gross margins required for a constant cost of capital over the life time of a single asset experiencing appreciation in value



A5.24 In the appeal of the 2012 Statement, BT said that Ofcom's model was too theoretical to justify a finding of over-recovery. BT produced an alternative model that purported to show that the RAV adjustment would result in a windfall loss and under-recovery of costs. The key assumption on which BT relied was that shareholders bought BT's assets, including duct, at close to their CCA value at privatisation. This resulted in an initial valuation which was well above the HCA valuation. Setting charges on an HCA basis before 1997 and after 2005 then meant that the amount shareholders paid for the duct would not be recovered in full. BT argued that its approach was consistent with that of other regulators which had used the sale price at privatisation to value assets for charge-setting purposes.

A5.25 These arguments formed the basis of BT's appeal. BT's appeal therefore rested on the claims, firstly, that the appropriate value of duct for regulatory charge setting purposes was the amount that shareholders had paid at privatisation, and secondly, that it should be assumed that the duct assets were then valued at the (small) average discount to their CCA value.

A5.26 We consider that there is no necessary duty on us to allow shareholders a return on an initial investment at privatisation as, for example, this could mean that unrealistic valuations would be reflected in excessive prices for consumers.

A5.27 In any case, because BT was sold as a single vertically-integrated company in 1984, it is not possible to say how shareholders valued duct assets at the time. In our view, the best indicator of investors' reasonable expectations at privatisation is the price control in force at the time, which was described in the sale prospectus and which applied until 1989. This means that, in our view, the relevant start point

for consideration of over or under recovery is not 1984 but 1989, when BT's assets were first explicitly valued by Ofcom, on an HCA basis. We are not aware that any other regulator has attempted to decompose the sale price by asset type, or used the sale price so long after privatisation.

A5.28 This position was upheld by the CC which found that we did not err in the use of the RAV to value BT's pre 1997 duct assets.[13] The CC agreed with us that:

- the key issue on which the question of over-recovery depends is the initial value of the ducts;[14]
- the "difference in timing and scope" between other regulators' use of privatisation values and BT's approach meant that the latter was not "conventional";[15]
- whilst "the privatisation price provided…the best evidence for investors' *actual* expectations, we did not accept it to follow that these expectations were reasonable or legitimate" (emphasis in original);[16]
- BT's value at privatisation was determined "on a "whole-business" basis, rather than in respect of specific asset types" and there was a "fundamental flaw in imputing investors' expectations about specific assets at privatisation";[17]
- "it is neither possible nor necessary…to identify any set of reasonable expectations held by investors in relation to duct assets at privatisation";[18] and
- the appropriate start point should be the 1989 charge control, when HCA was adopted.[19]

A5.29 The CC concluded that, since the appropriate initial value of the duct assets was the HCA value, "Ofcom *could* rely on its theoretical model" of a switch from HCA to CCA to establish that over-recovery would occur (emphasis in original). It is also clear that this conclusion remains valid for the new control period, since it depends only on past events which cannot change. No change can occur to the value of BT's ducts in 1989, or the price cap which applied between 1984 and 1989.

A5.30 In the light of this, we consider that the RAV adjustment is necessary in order to avoid over-recovery of the costs of pre-1997 local access assets in the charge control to apply from 1 April 2014.

The RAV adjustment and incentives to invest in the provision of NGA services

A5.31 NGA services will become increasingly important over the period of the proposed new charge control. Ofcom policy, consistent with its duties, is to encourage efficient investment in NGA that will be to the benefit of consumers. As we explain below, the RAV adjustment is consistent with this policy.

[13] http://www.catribunal.org.uk/files/1192-93_BSkyB_CC_Determination_270313.pdf
[14] Paragraph 8.145 of the Determination
[15] Paragraph 8.154 of the Determination
[16] Paragraph 8.157 of the Determination
[17] Paragraph 8.159 of the Determination
[18] Paragraph 8.160 of the Determination
[19] Paragraphs 8.163 – 8.165 of the Determination

A5.32 An important part of efficient investment is making the best use of existing assets to deliver new services in the least cost way. One way of using assets efficiently is to allow BT's existing local access ducts to be used by other operators to deliver NGA services along their own fibre. Another way in which we encourage efficient investment in NGA services is by allowing pricing flexibility for such services which reflects the nascent nature of these services, the potential riskiness of the initial investment and the extent of competition between NGA and current generation broadband services.

A5.33 We also recognise that there is an important role for Ofcom in protecting customers who do not yet want an NGA service. Ofcom applies the anchor pricing principle to ensure that customers for current generation broadband services do not have to pay more because of the introduction of NGA services.

A5.34 The combination of anchor pricing for MPF and WLR, market pricing for VULA (subject to a fair and reasonable obligation including in respect of the margin) and consistent charging of the different wholesale services which use BT's duct will then protect customers, give efficient incentives for investment and promote competition.

A5.35 However, we have also considered whether, by changing the level of MPF and WLR charges, for example by not making the RAV adjustment, we could encourage operators to invest in, and customers to take up, NGA services.

A5.36 The way in which the copper access price might affect investment in (and expected take up of) fibre is complex. Some recent work (by Charles River Associates[20]) has concluded that the direction of the effect of the copper access price on investment in NGA is ambiguous and depends on the circumstances. At any rate, a view that investment in NGA can necessarily be increased by raising – or lowering – the copper access price, and still less the conclusion that the copper price should be manipulated in this way, does not seem to be justified.

A5.37 The key issue is one of relative prices not absolute prices. It might then be argued that, all other things being equal, lowering the copper access price relative to the fibre access price would increase the incentive to invest in fibre, because it would reduce the profits which these suppliers could make from their current generation services (supplied, in BT's case, over copper).

A5.38 On the other hand, reducing the price of current generation services would make it less likely that customers would want to switch to an NGA service in the first place. Most potential customers for NGA services will be existing broadband users and, if they take an NGA service they will cease taking the current generation service. The decision to switch to an NGA service will depend on whether the expected additional benefit of doing so is greater than the additional cost. In other words it is a question of relative benefits and relative prices.

A5.39 For both users and providers therefore, it is the incremental benefit of NGA relative to slower speed services, and the difference between their prices rather than the level of them, which are likely to matter most.

A5.40 A final complicating factor is the competitive interaction between BT and the other actual and potential investors in fibre networks. In the CRA model, it appears that

[20] CRA were commissioned by the EC's DG InfoSoc to advise it on setting access prices to encourage investment in fibre networks. Earlier work by another team of consultants had concluded that fibre investment could be stimulated by *reducing* the copper access price.

the primary mechanism by which a higher MPF charge would encourage investment could be by reducing the number of LLU operators and hence the intensity of competition. This allows current generation broadband prices, and with them NGA prices, to increase.

A5.41 We think this underlines the fact that competitive interactions are often complex. One firm's decision to invest in fibre may be more strongly influenced by expectations about what others will do than by a calculation based on the copper access price. Moreover, we observe that in practice Virgin has made substantial investments in upgrading its existing network to provide NGA services, notwithstanding the fact that BT's prices have reflected the RAV adjustment. The fact that this investment is happening shows that it is not deterred by the fact that the current price of LLU reflects the RAV adjustment.

Consistency with our statutory duties

A5.42 We also consider that applying the RAV adjustment in the way described above is consistent with our statutory duties. In terms of the requirements in Section 88 of the Act that:

A5.43 the setting of a charge control condition should be appropriate for the purposes of promoting efficiency, promoting sustainable competition and conferring the greatest possible benefits on the end-users of public electronic communications services; and

A5.44 in setting such a condition, Ofcom must take account of the extent of the investment in the matters to which the condition relates of the person to whom it is to apply.

A5.45 We consider that the RAV adjustment is consistent with promoting efficiency and sustainable competition, and more so than setting charges for the use of pre-1997 assets on the basis of full CCA, for the reasons set out above. In particular, the RAV adjustment means that charges depart from the statically efficient level only to the extent required to allow cost recovery in the interests of dynamic efficiency. It is also consistent with regulatory stability and hence with the promotion of dynamic efficiency. By allowing BT to recover its costs, including the cost of capital, the RAV adjustment means that charges take account of the extent of BT's investment in the relevant assets, as required by the Act.

A5.46 By contrast, setting charges on the basis of full CCA costs would allow BT to recover more than its efficiently incurred costs. It could encourage inefficient investment, in that an incentive for competing investment would exist even though the forward-looking costs of such investment were above BT's forward-looking costs by more than is necessary for recovery of sunk costs. Other, efficient, investment could be deterred by the signal that regulation would not be stable over time.

Valuing BT's post-1997 access assets

A5.47 We propose to calculate the value of BT's post 1997 assets on a CCA basis. We propose to determine this value on the basis of indexing capital expenditure by RPI. This is consistent with our approach in the March 2012 Statement. We discuss our reasons for the proposal below.

Valuing post-1997 assets on a CCA basis

A5.48 We previously decided in the 2005 Cost of Copper Review that post 1997 assets would be valued using CCA as they had been valued consistently on a CCA basis throughout their lives. There were two reasons for allowing a CCA valuation. Firstly, as the post 1997 assets were consistently valued on a CCA basis, there was no concern in 2005 about windfall gains. Secondly, it was felt that this approach would encourage infrastructure investment in the longer term.

A5.49 We described this approach as:

> "about striking an appropriate balance between protecting consumers through regulation and giving incentives for competition to develop through entry by new network operators. Although in the medium term, Ofcom believes that further entry by competing access providers is unlikely, in the longer term it remains possible. In the longer term, therefore, entry signals are still a relevant consideration, which Ofcom has sought to balance in its proposals with the need to protect consumers in the medium term. The aim of achieving this balance underlies Ofcom's decision to limit the possibility of over-recovery by BT of costs relating to those copper access network assets which were in place at the time of the switch to CCA in 1996/97 through the establishment of a RAV whilst, with this exception, retaining current cost accounting as the preferred approach to asset valuation. This is because, in the longer term, CCA will provide appropriate price signals to both suppliers and consumers as well as providing regulatory consistency and consistency with Ofcom's forward-looking approach generally".[21]

A5.50 In the March 2012 Statement we maintained our previous position that post-1997 access assets should be valued on a CCA basis. We thought that unanticipated changes to the basis of valuation would be undesirable as they would create investor uncertainty.

A5.51 We also noted that determining a value based on CCA would mean that incentives for both BT and other potential telecommunications asset investors would increase in strength over time. This is because over time, the proportion of the total value of duct represented by pre-1997 assets (valued at indexed HCA) declines. Setting the value of post-1997 assets at CCA allows the total duct valuation to move towards a full CCA valuation which would encourage infrastructure investment in the longer term, whilst avoiding over-recovery of costs.

A5.52 Our view was based on our wider understanding of market conditions and we explained that it may be appropriate to reconsider our position as part of the next review of the wholesale local access market.

A5.53 In the FAMR Consultation we are consulting on our view that BT continues to possess SMP in the wholesale local access and wholesale fixed analogue exchange line markets. In the light of this, and for the reasons set out earlier, we still consider that CCA is an appropriate basis for valuing post-1997 access duct assets. Changing the basis of the valuation now would create uncertainty for investors – both for investors in BT and investors in CPs seeking access to BT's local access network.

[21] Ofcom, "*Valuing Copper Access*", August 2005, paragraph 3.3

A5.54 We are also concerned with the promotion of efficiency, the promotion of sustainable competition and conferring the greatest possible benefits on end-users. In this context we need to consider whether it is appropriate to set charge controls for services using the existing assets on the basis of full replacement costs in order to give appropriate signals for competitive entry; and whether such entry is likely.

A5.55 As in the March 2012 Statement it remains our view that if prospects for infrastructure competition were to improve in the longer term, it could become more important for charges to reflect the costs of building the network at that time. Continuing to use CCA for post-1997 assets is consistent with cost recovery (but not over-recovery) and will give stronger incentives for competing investment in the longer term, as the share of the asset base accounted for by pre-1997 assets declines.

Determining a valuation of post-1997 duct assets

Our previous approach

A5.56 In the March 2012 Statement we considered the appropriate valuation for post-1997 access duct assets.

A5.57 Our starting point for determining the appropriate valuation of BT's network assets has typically been BT's estimate of the cost of replacing the entire network, as reflected in its RFS. We therefore considered BT's valuation of its post-1997 assets by reference to its absolute valuation in the RFS.

A5.58 The value in the RFS, and the methodology for determining the value, has been a matter for BT to determine.

A5.59 BT derives the duct assets' CCA valuation from an estimate of the cost of replacing the duct assets acquired in the last 40 years based on current contractor rates. Since 2007/08 BT has adjusted its estimate of the total cost to reflect its estimate of a hypothetical scale discount that it considers might be achieved on these rates if the entire duct network was replaced on a planned national basis over a short period (the national discount).

A5.60 In the 2012 Statement, we noted that BT's absolute duct valuation had shown some significant fluctuation over the recent years. We noted that this was despite there being no major changes in the underlying duct asset. We explained that, to be useful in setting charge controls, future asset values should, as far as possible, be predictable and not lead to dramatic changes in charges. As the absolute valuation method used by BT did not appear to change in line with the expected movements in the underlying asset, we explained that it does not seem to be an appropriate basis for charge controls. We therefore considered alternative approaches to deriving a CCA valuation for duct assets.

A5.61 We explained that establishing an alternative robust approach for determining an absolute valuation for post-1997 duct assets, would require us to undertake a fundamental review of BT's duct infrastructure that would go beyond the scope of, or time available for, that charge control review.

A5.62 We therefore considered approaches derived from indexation of actual expenditure since 1997. We noted that there are a number of industry-specific price indices that potentially could be used for duct assets, in particular the General Building Cost Index (the "GBCI") and the All-In Tender Price Index (the "TPI").

A5.63 We explained that, because the TPI is based on actual tender prices charged for construction work, it was a potentially attractive index as it gives a 'spot' price of values in the market. However, TPI has historically been more volatile than the GBCI, with significant changes due to changing economic conditions. This suggested that the TPI was not, comparatively, as robust a basis for a forward valuation of duct.

A5.64 GBCI is based on a cost model of an average building and reflects changes in the costs of labour, materials and plant costs. We therefore considered that it might provide a more appropriate starting point for an assessment of changes in the cost of building duct.

A5.65 However, we also sought to be consistent with the general approach taken by BT to the valuation in its RFS. Accordingly, we considered that we should continue to apply the "national discount" that BT considers would be achieved if the network was to be rebuilt on a planned basis over a short period. We noted that this is not reflected in the GBCI indexation alone. To capture the effect of this discount we concluded that it would be necessary to reduce the indexed value by an amount to reflect the potential discount.

A5.66 We considered that there was scope for a cost discount in a single large scale rebuilding project but recognised that it is difficult to determine a robust figure for what might be possible in the theoretical scenario reflected in BT's valuation of an overnight rebuild of the full network in an environment of limited scope for economies of scale for a dispersed infrastructure project. We decided that the discount used in BT's 2009/10 accounts (14.5%) and a subsequent estimate provided in the context of the consultation (9%) set a plausible range but concluded that there was not sufficient information to determine a single "correct" figure.

A5.67 We concluded that RPI was the most appropriate index to use as the basis for duct valuation for the following reasons:

- its value sits within the range determined by GBCI-14.5%-GBCI-9%;
- RPI is a well recognised index that is used by other regulators for indexed valuations and price regulation calculations; and
- the use of RPI will enable a more transparent calculation without the need to estimate the exact figure for the national discount. This is advantageous as even if the "correct" discount could theoretically be determined, the figure may change year on year leading to unpredictable movements in duct valuation. We explained that the use of RPI index removes the need for the re-evaluating the national discount estimate annually.

A5.68 We concluded that CCA remained the appropriate approach for valuing post-1997 duct assets and consider that the appropriate method for estimating the CCA value was indexing annual spend on the network by RPI. We therefore updated the calculation to reflect BT's actual capex for 2009/10 and the relevant RPI.

A5.69 The choice of RPI as an appropriate index was subsequently appealed. The CC concluded that we did not err in using RPI to value post-1997 duct assets.[22]

[22] Paragraph 12.78 of the Determination http://www.catribunal.org.uk/files/1192-93_BSkyB_CC_Determination_270313.pdf

Our proposed approach – indexation using RPI

A5.70 As noted above, our starting point for determining the appropriate valuation of BT's network assets has typically been BT's estimate of the cost of replacing the entire network, as reflected in its RFS.

A5.71 In the 2011/12 RFS, BT continued to derive its estimate of the CCA valuation of its duct assets from an estimate of the cost of replacing the assets based on current contractor rates, less it estimate of the hypothetical national discount.

A5.72 We consider that, as a basis for setting price controls, BT's 2011/12 valuation methodology is subject to the same flaws as those identified in our March 2012 Statement, as described above.

A5.73 We therefore remain of the view that BT's 2011/12 absolute valuation is not an appropriate basis for deriving the post-1997 duct assets valuation.

A5.74 As in 2012, we also consider that establishing an alternative absolute valuation of our own would require us to undertake a fundamental review of BT's duct infrastructure. Additionally, it is not obvious that such an approach would provide a more robust or predictable valuation methodology than the one adopted by BT.

A5.75 We have therefore re-considered approaches derived from indexation of actual expenditure since 1997.

A5.76 We have concluded that the approach taken in 2012, based on RPI continues to provide an appropriate index to use as the basis for deriving an opening duct valuation for use in the price control for the following reasons:

- using a general price index reduces volatility in the valuation while setting appropriate incentives;
- RPI is a well recognised index that is used by other regulators for indexed valuations and price regulation calculations;
- the use of RPI will enable a more transparent calculation without the need to estimate a national discount;
- it sets an opening value that is similar to the valuation indicated by BT's absolute valuation;
- it gives a valuation consistent with recent decisions; and
- it is consistent with the basis that BT intends to adopt in its 2012/13 RFS.

A5.77 For the purpose of forecasting changes in the replacement cost of duct over the duration of the price control, we consider that there are advantages in using a similar basis to the one chosen to set the opening value. Specifically, we consider that, having determined that RPI provides an appropriate index for deriving the opening duct valuation at the start of the control period, it should also be used to provide a predictable and consistent basis for forecasting changes during the price control period.

A5.78 We consider each of these points in more detail below.

The use of a general price index reduces volatility while setting appropriate incentives

A5.79 When we considered the use of an indexed-based valuation methodology in 2012, we noted that, in the absence of a robust absolute valuation, indexation is an acceptable "*second best*" method of valuation.

A5.80 We noted that the chosen index would ideally be derived from industry costs. However, as explained above, after considering the GBCI and TPI, we concluded that RPI was the most appropriate index to use.

A5.81 In response to the 2012 FAMR CFI, we received a report from Frontier Economics commissioned by Sky and TalkTalk. Frontier suggested that an indexation approach based on RPI could be used for post-1997 access copper assets. They argued that such an approach is preferable to the existing absolute valuation. Frontier gave three reasons for preferring RPI indexation.

A5.82 Frontier said: 'There are a number of reasons for preferring the use of a general price index over the current methodology:

A5.83 **Reduced volatility.** An indexation approach based on a general price index would reduce volatility, bringing benefits to all stakeholders.

A5.84 **Increased transparency.** An indexation approach can be implemented by modifying the existing RAV model spreadsheet, which can be made available to all stakeholders. The key assumption, the assumed price index, would also be fully transparent to all stakeholders.

A5.85 **Undistorted incentives.** An indexation approach which uses a third party index, making the revaluation of the asset base exogenous to BT, ensures that the incentives on BT to increase efficiency due to the charge control mechanism are effective.'[23]

A5.86 While this report was referring specifically to access copper, we consider that these arguments would also apply to access duct valuation.

RPI is a recognised and understood index

A5.87 RPI is a well recognised index that is used by other regulators for indexed valuations and price regulation calculations.

A5.88 We note that the ONS recently identified concerns with the formula used to calculate the RPI and the UK Statistics Authority recently concluded that RPI statistics will no longer be designated as a National Statistic. An index designed to address the formula problems with RPI has been published from March 2013 known as RPIJ.

A5.89 RPIJ is currently an experimental statistic and an assessment by the UK Statistics Authority on its status as a National Statistic is due to be published in the summer of 2013.[24] It also appears that the RPIJ statistics will not be recreated back to 1997

[23] http://stakeholders.ofcom.org.uk/binaries/consultations/fixed-access-markets/responses/BSkyB_and_TTG_cost_standard1.pdf

[24] Office for National Statistics, Derek Bird 'Introducing the new RPIJ measure of consumer price inflation'

and independent forecasts are not widely available. It would therefore be difficult in practice to use RPIJ to value post-1997 duct at present.

A5.90 We note that CPI is also a well recognised index that is readily understood by stakeholders. However, it does not have some of the other advantages that RPI offers. Notably, using CPI to index post-1997 duct assets would not provide consistency with BT's absolute valuation and previous regulatory decisions.

RPI provides a relatively simple and transparent basis for valuing assets

A5.91 As explained below, the use of RPI as the index appears to provide a 2011/12 valuation similar to BT's 2011/12 absolute valuation. This does not in itself prove that RPI is the "correct" index (given the inherent limitations in any absolute valuation methodology), but it provides some assurance that it is a reasonable approach.

A5.92 The RPI methodology therefore does not explicitly model the effects of a national discount but delivers a valuation that is consistent with BT's 2011/12 methodology that does.

A5.93 The use of RPI therefore enables a more transparent calculation without the need to estimate the exact figure for the hypothetical national discount. This is advantageous as even if the "correct" discount could theoretically be determined, the figure may change year on year leading to unpredictable movements in duct valuation. The use of RPI index removes the need for the re-evaluating the hypothetical national discount estimate annually.

Consistency with BT's absolute valuation

A5.94 A valuation based on RPI indexation of capital expenditure results in a similar value as BT's absolute valuation in the 2011/12 RFS. From the information we currently have from BT it appears that the total value of access duct on the basis of an absolute valuation is also likely to be similar to the valuation on the basis of indexed RPI in 2012/13. Net Replacement Cost for both is estimated to be around £5.4bn.

A5.95 There continues to be significant uncertainty over the appropriate level of the national discount, if any, to be used for valuing duct given that it is a hypothetical discount that BT might receive if it were to rebuild its entire network. While the methodology of indexing duct capital expenditure by RPI does not explicitly include a national discount, it appears to deliver a value that is consistent with BT's absolute valuation both in 2011/12 and 2012/13 which includes such a discount.

A5.96 Consistency with BT's absolute valuation does not demonstrate that RPI delivers the "correct" valuation, but the fact that the valuation does not change significantly provides some assurance that BT will not make a significant gain (or suffer a significant loss) as a result of a move away from the absolute valuation.

Consistency with previous decisions

A5.97 Changing valuation bases between price controls could cause valuations to change by more or less than was anticipated when the previous price control was set. This could result in changes in asset values being significantly different from the offsetting effects of holding gains or losses. Therefore we consider that, unless the previous valuation methodology is clearly no longer appropriate, we should be

cautious about changing the valuation methodology if to do so would cause a significant change in the valuation.

A5.98 As explained above, for the purpose of the 2012 price control we used RPI to derive the opening asset value and forecast holding gains. Therefore, adopting a similar approach for the purposes of this control should mean that the opening asset valuation (as well as the valuation methodology itself) will be broadly consistent with that reflected in the 2012 decision.

A5.99 We also note that the choice of RPI for post-1997 is also consistent with the choice of RPI as the index applied to pre-1997 assets.

Consistency with BT's 2012/13 RFS

A5.100 BT has signalled an intention to move from its existing approach of valuing access duct on the basis of an absolute valuation to a methodology based on RPI indexation in the 2012/13 RFS. In the event of the move, BT would not be maintaining the complex database required to calculate the absolute valuation.

A5.101 BT has explained that the proposed move is due to a number of uncertainties in the absolute valuation and notably the fact that the valuation is dependent on the surface mix assumption. Surface mix estimates the amount of duct built in different conditions (e.g. under carriageway) and the different types of duct are priced accordingly. BT's auditors, PricewaterhouseCoopers, said in their 2011/12 audit report on BT's RFS that "the potential impact on the Financial Statements of any change in the valuation of these assets as a result of changes to source data cannot be accurately determined".[25] As a consequence, we understand that BT is now planning to use an indexed approach instead of an absolute valuation.

A5.102 The fact that BT may adopt a similar approach in its RFS does not demonstrate that the approach is necessarily correct for the purpose of setting prices, but there are advantages in the longer term of consistency of approach.

Consistent and predictable recovery

A5.103 In terms of forecasting the value of post-1997 duct going forward (and the resultant holding gains reflected in our cost modelling), we note that the choice of forecast methodology does not affect the present value of the recovered amount. It only affects the profile of recovery insofar as a higher index would result in lower costs (and therefore charges) in the short term and higher charges later in the asset's life. Therefore, we consider that there is a benefit in using the same basis of forecasting duct costs as we use for the opening valuation, in order to achieve consistency between future charges and the prices at the start of the control as well as costs recovered by BT during the previous control.

Conclusion

A5.104 In the light of the above we propose to conclude that CCA remains the appropriate approach for post-1997 duct asset valuation. We propose to estimate the CCA value for post-1997 access duct on the basis of annual capital expenditure indexed by RPI.

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25 http://www.btplc.com/Thegroup/RegulatoryandPublicaffairs/Financialstatements/2012/RFS_2012.pdf

Valuation of post-1997 copper assets

A5.105 We propose to continue to use CCA to value post-1997 access copper assets consistent with the 2005 Cost of Copper Review and our approach in previous charge controls. The opening value for post-1997 copper assets is therefore BT's absolute valuation in 2011/12.[26] However, because it is difficult to forecast movements in copper prices going forward, for the purposes of our forecast we propose to index copper by RPI. This is the approach we have adopted in other charge controls including the previous LLU and WLR charge controls and the recent leased line charge control.[27]

A5.106 Similar to duct, BT has signalled an intention to move from its existing approach of valuing access copper on the basis of an absolute valuation to a methodology based on RPI indexation in the 2012/13 RFS. Given that we already propose to forecast copper valuation based on RPI, this change may only affect our consideration for estimating the opening value for post-1997 copper assets. Based on initial discussions with BT we do not anticipate that the change from absolute valuation to RPI indexation will result in a significant change in the 2012/13 valuation, although we will need to consider if and how we take this new information into account when it is available.

Modelling approach

A5.107 In order to model the RAV adjustment, we substitute BT's reported access duct and copper CCA values for GRC, NRC and depreciation with the equivalent outputs from the RAV model. Given that the LLU and WLR services consume a proportion of access duct and copper, we take the relevant percentage of GRC, NRC and depreciation that is allocated to the LLU and WLR services as identified by BT. The relevant percentages are c.69% for duct and c.93% for copper. This percentage of access duct and copper RAV values for GRC, NRC and depreciation are then apportioned to all components that use access duct and copper in the same proportion as the equivalent CCA values in BT's RFS.

[26] Under the absolute valuation method, the replacement cost of assets is estimated by multiplying the quantity of assets in place by the estimated current price of the relevant assets – rather than by applying a price trend to previous asset values.
[27] Ofcom, *Business Connectivity Market Review - Review of retail leased lines, wholesale symmetric broadband origination and wholesale trunk segments*, 28 March 2013 http://stakeholders.ofcom.org.uk/consultations/business-connectivity-mr/final-statement/

Annex 6

Differentials between MPF and WLR/WLR+SMPF

Introduction

A6.1 In this Annex we compare our current estimates of the differences between MPF and WLR/WLR+SMPF with the estimates in the March 2012 Statement.

Comparison of FAC differentials

A6.2 Table A6.1 below shows the difference between MPF and WLR/WLR+SMPF in terms of charges, the FAC estimates in the March 2012 Statement and the FAC estimates in this consultation.

Table A6.1: Differentials between MPF and WLR/WLR+SMPF (in nominal terms)

	per line per annum	WLR+SMPF charges less MPF charge	WLR charge less MPF charge
1	Current charges (in force since May 2013)	£18.76	£9.01
2	Charges for 2013/14 from March 2012 Statement	£20.01	£9.63
3	FAC estimates for 2013/14 in March 2012 Statement, excluding the TAMs pricing adjustment	£16.09	£7.36
4	FAC estimates for 2013/14 in March 2012 Statement, adjusted to reflect current proposed treatment on: (1) TAMs, (2) printed directory costs in WLR (3) line length and (4) evoTAMs	£13.86	£3.41
5	FAC estimates for 2013/14 in March 2012 Statement, adjusted as per row 4, and also including revisions due to appeals	c£12.60	c£2.80
6	Current FAC estimate for 2013/14	£11.30	£1.40
7	Current FAC estimate for 2016/17	£10.89	£1.41

Note: the figures in this table are in nominal terms and the 2013/14 and 2016/17 figures may not be directly comparable.

A6.3 Row 1 shows the differences between current prices, which incorporate the revisions following the appeals.[28] Row 2 shows the charges forecast for 2013/14 in

[28] The changes as a result of the appeal related to volume forecasts, test head allocations, cumulo rates calculation, copper recovery revenue and migrations. The Competition Commission also found that Ofcom erred in its treatment of service levels and faults and that was remitted to Ofcom by the Competition Appeal Tribunal. See: http://stakeholders.ofcom.org.uk/consultations/wlr-cc-2011/charge-control-april2013/

the March 2012 Statement, which was before they were amended during the appeals.[29]

A6.4 The FAC estimates in the March 2012 Statement were different from the charges set in that statement because the charges included a "TAMs pricing adjustment" while the FAC estimates did not. This adjustment spread TAMs costs over both SMPF and MPF rentals, even though they are only used for MPF lines. Row 3 shows the FAC differentials for 2013/14, which recovered all TAMs costs from MPF. This is consistent with our proposal for the Charge Control.[30]

A6.5 Row 4 shows what the FAC estimates would have been in the March 2012 Statement if we had made the same policy proposals as we now propose to make on:

- printed directory costs, where we do not propose to include a printed directory contribution from WLR; and [31]
- line length adjustment, where we do not propose to include a line length adjustment between MPF and WLR;[32]
- evoTAMs, where we propose to recover all evoTAMs costs from SMPF.[33]

A6.6 Row 5 is the same as row 4 except that we have also included the revisions due to the appeals.[34] Given that we also propose to implement the same approach to the issues in the appeal as the Competition Commission in its determination, this row provides a more like for like comparison to our current estimates.

A6.7 Rows 6 and 7 show our current base case estimates for 2013/14 and 2016/17 respectively. These are the FAC numbers from our cost model (before the adjustment which we make that sets the difference in charges to be equal to difference in LRIC).

A6.8 By looking at rows 5 and 6, we can compare the estimated FAC differentials in our modelling for the March 2012 Statement with that in our current modelling. Both

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http://catribunal.org/239-7606/1192-3-3-12-1-British-Sky-Broadcasting-Limited-2-TalkTalk-Telecom-Group-PLC.html
http://catribunal.org/239-7610/1193-3-3-12-British-Telecommunications-PLC.html
http://www.competition-commission.org.uk/assets/competitioncommission/docs/2012/llu-wlr/determination_excised.pdf

[29] Row 2 shows the differences in the charges forecast in the March 2012 Statement (see Figure 6.2 of the March 2012 Statement). Because inflation has been slightly higher than forecast then, the actual charge differential resulting from the charge controls imposed by the March 2012 Statement was slightly higher. Before the impact of the changes resulting from the appeals, which were implemented in May 2013, the differences in the charges in April 2013 were £20.11 for MPF vs WLR+SMPF charges and £9.71 for the MPF vs WLR differential. Similarly for the FAC estimates from the March 2012 Statement in other rows, we have used the figures in the March 2012 Statement without adjustment for slightly higher outturn inflation.

[30] See paragraphs 3.83 to 3.95 for more explanation of the TAMs pricing adjustment and our proposals in this consultation.

[31] See paragraphs 3.105 to 3.126 for an explanation of our proposals on printed directories.

[32] See paragraphs 3.96 to 3.104 for an explanation of our proposals on line length.

[33] See paragraphs 6.149 to 6.151 for an explanation of our proposals on evoTAMs.

[34] We have calculated row 5 crudely as the sum of row 4 and the difference between the charges set originally for 2013/14 and those resulting from the appeal (i.e. the difference between rows 1 and 2). The figures in row 1 may include some adjustment for inflation implicit in the Competition Commission's Determination of 27 March 2013, unlike the figures in row 4.

estimates have the same policy assumptions for printed directories, line length, TAMs and evoTAMs, and are for 2013/14. It can be seen that our estimate of the FAC differential for WLR+SMPF and MPF is £1.40 lower than it was previously, having been around £12.60 and now being £11.30. The difference in the FAC differential for WLR and MPF is similar.

A6.9 However, we note that if TAMs and evoTAMs costs were allocated as in BT's 2011/12 RFS, the current FAC differentials would be much smaller than we estimated in the March 2012 Statement. The WLR+SMPF vs MPF differential would reduce to about £3, while the MPF vs WLR differential would change direction with MPF being about £4 above WLR. We have discussed TAMs and evoTAMs costs in Section 6.

A6.10 While Table A6.1 shows that the FAC differentials in the March 2012 Statement for 2013/14 and those in the current consultation for 2016/17 are broadly similar for WLR+SMPF and MPF, it is not possible to explore in a precise way whether all the components are similar.

A6.11 As noted in Section 6 and Annex 13, in this consultation we have used the CCA FAC forecasts from the cost model, which begins with BT's RFS. While both the cost estimates from the March 2012 Statement and now are informed by the CCA FAC data from the RFS, the way the CCA FAC figures are compiled is different between the March 2012 Statement and the current consultation. This means that the data is not directly comparable.

Comparison of LRIC differentials

A6.12 In the March 2012 Statement prices were set based on the FAC figures. Ranges for the likely LRIC differences were used to check that the resulting prices would be unlikely to lead to inefficiencies. For the Charge Controls we propose to set prices so that the differences between MPF and WLR/WLR+SMPF are equal to LRIC in the final year of 2016/17.

A6.13 Table A6.2 below compares our estimates of the LRIC differences in the March 2012 Statement with our current estimates. We note that these are for different years and so may reflect changes over time in terms of input prices, efficiency and volume changes.

Table A6.2: LRIC differentials between MPF and WLR/WLR+SMPF (in nominal terms)

per line per annum	WLR+SMPF charges less MPF charge	WLR charge less MPF charge
March 2012 Statement (for 2013/14)	Likely to be in the range of £10 to £14	Likely to be in the range of £3 to £8
Current LRIC estimate (for 2016/17)	£9.90	£1.65

Note: the figures in this table are in nominal terms and the 2013/14 and 2016/17 figures may not be directly comparable.

A6.14 It can be seen from Table A6.2 that our current LRIC estimates of the differentials for 2016/17 are below the ranges estimated in the March 2012 Statement.

A6.15 As with FAC, the methodology used for estimating the LRIC differentials in the March 2012 Statement is different to the methodology used in this consultation. In the March 2012 Statement we considered the physical and contractual differences between MPF and WLR/WLR+SMPF and tried to estimate the likely costs of those differences, on a LRIC basis. In doing this, we drew on CCA FAC figures. In the current statement we have used the CCA FAC figures, together with a LRIC:FAC ratio to forecast the LRICs for each service at the end of the control period. While both estimates are informed by the CCA FAC data, as explained above, the way the CCA FAC figures are constructed is different.[35]

[35] For some of the components used to estimate the LRIC differentials in the March 2012 Statement we assumed a LRIC: FAC ratio of 90%, whereas we now used the LRIC:FAC ratio for each service as derived from our modelling. This implies a ratio of 54% for MPF, 55% for WLR and 87% for SMPF. This does not make a significant difference to the resulting differentials. For example, if we assumed a 90% LRIC:FAC ratio for all three services, then the LRIC differentials for MPF vs. WLR+SMPF would be £9.80 and for MPF vs. WLR it would be £1.27.

Annex 7

Efficiency

Introduction

A7.1 In this Annex, we set out for consultation our assessment of the efficiency gains to be delivered by Openreach over the period of the proposed charge control. We also set out how we propose to reflect this in our cost modelling.

Definition of efficiency gains

A7.2 The rate we are trying to establish for the purpose of forecasting Openreach's efficiency gains is a single rate that:

- is applied to all cash payments (cash costs are defined to be operating costs less depreciation plus capital expenditure);
- is independent of volume effects;
- captures the effect of all means of delivering efficiency savings including the savings that might be achieved by doing things less often (e.g. through reduced fault visits) or more quickly (e.g. through reduced task times) and for less money; and
- is stated with reference to the overall reduction in cash costs i.e. it takes into account any additional costs incurred, such as redundancies.[36]

A7.3 This efficiency measure is independent of input price changes and so can be thought of as a measure of Openreach's total factor productivity over time. For a given level of output, it captures how much inputs can be reduced, ignoring input price changes.

A7.4 Our efficiency estimate includes both "catch up" and "frontier shift". Catch up is the change in costs required to bring Openreach in line with an efficient operator. Frontier shift is the movement in efficiency expected by an efficient operator over time. We have not separately estimated how much is frontier shift and how much is catch-up efficiency.

Proposal

A7.5 Based on the analysis described below, we believe that Openreach should be capable of reducing its cash payments, taking into account the costs of implementation, by between 4% and 6% each year.

A7.6 For the purpose of our cost modelling for this consultation, the effect of this reduction will be achieved by applying a single rate of 5% to all cash costs (including capital expenditure); the rate of 5% reflects the cost of achieving the efficiencies projected.

[36] Any financial changes resulting from different levels of service provision from those underlying the costs in the base year of our model (2011/12) are being considered separately as part of our consultation proposals on quality of service.

Regulatory Background

2012 LLU WLR Appeal Decision

A7.7 In the March 2012 Statement we concluded that a rate of 4.5%, allowing for the cost of implementation, was an appropriate efficiency rate for the purpose of our charge control.[37]

A7.8 Following this decision, the application of the efficiency rate to corporate overheads was appealed by BT. The appeal was based on arguments around accuracy and consistency of methodology.

A7.9 The Competition Commission (CC) upheld Ofcom's decision. It ruled that the inaccuracies highlighted by BT were not significant in affecting the result. It stated that the efficiency rate was ultimately based on a regulatory assessment that balanced a wide variety of sources. It concluded that the granularity that BT sought to introduce to this specific aspect of the calculation was not applicable.[38]

Responses to 2012 FAMR CFI and Stakeholder Submissions

A7.10 BT has stated that the scope for efficiency savings is reducing. BT states that this is due to the increasing demands on Openreach and because the more straightforward cost reductions have already occurred. The increased demands are identified to be a result of higher fault rates and a greater proportion of lines on a higher care level (as a result of migration from WLR to MPF).[39]

A7.11 BT has further stated that it does not believe a single efficiency rate applied to both operating expenditure and capital expenditure to be appropriate. BT has suggested that separate targets should be set for these two cost types because of the different impacts operating costs and capital expenditure have on the cost stack. (Capital expenditure is included in the cost stack over a period of years via the depreciation charge and return on capital employed. Operating costs are included in the year incurred.)

A7.12 TalkTalk stated that BT has historically submitted to Ofcom arguments which consistently underestimate BT's potential efficiency gains, hence "Ofcom should place very little (or no) weight on BT's claims".[40] Talk Talk argues that Ofcom has in all previous charge controls underestimated BT's efficiency gains either placing too much weight on BT's arguments or by "a misplaced belief that it is appropriate to underestimate efficiency gains in order to create incentives for BT to outperform its target".[41]

A7.13 Sky said that it should not be necessary to adopt an efficiency rate from the bottom of the proposed range in order to maintain incentives on BT to beat it. This incentive would be equally strong were Ofcom to select a rate from anywhere else in the range.[42]

[37] March 2012 Statement paragraph A3.5
[38] 2013 CC determination 2.60
[39] Openreach Efficiency Presentation 15th April 2013
[40] TalkTalk response to the 2012 FAMR CFI paragraph 3.23
[41] TalkTalk response to the 2012 FAMR CFI paragraph 3.25
[42] Sky response to 2012 FAMR CFI paragraphs 4.c) and 24.d)

Ofcom's analysis and assessment of responses

Separate Efficiency Targets

A7.14 We do not propose to apply separate operating and capital expenditure efficiency targets as BT has suggested.

A7.15 BT's observation that operating costs and capital expenditure have different impacts on the cost stack does not lead us to conclude that they should have different efficiency targets applied. In our modelling, we apply the efficiency rate to both operating costs and capital expenditure which then flow through into the cost stack calculations. In this way the application of the efficiency target is consistent with the way it has been assessed.

A7.16 Further we understand from discussions with BT that its internal targets are set on a cash basis. The data provided by BT appears to support this; showing less variation in the overall cash efficiency rate than in the separate capital expenditure and operating expenditure rates.

A7.17 We consider that the current approach of having one target efficiency rate effectively captures efficiency in our modelling. We believe that there is no benefit in increasing the complexity by consulting on two separate rates.

Efficiency Rate in Charge Control Model and Incentives

A7.18 Once the charge control is set, BT will have an incentive to try to maximise profits and reduce costs regardless of whether the efficiency target has been set too high or too low. Setting the efficiency rate is therefore not about giving BT incentives but about ensuring that future prices are set at an efficient forecast cost level.

A7.19 We note that longer term if the efficiency rate assumed were systematically more than BT could deliver, BT may have less incentive to invest in and maintain the network. However, this is not a unique consideration in the setting of the efficiency parameter in the cost model. If cost forecasts are biased downwards, whether by the efficiency parameter or otherwise, this risks pushing expected returns below the cost of capital and thus reducing incentives to invest. However, by seeking to set cost forecasts (including the future extent of efficiency savings) in an unbiased way, coupled with the use of control periods and glide paths, the incentive properties of price cap regulation should be retained.

Future Scope for Efficiency Gains

A7.20 We have considered a range of indicators to estimate the efficiency improvement that would bring Openreach's costs in line with those of an efficient operator. These include historic trends, forecast and benchmark data as well as more qualitative data from industry analysts.[43]

[43] We also sought to commission a study on Openreach's efficiency, inviting bids from external consultants. Although we received no bids, we considered that our evidence base without this is sufficient to determine a robust efficiency target and therefore, did not consider it necessary to commission supplemental evidence.

Historical trend analysis

A7.21 Historical levels of efficiency gains are a useful benchmark if past efficiency savings are considered to be indicative of the savings that might be made in the future.

A7.22 We have considered Openreach's historical data as recorded within its management accounts (adjusted for NGA) and from the Regulatory Financial Statements.

A7.23 Based on Openreach's most recent performance as recorded within its management accounts, we estimate that Openreach reduced its cash costs in 2011/12 by around [✂] (after taking into account adjustments for changes in input prices and volumes and adjusting for NGA) but not taking into account the costs of achieving that efficiency.

A7.24 This assessment assumes that some costs should be excluded as they are either "one off" or relate to cost movements not applicable to efficiency; as identified by Openreach. Assuming that an upper bound on the efficiency rate could be identified by the inclusion of these costs, i.e. including all costs except those applicable to volume and input price changes, we estimate that an upper bound for the 2011/12 efficiency rate is around [✂].

A7.25 Looking at Openreach's historical trend from its management accounts from 2007/8 to 2011/12, after taking account of adjustments for inflation and changes in volumes (and NGA); we consider that Openreach has achieved [✂] efficiency savings accounting for all movements in costs, excluding "one offs" and other costs reduces this estimate to around [✂].

A7.26 The Regulatory Financial Statements also provides a useful reference point as using this data we can identify the trend in operating cost reductions specific to the WLA and the WFAEL markets. Our analysis of this data estimates that Openreach has achieved operating cost (excluding depreciation) efficiency savings of around 6.0% over the past three years after adjustment for volume and input price changes. The volume effect implicit in this methodology is very small as it uses total rental volumes.

A7.27 If past efficiency savings are considered to be indicative of the savings that might be made in the future then:

- Accepting Openreach's argument that one off and other ("non efficiency related") cost movements should be excluded suggests an efficiency rate of around 4%, including estimates of the cost of implementation.

- Including all cost movements as efficiency related (other than those related to volume and input prices), implies a higher efficiency rate of between around 5% and 6.0%.

BT planning documents and public statements

A7.28 For the purposes of generating our consultation proposals, we requested, using our statutory information gathering powers, Openreach's own expectations within its planning documents. We also considered Openreach's own expectations as recorded in its public statements.

A7.29 BT's Biannual Rolling Forecast (BRF2) is an internal forecast used for planning purposes within BT. The data submitted to Ofcom sets out BT's view of the financial outlook for 2012/13 (including 10 months of outturn data) and 2013/14.

A7.30 The BRF2 suggests an efficiency rate of around [✂] (after accounting for input price inflation and volumes), including BT adjustments to remove the impact of its current efficiency programme to reduce fault visits. Dependent on the treatment of BT cost allocations to one off and other (i.e. exceptional) effects, the forecast implies a range of net efficiency between around [✂] and [✂].

A7.31 Openreach has argued that the overall approach of the planning process is to set stretching efficiency targets,[✂].

A7.32 BT has also submitted data for the year 2014/15 and 2015/16 which form part of a different planning process, BT's Medium Term Plan (MTP). [✂].

A7.33 BT's recent presentation to analysts on its year end results would suggest that BT is envisaging a continuation of efficiency savings, at least to 2014/15. In general the tone was one that stressed continued and sustainable cost cutting along the lines of previous years. BT Group Finance Director spoke of changes to costs continuing over the next three years "the key is the journey hasn't stopped. The key is there are plenty more opportunities for us to do this in a forensic fashion, over the course of the next three years"[44]. He further stated "But what I would say is, in terms of underlying efficiency, we've got a material, material opportunity. You know, and the opportunity in relation to the efficiency component is no smaller than it was. It's going to be a little bit more difficult, not a little bit more, much more difficult to get to because we've taken out the low hanging fruits. But the opportunity is material".[45]

A7.34 In conclusion, if you consider the BRF2 to contain the most relevant planning data for our charge control, as it contains the most recent data and could be argued to be less susceptible to forecast error as it covers the immediate time period. Then this implies an efficiency range (according to our definition) of between around [✂] and [✂].

A7.35 However if you consider the MTP to provide the more relevant data, as the time period the MTP covers (2014/15 and 2015/16) more closely aligns with that of our charge control modelling. Then the planning data implies a range of between [✂] and [✂]

A7.36 Considering both sources of planning data in the round, we consider that the data implies a midpoint position of 5% and a range of between 4% and 6%.

Analyst Reports

A7.37 We have reviewed statements concerning BT's future cost reductions made by industry analysts.

A7.38 It appears that analysts are positive about BT's ability to continue to reduce costs but believe that this may well be increasingly difficult to achieve.

[44] http://www.btplc.com/Sharesandperformance/Quarterlyresults/PDFdownloads/q413_transcript2.pdf slide 4

[45] http://www.btplc.com/Sharesandperformance/Quarterlyresults/PDFdownloads/q413_transcript2.pdf page 10

A7.39 New Street Research (NSR) stated that "BT has become well known for its prodigious cost cutting ability" however NSR state that "we believe it will be increasingly hard for BT to reduce costs"[46].

A7.40 The Bank of America expressed similar views stating that "BT has done an excellent job taking costs out of the business" and "if we benchmark BT against the other European telcos (using fixed line only data / our adjustments) it appears that BT can still reduce headcount costs". They summarise their analysis saying "this analysis suggests BT still has several years of cost cutting ahead of it. While such things look easy on paper, we believe the reality may be different"[47].

A7.41 Normura's paper of February 2013 which focuses on Openreach, reports on an update from Openreach's CEO. Normura state "one of the CEO's core performance benchmarks is delivering efficiency gains, and Ms Garfield was adamant that Openreach would become more efficient". The paper states that "Openreach is considerably behind the Retail division on its cost transformation journey".[48]

A7.42 In summary, analysts suggest that BT, and Openreach in particular, has the potential to continue to cut costs but that it may get increasingly difficult to achieve the reductions. This view is consistent with BT's public statements.

External Benchmarks

A7.43 In BT's recent analyst briefing for its 2013 year end results, BT used international benchmarks to position BT in terms of the potential to reduce cost. It presented a top level view of how different areas of BT compared to the European benchmarks using data from 2011/12. The different areas included "Technical Services (Connectivity)" and "Network Operations", which were said to be in the second and fourth(bottom) quartiles respectively. "Technical Services (Connectivity)" and "Network Operations" account for the majority of Openreach's costs.

A7.44 BT stated that it believed that the 2012/13 data would show further improvement with the average across the whole of BT likely to have moved from the second to the top quartile. BT also added that the sector is not a great benchmark as "*the industry is not efficient*" [49]

A7.45 Taking this in the round, international benchmarks suggest that Openreach has the opportunity to reduce its cost, particularly in the area of "Network Operations" which involves the construction and maintenance of the access network.

A7.46 Further, to provide a cross reference, we asked other telecoms operators[50] within the UK which operate an access network to provide us with estimates of their own efficiency savings on their network business. Although the data we received in this regard was limited, the data provided suggested that the ranges implied by Openreach's historical and forecast data were reasonable.

[46] New Street Research 'The Hare and The Tortoise' Published 6th March 2013
[47] Bank of America 'Downgrade to Neutral' Published 29th January 2013
[48] Normura 'Perspective from BT Openreach's CEO" Published February 2013
[49] http://www.btplc.com/Sharesandperformance/Quarterlyresults/PDFdownloads/q413_transcript2.pdf slide 5
[50] Benchmark data was sought from both Virgin Media and KCom.

Summary

A7.47 Taken in the round, the evidence we have been able to consider suggests that a net efficiency target of between 4% and 6% per annum (on all cash costs) is reasonable. We propose to adopt a base case efficiency of 5% which will be applied in our cost modelling to both operating costs (excluding depreciation) and capital expenditure.

Question A7.1: *Do you agree with our proposed approach to modelling efficiency, both in general and in particular in applying a single efficiency target to both operating costs and capital expenditure? Please provide reasons to support your views.*

Question A7.2: *Do you agree with our proposed net efficiency range of between 4% and 6% and base figure of 5%? Do you agree with the levels proposed? Please provide reasoning to support your views.*

Annex 8

Volume Forecasting

Introduction

A8.1 This Annex explains the approach we have taken to forecast volumes for the services within the scope of this review.

A8.2 Volume forecasts impact costs because:

- the existence of fixed and common costs means that unit costs will increase if volumes fall, because fixed costs must be recovered over fewer lines; and
- shifts in demand (e.g. from WLR to MPF) will result in changes to the profile of cost recovery of the individual services.

A8.3 These volume forecasts have been prepared solely for the purpose of inputting into the WLR/LLU cost model.[51]

A8.4 In line with the anchor pricing approach we take in this charge control, this forecast considers BT's copper network as if there were no deployment and take up of Next Generation Access (NGA) services. This is necessary as the charge control is only for BT's copper services. In the rest of this Annex we refer to copper lines as the sum of service connections, some of which may include an optical fibre element.

A8.5 Our forecast of line volumes in the March 2012 Statement was subject to appeal by Sky and TalkTalk.[52] They challenged the lack of transparency[53] in the forecasting volumes methodology (a challenge that was not upheld by the CC[54]) as well as the forecast numbers themselves.[55] The CC recognised that forecasting line volumes is an area which is subject to uncertainty and involves a significant degree of judgement.[56] The CC determined, however, that we had made an error in that the forecast of total line numbers we used in our cost model was inconsistent with trends in the key drivers we had identified, and set out in the March 2012 Statement.[57]

A8.6 In this volume forecast we have adopted a different approach to forecasting volumes and have built a model which we are consulting on (see Annex 9). We address the CC's concerns and identify the drivers of volumes for different services

[51] As these volume forecasts are based on a hypothetical ongoing copper network they do not represent Ofcom's view of actual 'real world' volumes and should be considered on that basis. . See A8.4 and A8.43 for further detail.
[52] *2013 LLU and WLR Determination* http://catribunal.org/files/1192-93_BSkyB_CC_Determination_270313.pdf
[53] Paragraph 9.143, *2013 LLU and WLR Determination* http://catribunal.org/files/1192-93_BSkyB_CC_Determination_270313.pdf
[54] Paragraph 9.162, *2013 LLU and WLR Determination* http://catribunal.org/files/1192-93_BSkyB_CC_Determination_270313.pdf
[55] Paragraph 9.20, *2013 LLU and WLR Determination* http://catribunal.org/files/1192-93_BSkyB_CC_Determination_270313.pdf
[56] Paragraph 9.156, *2013 LLU and WLR Determination* http://catribunal.org/files/1192-93_BSkyB_CC_Determination_270313.pdf
[57] Paragraphs 9.202 – 9.204, *2013 LLU and WLR Determination* http://catribunal.org/files/1192-93_BSkyB_CC_Determination_270313.pdf

and using a combination of quantitative data and regulatory judgement forecast their effect on volumes. Where possible, we use input data which is publicly available allowing us to publish our model, with the aim of improving the transparency of our analysis.

A8.7 However, there are many reasons why a forecast is likely to diverge from outturn figures, particularly when market developments cannot be foreseen, or where there are complex interactions between the different services being modelled. While we have aimed to provide a forecast based on current knowledge and data, we welcome respondents' views on the parameters included in our model and suggestions about other parameters which could materially affect forecast volumes but which have not been included in our model.

Summary of our volume forecasts

A8.8 We forecast that in the period to 31 March 2017:

- the total number of Openreach lines will increase to 25 million;
- broadband penetration will increase to 78% of Openreach lines; and
- MPF will account for 36% of the total lines.

A8.9 Table A8.1 summarises our volume forecasts.

Table A8.1: Forecast results summary[58][59]

	2011/12 Actuals		2016/17 Forecasts	
	Number of lines (millions)	Share (%)	Number of lines (millions)	Share (%)
WLR (voice only)	8.2	34%	5.6	22%
WLR +SMPF	11.2	46%	10.3	41%
MPF	5.0	20%	9.1	36%
Totals	24.4	100%	25.0	100%
Broadband lines	16.1	66%	19.4	78%

Structure of this Annex

A8.10 This annex is structured as follows:

- we first summarise the outcome of the appeal at the Competition Commission and review Stakeholders' responses to the 2012 FAMR CFI;
- we then provide an overview of the drivers we have considered and the inputs we used for our analysis; and

[58] All volumes data presented in this annex have been calculated by Ofcom.
[59] Openreach lines only, including fibre (see A8.4 and A8.43 for more detail). Excludes cable.

- finally, we describe the processing stages and the outputs of the model.

Summary of the CC appeal and the responses to the CFI

A8.11 Our forecast of line volumes in the March 2012 Statement was subject to a joint appeal by Sky and TalkTalk. The appellants challenged the lack of transparency in the forecasting volumes methodology as well as the forecast numbers themselves. We forecast that total Openreach line numbers would decline over the charge control period by over 600,000 but Sky and TalkTalk argued that volumes were in fact increasing, adding that Ofcom's forecast had the effect of erroneously increasing the rental prices.

A8.12 The CC stated that, in its view, forecasting line volumes is an area which is subject to uncertainty and involves a significant degree of judgement. It therefore judged that in this regard it was right that Ofcom should be afforded a significant margin of appreciation.[60] The CC did not uphold Sky and TalkTalk's challenge over lack of transparency.[61] However it determined that Ofcom had made an error in the calculation of the actual volume numbers – in effect, the forecast decline in Openreach line numbers was inconsistent with Ofcom's stated judgements about the key factors driving the projected change in line volumes, most notably household growth.[62]

A8.13 The CC considered that the March 2012 Statement was clear about the factors driving incremental line volumes over the charge control period. Sky and TalkTalk, together with Everything Everywhere (EE), also agreed that these were the most important factors in relation to forecasting line volumes over the charge control period.[63] The identified factors were:[64]

i) the increase in the number of mobile only households;[65]

ii) the growth in the number of UK households;

iii) the decline in the number of business lines;

iv) competition from cable; and

v) the roll-out of fibre-based access networks (NGA).

A8.14 Following further submissions from the parties to the appeal on, amongst other things the appropriate level of household growth, the CC determined the correct volume forecasts. On 30 April 2013, we corrected the charge controls to implement this correction.

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[60] Paragraphs 9.156 – 9.161, *2013 LLU and WLR Determination* http://catribunal.org/files/1192-93_BSkyB_CC_Determination_270313.pdf
[61] Paragraph 9.162, *2013 LLU and WLR Determination* http://catribunal.org/files/1192-93_BSkyB_CC_Determination_270313.pdf
[62] Paragraphs 9.163 – 9.204, *2013 LLU and WLR Determination* http://catribunal.org/files/1192-93_BSkyB_CC_Determination_270313.pdf
[63] EE was granted permission from the CC to intervene to the appeal in support of the appellants.
[64] Paragraphs 9.164 and 9.165, *2013 LLU and WLR Determination* http://catribunal.org/files/1192-93_BSkyB_CC_Determination_270313.pdf
[65] Mobile-only-households are those households where all the communication needs, including voice and data, are covered solely by mobile access. These households are not served by copper, cable, or optical fibre.

Responses to the 2012 FAMR CFI

A8.15 In the 2012 FAMR CFI[66] we presented our proposed approach to modelling, including our proposed approach of a hypothetical ongoing copper network.

A8.16 We received responses related to volume forecasting from TalkTalk, Sky, and [✂], which we summarise below.[67]

A8.17 Sky stated that Ofcom's previous approach could be improved by adopting a more structured, transparent method for forecasting line volumes. It said the previous LLU and WLR charge control was inadequately reasoned and that while Ofcom cited a variety of line volume data, forecast information and key trends, it failed to show precisely how it used this information and how it quantified its key inputs into the overall line volume forecast. Sky stated that it was important for these deficiencies to be addressed at the next charge control.[68]

A8.18 [✂][69]

A8.19 [✂][70]

A8.20 TalkTalk stated that the projection for MPF/WLR volumes is significant because the large economies of scale inherent in fixed telecommunications networks like BT's mean that even a small under forecast will materially overestimate unit costs and so prices. It said that in the last Charge Control Ofcom's volume projection was out of kilter with the historic trends and Ofcom's view of future trends.[71]

A8.21 TalkTalk also suggested that Ofcom develop a simple spreadsheet as this would allow stakeholders to understand how the various assumptions made by Ofcom fitted together, their relative importance and how they fed through into the volume forecasts. They stated that such a model could arrive at Openreach volume forecasts using the following process:[72]

- Defining segments in the addressable market (e.g. households and small office/home office);
- Forecasting the total addressable market for each segment based on official population forecasts/trend analysis;
- Forecasting total penetration of narrowband/broadband in each segment based on assumptions about the number of mobile only homes, penetration of broadband, etc.;
- Forecasting market share in each segment (BT, cable, CPs) based on current trends;

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[66] *2012 FAMR CFI*, http://stakeholders.ofcom.org.uk/consultations/fixed-access-markets/
[67] *Responses to 2012 FAMR CFI,* http://stakeholders.ofcom.org.uk/consultations/fixed-access-markets/?showResponses=true
[68] Sky's additional paper, page 5, paragraph 24a, http://stakeholders.ofcom.org.uk/binaries/consultations/fixed-access-markets/responses/BskyB_Additional_Paper.pdf
[69] [✂]
[70] [✂]
[71] TalkTalk's response to the 2012 FAMR CFI, page 10, paragraph 3.17
[72] TalkTalk's response to the 2012 FAMR CFI, page 10, paragraph 3.18

- Forecasting demand for Openreach wholesale subscriptions services for each segment based on assumptions about the coverage of each CP; and

- Forecasting installations, migrations and disconnections consistent with the subscription forecasts based on churn rates and net migration.

A8.22 TalkTalk said that in terms of the base year volumes, Ofcom should ensure that the forecasts reconcile to other data sources, for example: [73]

- the volume data shown in BT's RFS; and

- the volume data published by BT as part of the Key Performance Indicators; and

- Ofcom's Market Information publications.

A8.23 It states that such a reconciliation would ensure that the data inputs to the model are robust.

Forecast drivers and assumptions

Model Inputs

A8.24 For the purposes of building our forecast model we have used data that is publicly available, wherever this was possible. To this end, we have used data from BT's Regulatory Financial Statements (RFS)[74], data published in our 2012 Communications Market Report (CMR)[75], data published by the Department of Communities and Local Government (DCLG)[76] and the Office of Budget Responsibility (OBR)[77].

A8.25 We also requested confidential data from BT for the financial years 2009/10 through to 2016/17 using our statutory information gathering powers, of which the final five years are forecast data.[78] In particular we requested BT to provide volumes consumed internally by BT Wholesale which are not published in the RFS.[79]

[73] TalkTalk's response to the 2012 FAMR CFI, page 10, paragraph 3.19
[74] BT's RFS is published at:
http://www.btplc.com/Thegroup/RegulatoryandPublicaffairs/Financialstatements/index.htm
[75] Ofcom's Communication Market Report 2012:
http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr12/CMR_UK_2012.pdf
[76] DCLG, Live tables on household projections, https://www.gov.uk/government/statistical-data-sets/live-tables-on-household-projections
[77] http://budgetresponsibility.independent.gov.uk/pubs/Copy-of-March-2013-EFO-charts-and-tables.xls, Chart 3.10: Forecasts of the level of GDP
[78] First s.135 to BT, 8 February 2013
[79] In our forecast model we have used data provided directly by BT using our statutory information gathering powers and from the RFS. The scope of the data captured is different from that published in Ofcom's telecommunications market data update tables as the telecoms tables include alternative network infrastructure available in the UK (for example KCOM). Therefore as alternative infrastructure is not considered in this charge control it is appropriate to base our forecast model on the data provided by BT.

A8.26 The base year for our forecast is the financial year 2011/12. In the base year there are 19.4 million WLR lines, out of which 11.2 million lines are SMPF-enabled. There are also 5.0 million MPF lines.[80]

A8.27 As noted above, in the March 2012 Statement we identified five key parameters driving the number of copper lines. These were:

i) the change in the number of mobile only households;[81]

ii) the change in the number of households;[82]

iii) the change in the number of business sites and lines;[83]

iv) competition from cable;[84] and

v) the roll-out of fibre-based access networks (NGA).[85]

A8.28 We continue to consider these factors to be the primary parameters driving copper volumes, but also extend our model to account for additional parameters that can delineate the main drivers into underlying factors. The additional parameters we have considered are:

i) the change in the number of lines per household that use a fixed service;

ii) the change in the number of lines per business site;

iii) broadband market shares;

iv) customer churn between broadband providers;

v) the potential for further LLU roll-out;

vi) recent LLU consolidation;

vii) broadband penetration; and

viii) the split between MPF and WLR+SMPF.

Drivers used in the March 2012 Statement considered in our forecast

Mobile-only households

A8.29 The change in the percentage of mobile only households was recognised by Ofcom as one of the main factors affecting fixed line numbers in the March 2012 Statement.[86] We continue to consider that the number of mobile only households (and the potential future trend in the number of mobile only homes) is a driver of

[80] Combining data published in BT's 2012 RFS and data provided by BT in response to the First s.135 to BT.
[81] March 2012 Statement, paragraphs A2.34 – A2.38
[82] March 2012 Statement, paragraphs A2.42 – A2.46
[83] March 2012 Statement, paragraphs A2.39 – A2.41
[84] March 2012 Statement, paragraphs A2.47 – A2.48
[85] March 2012 Statement, paragraphs A2.49 – A2.51
[86] March 2012 statement, paragraphs A2.34 – A2.38

future line volumes and therefore we have considered how the number of mobile-only households is likely to change over the review period.

A8.30 In our analysis we remove mobile only households from the total number of households in our actual data. This allows us to separately consider the number of households with no fixed line at all and the number of lines per household in homes that have a fixed line.[87]

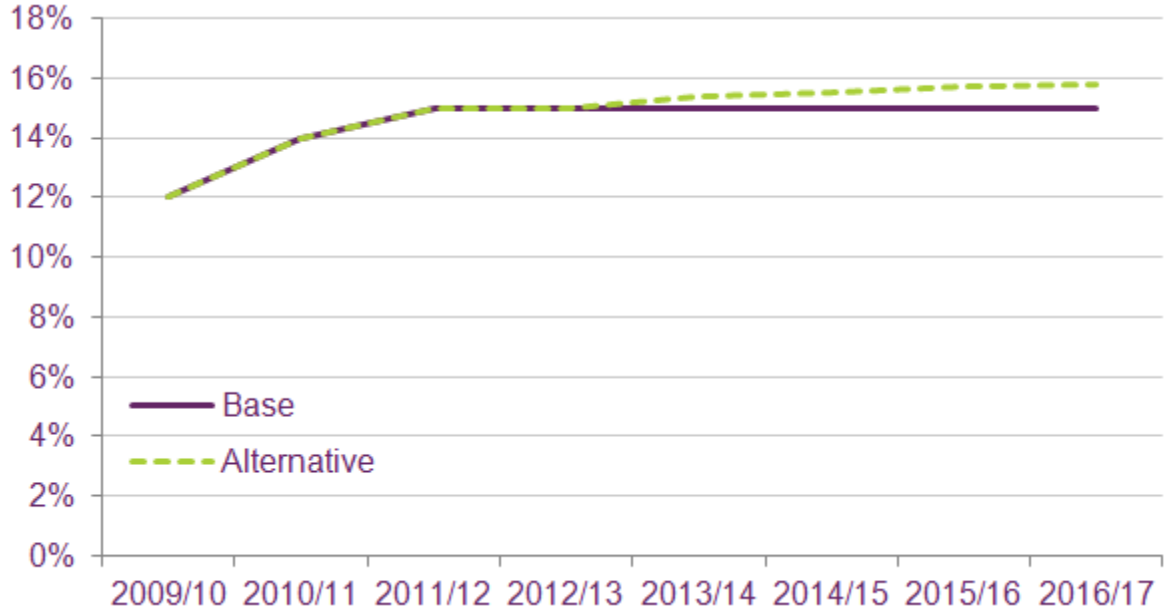
A8.31 The percentage of mobile only households has remained flat in the two most recent years following a period of steep increase.[88] The end to the previous upward trend may be related to falling usage of mobile broadband 'dongles' as consumers recognise that at home, mobile broadband is a limited substitute for fixed broadband.[89] We do not expect the introduction of LTE to change this flat trend over the period of the next charge control, as within those time horizons we do not consider LTE is likely to be viewed as a mass market substitute for fixed broadband access.[90] We therefore propose as our base forecast that the proportion of mobile only households will not change.

A8.32 However we have also developed an alternative scenario which sees the longer term growth in mobile only households resume.[91] This extrapolation of the long term trends leads to an increase of 0.9% in mobile-only households by 2016/17.

A8.33 Figure A8.1 shows the two scenarios we use in our forecast of the share of mobile only households.

[87] In deciding the appeal of the last control, the CC agreed that our forecast for mobile substitution was reasonable but found that we erred in that the aggregate forecast was inconsistent with this.
[88] Ofcom's Communication Market Report 2012: http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr12/CMR_UK_2012.pdf, figure 5.56
[89] A flattening of the mobile broadband market is discussed in the Ofcom CMR 2012, section 5.1.3, http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr12/CMR_UK_2012.pdf
[90] Long Term Evolution (LTE), also known as 4G, provides faster data rates than 3G but it cannot offer the same capacity as fixed broadband connections. This results in relatively low data usage caps compared to fixed broadband. The current WBA Market Review expands on this and concludes by saying that within the timescale of the market review period it is appropriate to continue to consider that mobile broadband access is not in the same relevant market as fixed broadband access.
[91] We developed the alternative scenario to reflect the uncertainty that the previous upwards trend in upwards only households has fully stopped.

Figure A8.1: Forecast of the share of mobile only UK households



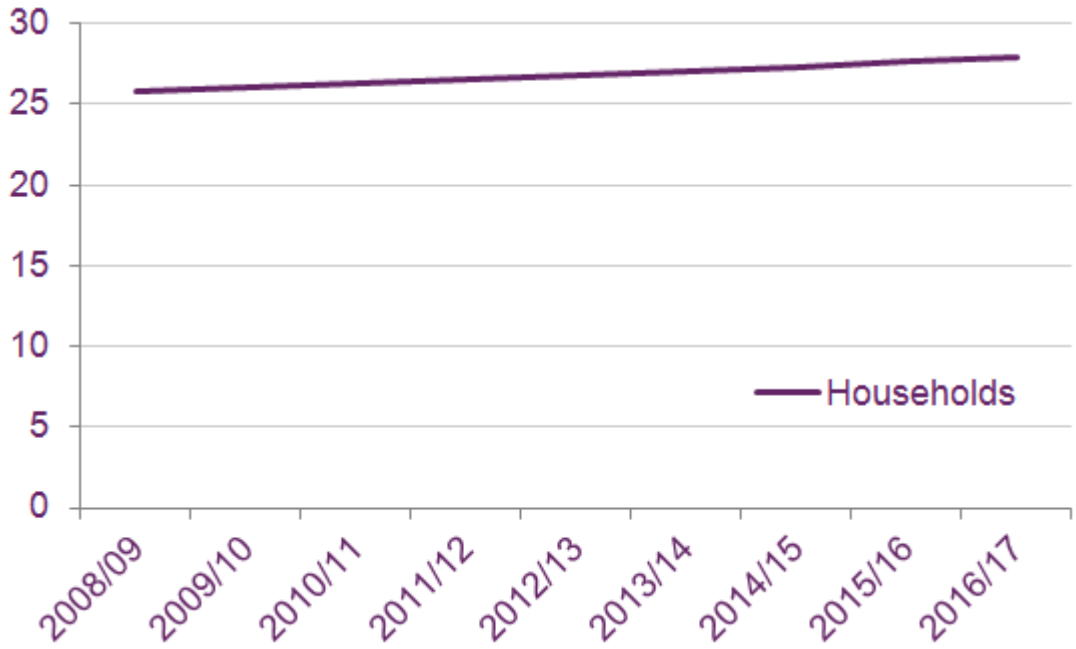
Number of residential households

A8.34 In the March 2012 Statement we recognised that the change in the number of individual households could affect the number of lines. However, our view was that, at that time, it was very difficult to predict household growth. This was due to contradicting drivers, on the one hand there were declining macroeconomic indicators (published by the Bank of England and the Office for National Statistics), while on the other hand there were Government initiatives aiming to promote the development of new households.[92]

A8.35 The UK household forecast published by the DCLG has forecast the number of UK households to increase to 27.9 million in 2016/17.[93] This is an increase of approximately 1.4 million households from 26.5 million households in 2011/12. We expect this increase in households to flow through to an increase in the number of fixed lines.[94]

[92] March 2012 Statement, paragraphs A2.42 – A2.46
[93] DCLG, Live tables on household projections, https://www.gov.uk/government/statistical-data-sets/live-tables-on-household-projections
[94] We assume new households have the same propensity to use an Openreach line as existing households.

Figure A8.2: Forecast of UK households



Number of business sites

A8.36 Business lines appear to be in long term decline. This decline is likely to reflect both a decline in the number of sites[95] and a trend to fewer lines per site as, for example, fax machines are removed, or as businesses now use IP solutions over a broadband connection rather than multiple telephone lines. In order to try to separate these two factors we have considered separately the trend in the number of business sites and the trend in the number of lines per business site (discussed later).

A8.37 The number of business sites is likely to be linked, in the short term, to changes in the economic climate. To inform our projections, we have used externally produced and published GDP forecasts.[96] We have used historic data on the number of registered SME business sites published by BIS[97] to inform the start point of our forecasts.

[95] Department for Business, Innovation & Skills, Business population estimates, 5 December 2012: https://www.gov.uk/government/organisations/department-for-business-innovation-skills/series/business-population-estimates

[96] For the purposes of generating a range of estimates for this consultation, we have used the forecasts of GDP growth published by the Office of Budgetary Responsibility (see chart 3.10: Forecasts of the level of GDP of http://budgetresponsibility.independent.gov.uk/pubs/Copy-of-March-2013-EFO-charts-and-tables.xls) in our base-case. The average of independent forecasts compiled and published by HM Treasury (see Table M1 of https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/199018/201305_-_Forecasts_for_the_UK_economy.pdf) also points to positive and increasing GDP growth over the control period, though at a somewhat lower level than the OBR.

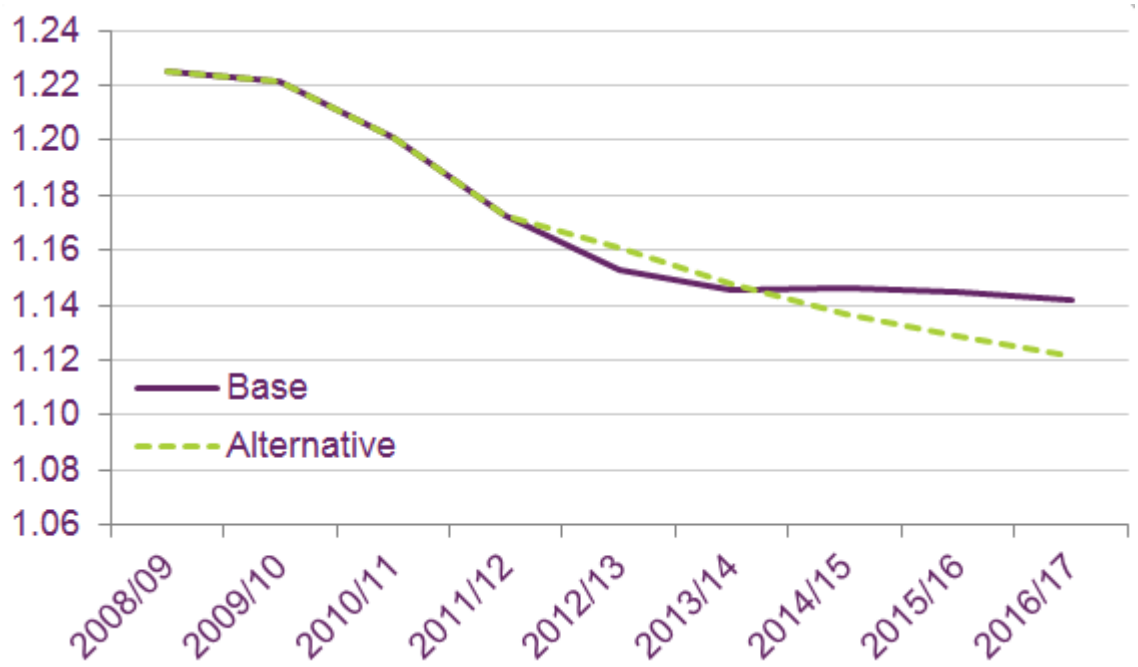
[97] Department for Business, Innovation & Skills, Business population estimates, 5 December 2012: https://www.gov.uk/government/organisations/department-for-business-innovation-skills/series/business-population-estimates

A8.38 Figure A8.3 shows our business sites forecast scenarios. In our base case, the current decline in the number of business sites is predicted to level off after 2014/15. This reflects, firstly, the effect of the GDP forecasts referred to above and, secondly, the inclusion of a "dampening factor" which slows down the three-year moving average trend.[98] Since the change in GDP is smaller in later years the change in business sites levels off. We have also created an alternative scenario which instead extends the three-year trends in business sites without considering the role of changes in GDP.

A8.39 We have used 3-year averages in a number of Ofcom forecast models (for example in the Network Charge Control model)[99]. We believe that 3-years is a sufficiently long period to prevent distortion by very short-term effects which might not be a reliable predictor of the future, while also avoiding over-reliance on historic data which might reflect out of date trends. In taking this approach we respond to the CC's finding that Ofcom previously erred by not ensuring that it had taken into account recent changes in volume trends.[100]

[98] An assumption of a constant rate of decline in business site numbers would not be plausible over the longer term. Therefore, to be consistent with the reasonable long term expectation that trends will level off we have applied a 'dampening factor' to smooth trends within the model. The value of the dampening factor is typically set so that our projections level off in 2024/25 to reflect the uncertainty around trends as we go further into the future.
[99] Narrowband Consultation, February 2013, http://stakeholders.ofcom.org.uk/binaries/consultations/nmr-2013/summary/NMR_Consultation.pdf
[100] Paragraph 9.161, *2013 LLU and WLR Determination* http://catribunal.org/files/1192-93_BSkyB_CC_Determination_270313.pdf

Figure A8.3: Forecast number of business sites (Millions)



Cable

A8.40 In the March 2012 Statement we said that cable growth had plateaued and it would therefore not affect the number of fixed lines on BT's network.[101] Sky, TalkTalk, and EE agreed with our modelling approach.[102] BT on the other hand suggested that changes in Virgin Media's market share could result in a loss of lines.[103] The CC thought that cable was a contributing factor to the error in our forecast.[104]

A8.41 In this forecast we expect Virgin Media's customer base to change in line with the forecast growth of UK households so that the relative share of fixed connections on Openreach's and Virgin Media's networks remains constant.[105] We have assumed that competition from cable does not impact the number of Openreach provided lines. Therefore, we assume that the net churn between copper and cable is zero.

NGA rollout

A8.42 In the March 2012 Statement we concluded that the effect of NGA on the number of copper lines was not significant. This was because FTTC requires a copper

[101] March 2012 Statement – paragraph A2.47 (http://stakeholders.ofcom.org.uk/binaries/consultations/wlr-cc-2011/statement/annexesMarch12.pdf)
[102] Paragraph 9.181, *2013 LLU and WLR Determination* http://catribunal.org/files/1192-93_BSkyB_CC_Determination_270313.pdf
[103] Paragraph 9.182, *2013 LLU and WLR Determination* http://catribunal.org/files/1192-93_BSkyB_CC_Determination_270313.pdf
[104] In paragraph 9.204 in the CC Determination the CC said that we "*had not properly taken into account two specific drivers of recent changes in trends – primarily household growth but also cable".*
[105] Although we assume Virgin Media's line market share remains constant throughout the forecast period, the same is not true of broadband market share. This is discussed further in A8.58.

connection for voice services and also to connect the end user premises to the street cabinet, while take up of FTTP (which uses only fibre) was negligible.[106]

A8.43 In this consultation, our cost model is based on a hypothetical ongoing copper network. Therefore, we have forecast the number of copper lines as if there were no deployment and take up of NGA. For forecast calculation purposes this approach means that we allocate a copper equivalent line for every FTTx connection. In particular, we allocate FTTx purchased by BT Wholesale to WLR and SMPF volumes, and FTTx purchased by CPs which use MPF to MPF volumes. This most closely reflects how in the base year FTTx customers would be served if they remained with the CP in question.

Additional drivers considered in our forecast

A8.44 In this forecast we have considered a number of drivers in addition to those recognised by the CC and the appellants in the previous charge control. This is because we believe these additional drivers will further help refine the forecast.

Lines per household with a fixed service

A8.45 As discussed above, we have disaggregated the number of mobile-only households from the total number of households. This approach allows us to predict the number of copper lines per household that receive a fixed service. Continuing the current three-year trend we forecast the number of lines per household with a fixed service to decline by 0.9%, from 0.90 lines per household in 2011/12 to 0.89 in 2016/17. We believe this trend to be driven by households disconnecting second lines, as IP-based services over a fixed broadband connection substitute for dedicated dial-up access lines or fax lines.

Lines per business site

A8.46 The number of lines per business site has also been in decline, and research has suggested that business users are more likely (than households) to substitute away from multiple fixed lines to mobiles and VoIP (over a single connection).[107] We do not see any significant factors which would cause this underlying trend in business line numbers to change over the period of this charge control and therefore base our forecasts on extrapolating the three-year trend. We therefore expect the number of copper lines per business to reduce by 1.9%, from 3.55 lines per business site in 2011/12 to 3.48 in 2016/17.

Market shares during the forecast period

A8.47 We assume that in the period covered by this review the shares of the wholesale broadband access market of BT, Sky and TalkTalk remain at their current levels. In other words, growth in broadband penetration is captured according to current market shares. We consider that this is a reasonable assumption since market shares depend on a number of factors which are difficult to predict. Furthermore, recent market share trends may not be a good guide to the future. One reason is that, although the roll-out of LLU by some CPs has previously facilitated these LLU operators to gain market share, for the period covered by this forecast further market share changes due to LLU roll-out are unlikely to be material as the LLU roll-out programme is mostly complete. However, to assess the importance of this

[106] March 2012 statement, paragraphs A2.49 to A2.51.
[107] Ofcom's Communications Market Report 2011, p. 278.

assumption we have modelled low and high scenarios with a 1% per annum flex on BT Wholesale's market share.[108]

LLU rollout

A8.48 Since 2006 there has been significant LLU unbundling and take up. However the pace of unbundling has reduced as larger exchanges, where economies of scale are strong, have already been unbundled. Our data shows that in July 2006 Principal LLU operators (POs) had unbundled 720 exchanges in total covering 46 per cent of UK's premises[109], while in the December 2010 POs had unbundled in total 2,141 exchanges, covering 87.1 per cent of UK's premises.[110] Our recent data shows that in December 2012 [✂] exchanges were unbundled by at least one PO, covering 93 per cent of UK premises.[111] We understand that POs have committed plans to roll out services to an additional [✂] of exchanges where BT is currently the only provider, increasing their total coverage by less than [✂] per cent. POs also have uncommitted roll out plans for an additional [✂] exchanges which would only increase their coverage by [✂] of UK premises.

A8.49 The evidence presented above suggests that LLU rollout has peaked and we expect very limited rollout to take place in the period of this charge control.

A8.50 Even if the uncommitted roll out plans are implemented, they will have a small effect on our volume forecasts.

Churn rate

A8.51 Some of the forecast service volumes are driven by customer switching between service providers, described by the churn rate, for example migration services.

A8.52 In line with our assumption of stable market shares we assume that the average churn rate over the period of this charge control is the same for all providers. Different churn rates would suggest that market shares gradually change over time as CPs with higher churn lose more customers than they gain.

A8.53 In our analysis we use a common churn rate for all CPs of 14% per annum. This is intended to be representative of average churn rates across operators and is informed by data on churn rates contained in recent financial reports and presentations.[112]

A8.54 We further assume that the probability of a churning customer to switch to a particular service provider is determined by the relative market share of that provider. This process ensures market shares remain consistent during the forecast (as the CP with the higher market share will have more churners leaving and also gain more churners from other CPs.)

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[108] This is explained further in A8.64

[109] Review of the wholesale broadband access markets 2006, table A3.4, http://stakeholders.ofcom.org.uk/binaries/consultations/wbamr/summary/wbamr.pdf

[110] Review of the wholesale broadband access markets 2010, paragraph A3.25, http://stakeholders.ofcom.org.uk/binaries/consultations/wba/statement/wbastatement.pdf

[111] Review of the wholesale broadband access markets 2013/14

[112] See, for example, Sky's annual report for 2012: http://corporate.sky.com/documents/the_bigger_picture_2012/pdfs/annualreport2012 See also TalkTalk's 2013 preliminary results presentation: http://www.talktalkgroup.com/~/media/Files/T/TalkTalk/pdfs/presentations/2013/preliminary-results-presentation-2013.pdf

Sky's purchase of O2 Broadband

A8.55 On 1 March 2013, Sky announced that it reached an agreement to purchase O2's broadband and fixed-line telephony business in the UK.[113] Following the acquisition, O2's customers are to be gradually transferred to Sky's own network. O2 was the third largest LLU operator, having approximately 0.5 million customers on its SMPF platform.[114]

A8.56 In our forecast model we assume that Sky will integrate O2's customers with its own SMPF base and will gradually migrate them to MPF. We do not explicitly model each individual LLU operator's number of SMPF customers. However, the number of customers served by the remaining SMPF-only LLU providers (that is, those who do not use MPF) represents a lower bound for the total number of SMPF rentals once SMPF to MPF migration by the main MPF providers has ceased, and this is consistent with our forecast.

Broadband penetration

A8.57 Historical data shows a continuous increase in the number of broadband lines over the past three years.[115]

A8.58 Extrapolating the current trend using the three-year moving average with a dampening factor applied (as discussed above), we forecast in our base case scenario that the proportion of Openreach lines which are used for broadband will increase from 66% in 2011/12 to approximately 78% in 2016/17. We forecast low and high scenarios by flexing the dampening factor. In our calculations we have only considered broadband access provided by Openreach. As such, although not directly calculated, we implicitly forecast that Virgin Media's broadband market share reduces as it has fewer voice only customers to upgrade to broadband.[116]

A8.59 Figure A8.4 shows our forecasts for the increase in broadband penetration on Openreach's copper network.

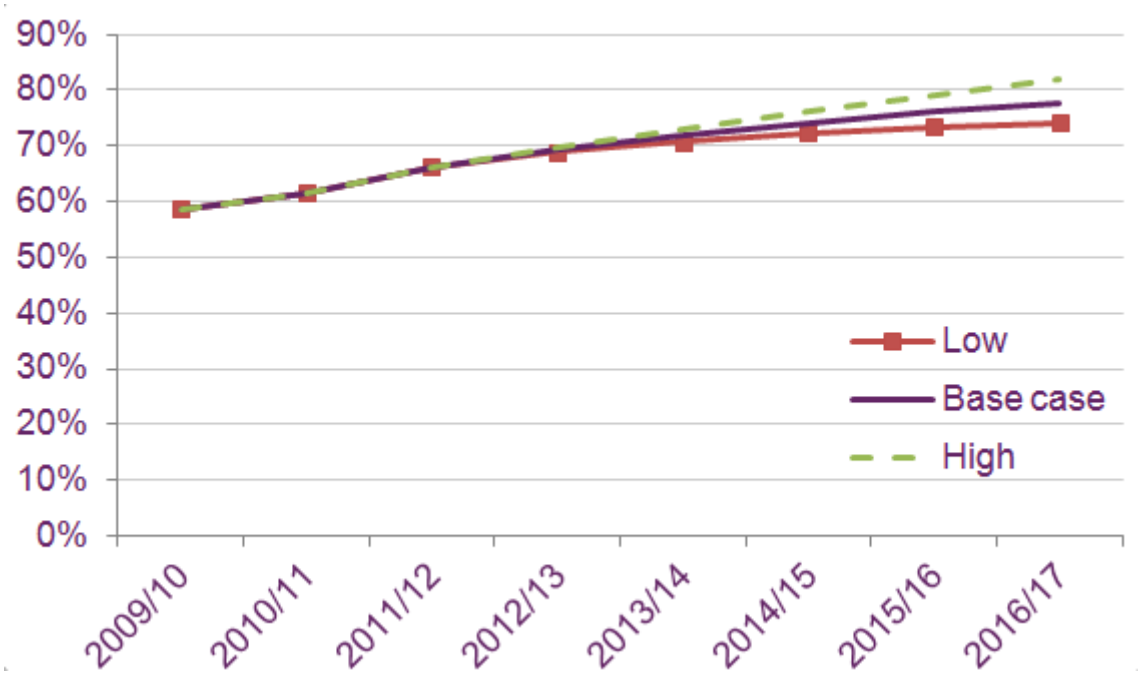
[113] See announcement at: http://corporate.sky.com/media/press_releases/2013/sky_to_acquire_telefonicas_uk_broadband_and_fixed_line_telephony_business#

[114] According to Telefónica's quarterly results (http://www.telefonica.com/en/shareholders_investors/html/financyreg/resultados2013.shtml)

[115] For example, see Figure 4.10 of the 2012 Communications Market Report which shows that broadband penetration (including both DSL and Cable) has increased from 41% in 2005/06 to 76% in 2011/12, http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr12/CMR_UK_2012.pdf.

[116] But as discussed above in paragraph A8.41, it should be noted that Virgin Media's share of total lines remains constant.

Figure A8.4: Forecast broadband penetration



Split between MPF and WLR+SMPF

A8.60 DSL Broadband lines can be deployed on either MPF or SMPF.[117] SMPF was the platform of choice during the first few years of DSL. However, market and technical developments led the larger CPs to gradually adopt MPF.

A8.61 Currently, Sky and TalkTalk have customers on both MPF and SMPF but during the last two years they have been migrating their SMPF customers to MPF.

A8.62 BT, on the other hand, uses SMPF+WLR for its wholesale, and retail, offerings.

A8.63 The split between MPF and SMPF + WLR connections is driven by two factors:

a) the broadband market share of BT wholesale; and

b) the rate at which LLU providers migrate their SMPF customers to MPF.

A8.64 With regards to BT Wholesale's broadband market share we assume three scenarios. Our base case scenario assumes that BT Wholesale's broadband market share remains static, at 51%, during the charge control period. Our low and high scenarios assume that BT's broadband market share increases or decreases by 1%, respectively, year-on-year.

A8.65 Our data for the last three years shows that the number of LLU SMPF lines has declined linearly.[118] In our base case scenario we expect this trend to continue, down from 2.9m in 2011/12 to 0.4m LLU SMPF lines in 2016/17. Finally, we estimate the number of MPF lines as the residual of the total number of broadband

[117] MPF allows the CP to offer both data and voice services, using a Multi-Service Access Node (MSAN) at the exchange. However when a CP uses SMPF, data services are provided by a Digital Subscriber Line Access Multiplexer (DSLAM) and voice services are provided separately via WLR.
[118] LLU SMPF lines are SMPF lines provided by non-BT LLU CPs for example Sky or TalkTalk.

lines less BT's Wholesale's broadband lines and LLU SMPF lines. Our base case forecast of the number of MPF lines in 2016/17 is 9.1m lines, with low and high scenarios of 6.7m and 11.0m lines respectively. The large range is due to taking either **all** the low or **all** the high scenarios of the contributing assumptions.

Model description

A8.66 The model uses the inputs described above and then trends them forward to produce volume forecasts. Unless otherwise stated we extrapolated forwards from 2011/12 using a three-year moving average with a dampening factor. Over the longer term, continuous growth or decline at a constant rate will often be implausible. The dampening factors are used to slow down the three-year trends to ensure that they are consistent with plausible and stable long-run levels for the key forecast variables. At the same time, the use of a three-year moving average means that our forecasts are also a reasonable reflection of shorter-term trends over the forecast period. This is a similar approach to that taken in the recent NCC volume forecasts[119].

A8.67 The model can be explained in three steps:

i) first, we forecast the number of potential customers for fixed voice and broadband services, being the number of residential households and registered small and medium businesses;

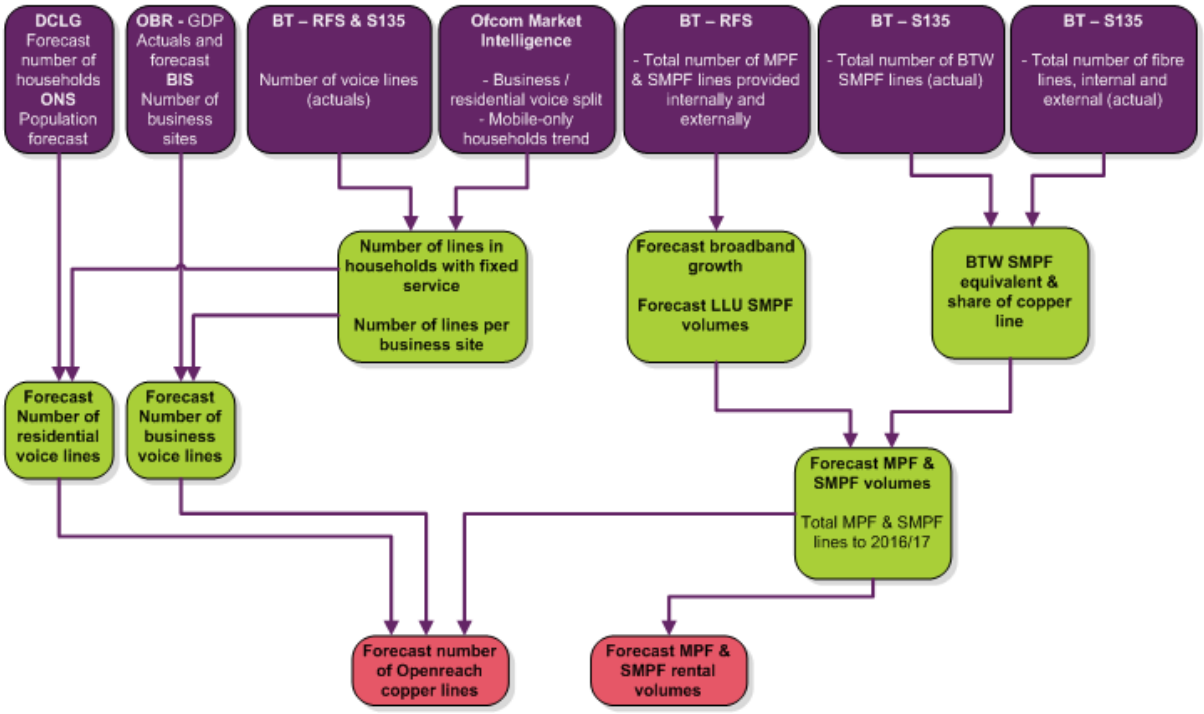
ii) we then forecast the total number of lines; and

iii) we finally forecast broadband penetration and the split between MPF and SMPF.

A8.68 Figure A8.5 summarises the method we follow for the main forecast, identifying the data sources and major processing performed.

[119] Review of the fixed narrowband services markets, 5 February 2013: http://stakeholders.ofcom.org.uk/consultations/nmr-13/

Figure A8.5: Forecasting methodology[120]



Forecasting WLR, SMPF and MPF rentals

A8.69 The methodology used for forecasting WLR, SMPF and MPF rentals can be summarised as:

a) after excluding mobile-only households, we calculate the number of households and businesses expected throughout the period we are modelling, and the number of lines per household and business;[121]

b) BT's volume data does not differentiate between business and residential lines. We therefore split them into business and household lines using Ofcom's Market Intelligence data on the proportions of business and household lines. We then allocate these lines to business and residential premises using the numbers of such premises previously calculated. This provides a start point for our forecasts which is consistent with BT's reported data, but is calibrated with externally sourced assumptions. We can then forecast the number of voice lines without being solely reliant on BT's data; [122]

c) we then, using assumptions on lines per household or business sites, market share, churn, LLU roll-out, penetration and the migration between SMPF and MPF, forecast the total volume of broadband lines, and the split between MPF, WLR and SMPF.

d) finally, we forecast the volume of ancillary services, for example migrations.

[120] Voice lines include all voice lines provided via Openreach
[121] 2008/09 to 2016/17
[122] Voice lines consist of WLR and MPF line

Additional detail of the methodology can be obtained by inspection of the published version of the model.

Service forecasts

A8.70 Forecasting specific services is often difficult as these volumes can be affected by the complex interaction of various factors. Where possible we have forecast service volumes using computationally simple methods. For example where appropriate we extrapolate current trends. Alternatively, we forecast some ancillary service volumes using the historic average ratio of the volume of that service to the volume of the relevant line rental service.

A8.71 Our base-case forecasts are presented in table A8.2.

Table A8.2: Actual and forecast volumes for LLU and WLR services (millions)[123]

	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
WLR Basic Rentals Internal	13.73	12.25	11.42	11.13	10.71	10.29	9.91	9.55
WLR Basic Rentals External	3.18	3.13	3.19	2.84	2.73	2.62	2.53	2.44
WLR Premium Rentals Internal	3.61	3.49	3.03	3.02	2.90	2.79	2.68	2.59
WLR Premium Rentals External	1.68	1.83	1.76	1.58	1.52	1.46	1.40	1.35
WLR Rentals Total	22.20	20.69	19.40	18.57	17.87	17.16	16.52	15.93
WLR Basic Connections Internal	0.56	0.56	0.57	0.51	0.49	0.47	0.45	0.43
WLR Premium Connections Internal	0.41	0.33	0.32	0.31	0.30	0.29	0.28	0.27
Wholesale premium and basic analogue external service connections.	0.72	0.74	0.53	0.60	0.57	0.55	0.53	0.51
WLR Basic and Premium Transfers Internal	2.59	1.52	1.12	0.86	0.72	0.63	0.56	0.52
WLR Basic and Premium Transfers External	2.16	1.39	0.61	0.42	0.30	0.23	0.20	0.17
MPF New provides	0.04	0.63	1.20	1.42	1.63	1.83	2.02	2.21
MPF Single Migrations	0.96	1.22	0.77	0.82	0.86	0.89	0.92	0.94
MPF Bulk Migrations	0.62	0.10	0.41	0.49	0.51	0.51	0.51	0.51
MPF Ceases	0.45	0.97	1.17	1.35	1.55	1.74	1.92	2.10
MPF Rentals	2.22	3.79	4.96	5.86	6.71	7.55	8.34	9.09
MPF Room build (hundreds)	6	15	15	17	16	5	5	3
MPF Hostel rentals	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
MPF Tie cables	-	-	1.26	1.32	1.35	1.37	1.39	1.40
SMPF New provides	3.00	2.72	2.57	2.08	1.96	1.85	1.72	1.59
SMPF Single Migrations	0.32	0.39	0.31	0.23	0.18	0.13	0.09	0.04
SMPF Bulk Migrations	0.10	0.20	0.40	0.08	0.06	0.04	0.03	0.02
SMPF Ceases	2.68	2.12	2.24	2.28	2.25	2.21	2.17	2.12
SMPF Rentals	12.09	11.28	11.17	11.09	10.94	10.78	10.57	10.32
SMPF Simultaneous Provide				0.55	0.63	0.70	0.78	0.85
WLR Conversions				0.010	0.009	0.009	0.008	0.008

WLR Volumes

WLR Basic Rentals Internal and External

A8.72 WLR Basic rentals are voice line rentals primarily used by residential customers. In the last three years WLR Basic rental volumes maintained a stable ratio of the total number of WLR rentals. We expect this trend to continue and apply the average ratio between WLR Basic rentals and total WLR rentals to estimate the number of WLR Basic rentals in the period of this charge control.

[123] MPF room build is shown in units of hundreds

A8.73 Similarly, we carry forward the average share of internal and external WLR Basic rentals in the last three years to estimate how the total WLR Basic rentals are distributed between internal and external.

WLR Premium Rentals Internal and External

A8.74 WLR Premium rentals are voice line rentals primarily used by business customers. In the last three years WLR Premium rental volumes maintained a stable ratio of the total number of WLR rentals.[124] As such we expect this trend to continue and apply the average ratio between WLR Premium rentals and total WLR rentals to estimate the number of WLR Premium rentals in the period of this charge control.

A8.75 Similarly, we carry forward the average share of internal and external WLR Premium rentals in the last three years to estimate how the total WLR Premium rentals are distributed between internal and external.

WLR Connections

A8.76 Gross WLR Connection volumes are primarily driven by numbers of home movers, migrations from cable, and new household formation. In the light of this, we consider that a reasonable assumption is that the number of WLR Connections is a stable proportion of the number of WLR rentals.[125]

A8.77 We forecast the number of WLR connections by carrying forward the average ratio between WLR connection and WLR rentals in the last three years.

WLR Basic and Premium connections internal and external

A8.78 We forecast the distribution of WLR Basic and Premium, internal and external, connections by carrying forward the average ratios of each of these services over the total number of WLR rentals.

WLR Transfers

A8.79 WLR Transfers are used when end customers change their WLR provider. Therefore, WLR Transfers are driven by churn between CPs using WLR. The trend over the previous three years is one of significant reduction in these transfers. To some extent, this is driven by MPF take up, however the relationship is complex. We expect the number of WLR transfers to continue to decline during the charge control period and we forecast the volume of WLR transfers by trending forwards the two[126] year moving average with a dampening factor. The dampening factor is applied as we expect the previous trend of significant reduction to slow.[127] This

[124] Although WLR premium is mainly used by businesses and we forecast business lines to decline whilst household lines rise, we project premium WLR lines to decline at the same rate as basic WLR lines. This is because WLR basic users have a greater propensity to migrate to MPF than WLR premium users and this offsets the faster decline in business lines.

[125] We note that TalkTalk, in its response to our CFI, suggested that we forecast installations, migrations and disconnections on the basis of churn rates and net migration. However basing our forecasts on churn rates would not necessarily account for home movers and new households. In addition attempting to forecast each driver separately may add complexity without necessarily increasing accuracy. The approach we are proposing captures the effect of these drivers while maintaining simplicity and transparency.

[126] The two year average is used due to the availability of three years of data only.

[127] We have chosen not to link the decline in transfers with the decline in rentals. This is because during the forecast period WLR rentals become largely used by just 1 CP (BT Retail), and therefore

same methodology is used for both WLR Basic and Premium Transfers sold internally and WLR Basic and Premium Transfers sold externally.

WLR Conversion

A8.80 WLR conversion is a service used to migrate from MPF to voice only WLR.[128] We have limited data to estimate how many such migrations occur, but we would expect them to be in the region of 10,000 in the 2012/13 as there are few voice-only MPF customers.[129] We expect the number of WLR conversions to reduce as the number of voice-only customers declines.

MPF Volumes

A8.81 MPF Rental volumes have increased significantly over recent years and we forecast they will continue to do so. This is primarily driven by migration from SMPF to MPF[130] and the increase in broadband penetration.

MPF New Provides

A8.82 MPF New Provides are used by home movers and end users taking an MPF-based service without previously having a WLR connection. These can be either new users, or users churning from cable services. There has been a significant increase in the usage of MPF New Provides over the previous three years, triggered by the take up of MPF. We expect that the number of MPF New Provides over the forecast period will continue to be the same, as a proportion of MPF rentals, as in 2011/2012. As such we forecast that the MPF New provides will increase in line with MPF rentals.

MPF Single Migrations

A8.83 MPF Single Migrations are caused by churn to MPF from either WLR or a different MPF provider. The increase in broadband penetration is a large driver of this. As such our forecast assumes that the percentage of MPF Single Migrations compared to total Openreach broadband lines[131] remains constant from 2011/2012 onwards. This results in our forecast of MPF single migrations increasing over the forecast period.

MPF Bulk Migrations

A8.84 MPF Bulk Migrations are driven by CPs moving large quantities of customers from WLR/SMPF to MPF. This primarily occurs in exchanges where a CP has added MPF capability, or increased the number of its MPF lines. We forecast these volumes by assuming that the decrease in the SMPF usage of MPF providers[132] is all due to MPF Bulk Migration.

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the opportunity for intra-WLR migrations becomes much reduced. We are therefore proposing to use an approach which follows the current trend but using a dampening factor to stop the number of transfers becoming negative.

[128] Where a migration is from MPF to WLR and SMPF this is instead captured in the model as an SMPF simultaneous provide as explained later in this annex.

[129] Voice only MPF is not promoted by MPF operators.

[130] See paragraph A8.61

[131] Total Openreach broadband lines is taken as MPF + SMPF

[132] See paragraph A8.61

MPF Ceases

A8.85 MPF ceases are primarily used by home movers and people churning away from MPF. We expect MPF cease volumes to rise as MPF rentals rise and as such we peg our forecast to MPF rentals. To this end the average percentage over the previous three years of MPF Ceases relative to MPF rentals is applied to the forecast period.

MPF Room Build

A8.86 Demand for MPF Room Builds is caused by unbundling and capacity expansion. At a detailed level, the volumes of MPF room build services are driven by parameters which are difficult to predict, such as the spare capacity CPs have in already installed racks and in each exchange, and market share fluctuations in different geographies. However, the number of room builds in the forecast period are expected to decrease as the level of new unbundling of exchanges decreases. To produce our forecast for this service we have considered data gathered using our statutory information gathering powers.

MPF Hostel Rentals

A8.87 MPF Hostel rentals can increase due to further unbundling and capacity expansion, and can decrease due to decommissioning of old or underutilised equipment and consolidation of MPF providers. In the past three years the volume of MPF hostel rentals has increased, driven by the increase in broadband penetration and unbundling of exchanges, although the increase from 2010/11 to 2011/12 was small. Going forward, we expect LLU rollout to gradually level off. This, along with recent market consolidation means on balance, we expect MPF Hostel volumes to remain static throughout the forecast period.

MPF Tie Cables

A8.88 MPF tie cables connect from the MDF to equipment within the exchange. SMPF connections require two tie cables whereas MPF connections require one tie cable. For this reason we have pegged the change in tie cables to MPF rentals and 2 x SMPF rentals. As such the tie cable volume increases slightly over the forecast period. The increase is due to the overall increase in lines and broadband penetration.

SMPF volumes

A8.89 The SMPF rental volumes have been declining over recent years and we forecast they will continue to do so. This is primarily driven by migration from SMPF to MPF.[133]

SMPF New Provides

A8.90 SMPF new provide services are used when a CP requires a new SMPF connection to a previously WLR-connected line. An SMPF new provide has also been used historically when a customer moves from an MPF-based provider or cable, to a provider using WLR+SMPF service.

[133] See paragraph A8.61

A8.91 We understand that the volume of SMPF new provides per annum is primarily driven by new broadband customers, home movers, and churn from MPF-based service providers and cable.

A8.92 We do not expect the effect of home movers to change with time and we believe it can be effectively modelled as a percentage of the total SMPF rentals.

A8.93 We expect, however, that migrations from MPF will in future be implemented using what we refer to in this consultation as a *Simultaneous SMPF provide* (that is, the combination of the discounted price applied to WLR Conversions when it is provided simultaneously alongside SMPF New Provide and the SMPF New Provide charge), which will allow significant cost savings.

A8.94 We therefore forecast the number of SMPF new provides in the following way. We first calculate the number of SMPF new provides on the assumption that the ratio of new provides to the total of SMPF rentals is constant at its 2011/12 level. We then subtract from this the forecast number of MPF to SMPF migrations in order to capture the effect of migration from MPF using a S*imultaneous SMPF provide* which is forecast separately.[134]

SMPF Single Migrations

A8.95 SMPF single migrations are driven by intra-SMPF customer migration. We expect SMPF single migrations to reduce as the number of LLU SMPF lines reduces.

SMPF Bulk Migrations

A8.96 We identify three main drivers for the Bulk SMPF migration volumes in the last three years. These are:

a) LLU operators migrating their WBA customer base onto their on-net SMPF platform;

b) migration of EE's LLU customers to BT Wholesale's SMPF platform[135]; and,

c) migration of customer lines from IP-Stream to BT's 21CN Wholesale Broadband Connect platform.

A8.97 We expect all the above drivers to become less important over the period of this charge control. This is because,

a) LLU rollout is expected to slow down, while the customer base in exchanges that are not yet unbundled is small;

b) we assume all EE customers have been moved to BTW's network;

c) we expect IP-Stream to WBC migration to slow down, or stop.

A8.98 To calculate our forecast we first remove from 2011/12 volumes of SMPF bulk migrations that we consider will not be repeated. Then we forecast assuming a 30% year-on-year reduction in SMPF bulk migration volumes to reflect the remaining

[134] The simultaneous SMPF provide service is explained below at paragraph A8.99.
[135] In April 2010, Orange (now EE) signed a deal with BT to switch its customers from LLU to BT Wholesale's network.

factors.[136] We estimate approximately 225,000 bulk migrations within our forecasting period.

SMPF Simultaneous provide

A8.99 As explained in section 4, BT has recently run a special offer which provided a discount to CPs purchasing SMPF New Provide and WLR Conversion simultaneously. In this consultation we propose to impose a cost-based charge control which discounts WLR Conversion where there is a simultaneous provision of SMPF New Provide, to reflect the reduction in effort if the provision of SMPF is done at the same time as a WLR conversion.[137] For the purposes of our model we therefore expect this combination of services to be used in all the cases where an MPF customer moves to an WLR+SMPF provider.

A8.100 We use our assumed churn rate of 14% per annum to estimate the number of customers moving from an MPF LLU provider to an SMPF provider. To account for the probability that a customer may choose to move to a different MPF LLU provider we assume that two thirds of the customers leaving their MPF provider will go to an SMPF platform.[138]

SMPF Ceases

A8.101 SMPF Cease volumes are primarily driven by the number of home movers and people churning away from SMPF. We expect SMPF cease volumes to drop as SMPF rentals reduce and as such we peg our forecast to SMPF rentals. To this end the average percentage over the previous three years of SMPF Ceases relative to SMPF rentals is applied to the forecast period.

Consultation Question

Question A8.1: *Do you agree with our proposed approach to forecasting volumes as set out in Annex 8 and Annex 9? Please provide reasons to support your views.*

[136] The use of the 30% year on year reduction in SMPF bulk migration volumes is an estimate. We welcome stakeholder responses regarding its appropriateness.
[137] This is discussed in section 4, Charge Control Design.
[138] We assume that BT Wholesale SMPF accounts for half of the broadband market whilst two MPF providers account for 25% of the market each. As such if a customer from an MPF provider churns to another provider we assume there is a two thirds chance of moving to SMPF.

Annex 9

Volume Forecasting Model

A9.1 Please see the separate Excel file published alongside this consultation entitled FAMR Consultation on Approach to LLU and WLR Charge Controls July 2013 Volume Forecasting Model.xlsx. This will be available here: http://stakeholders.ofcom.org.uk/consultations/llu-wlr-cc-13

Annex 10

Technical requirements of migrations

Introduction

A10.1 This annex provides a brief description of the exchange wiring arrangements associated with the provision of core LLU and WLR rental products. Understanding these wiring arrangements is necessary to understand the engineering activity that is required at the exchange to migrate a customer from one CP to another. This activity is one of the main drivers of migration costs.

Wiring arrangements for core WLR and LLU rental services

A10.2 There are three core WLR and LLU products, namely: WLR only, WLR+SMPF and MPF. Each of these services requires different wiring on the Main Distribution Frame ('MDF') at the exchange. The MDF is the termination point of the local loops of the telecommunications network (all copper telephone lines used to provide telecommunications services are terminated here). The MDF is then used to connect these local loops to additional equipment located at the exchange using jumper wires. A jumper is a copper cable that provides a flexible connection between two terminal ends, commonly used to connect the Line-Side to the Exchange-Side of the MDF.

A10.3 When migrating a customer from one CP to another the number of jumper movements needed varies according to the service required by the customer and the technology used by the gaining and losing providers. To explain this, below we provide stylised representations of the MDF wiring arrangements for the various WLR and LLU products.

Figure A10.1: WLR Wiring

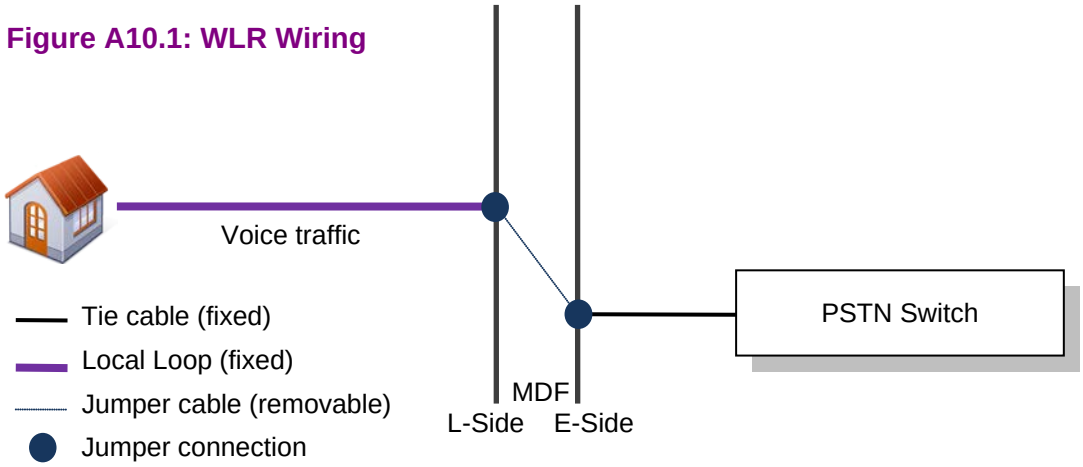


Figure A10.2: WLR + SMPF Wiring

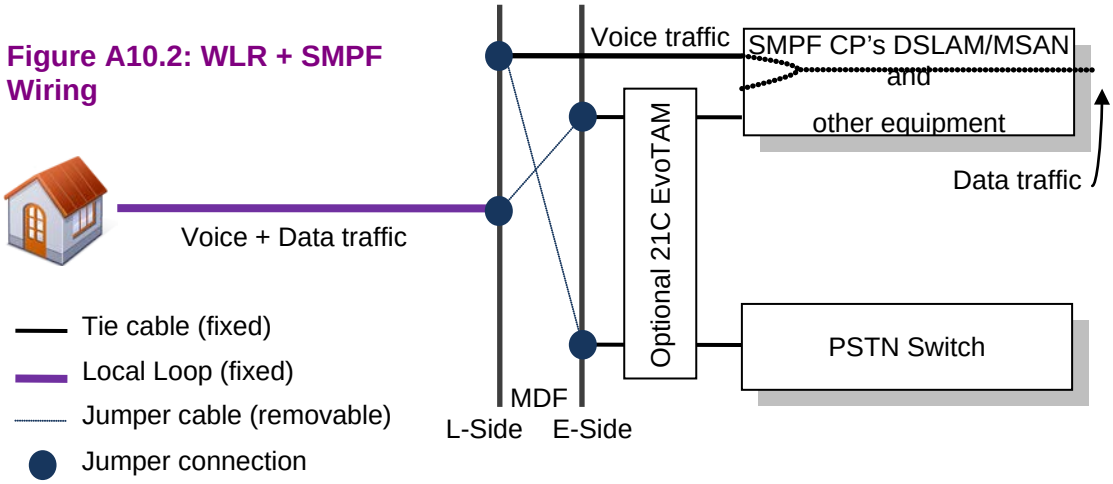
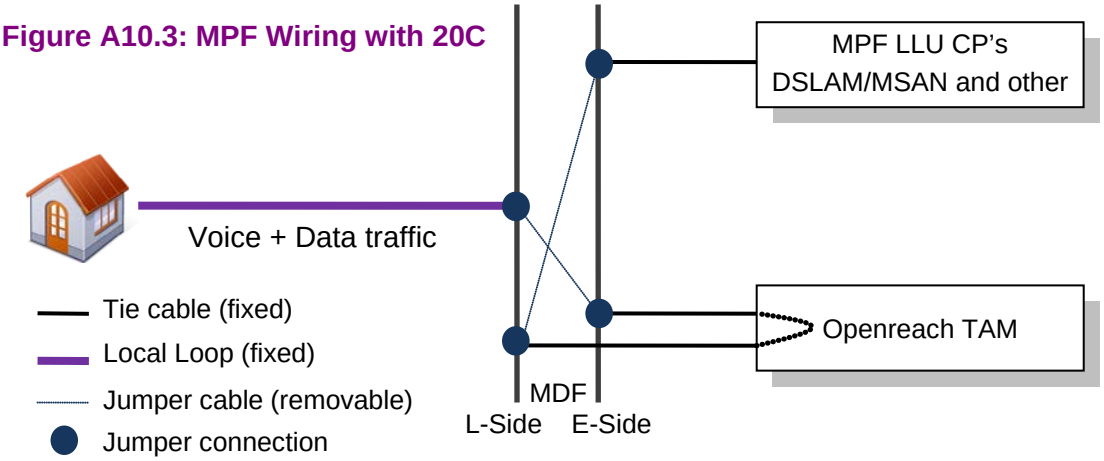


Figure A10.3: MPF Wiring with 20C



A10.4 The above diagrams show the MDF jumpering configuration (and the number of jumpers) that applies to each rental product. Each rental product relates to a different set up and must be changed where a customer requires different services or services from a different LLU operator (Migrations). Note that all traffic flows two ways between the operator and the customer.

Jumper movements for WLR and LLU migration services

A10.5 There are eight different migration services offered by Openreach. The key difference between each of these lies on the technology used by the gaining and losing CP, which determines the number of jumper movements at the exchange's MDF. We show this in Table A10.1 below.

Table 10.1 Migration services and number of jumper movements

	Product name	To	From	Jumpers		
				Removed	Installed	Total
1	MPF Single Migration	MPF	WLR	1	2	3
2	MPF Single Migration	MPF	WLR+SMPF	2	2	4
3	MPF Single Migration	MPF	MPF	1	1	2
4	SMPF Single Migration	WLR+SMPF	WLR+SMPF	2	2	4
5	SMPF New Provide	WLR+SMPF	WLR	1	2	3
6	SMPF Simultaneous Provide	WLR+SMPF	MPF	2	2	4
7	WLR Conversion	WLR	MPF	2	1	3
8	WLR Transfer	WLR	WLR	None	None	None

A10.6 The different migration services are as follows:

- **MPF Single Migration** (WLR to MPF – service 1 above): involves moving from the set up in Figure A10.1 above to that shown in Figure A10.3. This means that 1 jumper is removed and a further 2 jumpers are installed.

- **MPF Single migration** (WLR+SMPF to MPF – service 2): involves moving from the set up in Figure A10.2 to that shown in Figure A10.3. This means that 2 jumpers are removed and 2 jumpers are installed.

- **MPF Single Migration** (MPF to MPF – service 3): involves remaining with the set up in Figure A10.3 but switching to another CP's DSLAM or MSAN. Thus, this requires removing the 1 jumper connecting to the equipment of the losing CP and installing 1 new jumper connecting to the equipment of the gaining CP.

- **SMPF Single Migration** (WLR+SMPF to WLR+SMPF – service 4): involves remaining with the set up in Figure A10.2 but switching to the DSLAM or MSAN of another CP. Thus, this requires removing 2 jumpers connecting to the equipment of the losing CP and installing 2 new jumpers connecting to the equipment of the gaining CP.

- **SMPF New Provide** (WLR to WLR+SMPF – service 5): involves moving from the set up in Figure A10.1 to that shown in Figure A10.2. This means that 1 jumper is removed and a further 2 jumpers are installed.

- **SMPF Simultaneous Provide** (MPF to WLR+SMPF – service 6): this service relates to the simultaneous provision of a WLR Conversion and SMPF New Provide. It involves moving from the set up in Figure A10.2 to that shown in Figure A10.2. This means that 2 jumpers are removed and a further 2 jumpers are installed.

- **WLR Conversion** (MPF to WLR – service 7): involves moving from the set up in Figure A10.3 to that shown in Figure A10.1. This means that 2 jumpers are removed and 1 jumper is installed.

- **WLR Transfers** (WLR to WLR – service 8): this service does not involve any jumpering activity at the exchange MDF (it only consists of a systems update to reflect the change of CP).

Annex 11

Cost Model Documentation

A11.1 Please see the PDF document published alongside this consultation entitled FAMR Consultation on Approach to LLU and WLR Charge Controls July 2013 Cost Model Documentation.pdf. This will be available here: http://stakeholders.ofcom.org.uk/consultations/llu-wlr-cc-13.

Annex 12

Cost Model

A12.1 Please see the separate Excel file published alongside this consultation entitled FAMR Consultation on Approach to LLU and WLR Charge Controls July 2013 Cost Model.xlsx. This will be available here: http://stakeholders.ofcom.org.uk/consultations/llu-wlr-cc-13.

Annex 13

Detailed Cost Modelling Assumptions

A13.1 This annex explains in more detail the modelling treatment of a number of specific cost items.

Summary

A13.2 We explain our general approach to modelling costs for the purposes of the charge controls in Section 6. In Annexes 7, 8, 9, 14 and 15 we have explained in more detail our approach to efficiency, forecasting volumes, cumulo costs and the WACC. In Annex 5 we set out in more detail our use of the RAV model to determine the costs of BT's copper and duct assets.

A13.3 In this annex we set out our proposals for the modelling treatment of a number of other specific cost items, namely:

- SMPF costs;
- BT's pension costs;
- linecards;
- the dropwire adjustment;
- test access equipment (including PSTN line test equipment and broadband line testing equipment);
- E-side and D-side copper repairs (including fault rates and service levels); and
- pair gain.

A13.4 We have separately described our proposals in relation to the cost items listed above on the basis that they fall within one or more of the following categories:

- we are proposing a different approach from that contained in the RFS;
- they have previously been the subject of appeals;
- they have been specifically raised by stakeholders; and/or
- the costs have changed significantly from the March 2012 Statement.

A13.5 For each cost item included in this annex, we explain:

- whether we propose a change to our approach from the March 2012 Statement; and
- whether we propose to take a different approach in the Cost Model to that taken in the RFS, which in turn requires an adjustment to the Cost Model.

SMPF cost modelling

Regulatory background

A13.6 In the March 2012 Statement, costs and volumes were forecast at a total Openreach level. We did so based on Openreach's management accounts, as adjusted for Ofcom's policy proposals which were set out in the March 2012 Statement.

A13.7 The Cost Model we are using for the purposes of the proposed charge controls is based on BT's RFS costs and volumes, adjusted for Ofcom's policy proposals. The costs and volumes used in the Cost Model are for the WLA and WFAEL markets only.

A13.8 The RFS reports external and internal costs and volumes for services in the WFAEL market. However, the WLA market, as reported in the RFS only excludes costs and volumes for products consumed in other SMP markets. This means that internal costs and volumes (including equivalence of input[139] ('EOI') volumes) are not reported in the RFS under the WLA market. The information provided to us by BT under our statutory information gathering powers did not include internal costs and volumes for the WLA market as these are not included in the RFS data we requested. As a result, in the absence of any adjustment, the base year costs and total volumes of WLA services are understated in the Cost Model compared to the Openreach aggregate figures. Note, however, that unit costs are not understated.

A13.9 Whilst most of the services in the WLA market do not have significant internal volumes, this is not the case for SMPF services, such as SMPF Rentals, Migrations and New Provides. We therefore need to ensure that the costs and volumes for SMPF services are internally consistent within the Cost Model. We note that the service 'MPF Tie Cables' also has a substantial proportion of internal volumes.

Ofcom's analysis

A13.10 We consider that there are a number of approaches that we could use to forecast SMPF costs to 2016/17, which would allow us to estimate a cost applicable to both internal and external SMPF services. Within this sub-section we refer to SMPF services, but note the considerations in respect of SMPF apply equally to MPF Tie Cables. We have identified the following possible approaches:

a) using external costs and external volumes only as a proxy for the unit cost applicable to both internal and external SMPF services;

b) increasing the costs in the Cost Model to reflect the expected costs of both internal and external volumes; or

c) uplifting the volumes to include both internal and external volumes in 2012/13 (i.e. the first year after the base year), whereby the costs will increase due to the uplift in volumes (as forecast by the product of total volumes multiplied by the relevant AVEs and CVEs).

[139] Equivalence of input is the concept established by the undertakings in which BT provides, in respect of a particular product or service, the same product or service to all CPs (including BT) on the same timescales, terms and conditions (including price and service levels) by means of the same systems and processes, and includes the provision to all CPs (including BT) of the same commercial information about such products, services, systems and processes.

A13.11 As we do not have internal costs or internal volumes, for the purposes of the Cost Model approach (a), to use the external costs for SMPF along with the external volumes as a proxy, means that the Cost Model is internally consistent. We note that Openreach is required to sell internal SMPF services on an equivalence of inputs basis. This means that, on a per unit basis, costs allocated to internal SMPF will equal the costs allocated to external SMPF. Therefore, by using the costs of external SMPF only, along with the volumes of external SMPF, we will estimate a unit cost that would be applicable to both internal and external SMPF services.

A13.12 Approach (b) to estimate the additional costs of internal volumes in order to ensure the Cost Model uses total costs, is more complicated in practice. We can estimate the total costs in 2011/12 by multiplying the base year unit cost stack by the total volumes. However, to estimate the total cost for each cost component, we would need to know the usage factor for each cost component applicable to total volumes for WLA services.

A13.13 By using existing usage factors for components which are allocated to more than one product, e.g. to MPF Rentals and SMPF Rentals, we risk also increasing the costs allocated to MPF Rentals. We would therefore need to make an adjustment to the usage factors to ensure the correct allocation. We do not consider that this approach would be sufficiently robust and note that it would not reconcile to the published RFS data that we have available.

A13.14 Approach (c) is to assume an increase in volumes from external only to total SMPF services. Although this option would increase the costs closer to the total SMPF costs (because the Cost Model uses AVEs and CVEs to calculate the expected increase in costs as a result of an increase in volumes) the increase in costs as a result of inputting internal volumes in this way would be understated. This is because the additional costs for internal services should be calculated as the unit cost multiplied by the additional volumes. If we used external volumes in the base year, 2011/12 but assumed that the volumes in 2012/13 the increase in costs would be equal to unit cost multiplied by internal volumes multiplied by the relevant AVEs and CVEs, where AVEs and CVEs are less than 1, this means that the additional costs will be understated. Therefore, we do not think that this approach would be appropriate for forecasting the costs of internal and external SMPF services to 2016/17.

A13.15 Our proposed approach is (a), i.e. using the external SMPF volumes alongside external SMPF costs. We have reconciled the 2011/12 cost stack, using external SMPF volumes to the RFS and this is only possible using external costs and volumes (since this is how the RFS is compiled). We are therefore confident that this position is internally consistent. The reconciliation to the RFS is explained in more detail in Section 6.

A13.16 One complication to this approach relates to our forecast of external volumes. If the forecast trend for external volumes were to differ from our forecast trend of internal volumes, our cost forecast would no longer be representative of the total SMPF unit cost. For example, if our forecast was for external volumes to decline significantly, the unit cost would rise. However, if internal volumes were increasing to offset this, the total unit cost would not change as a result of volume forecasts.

A13.17 In order to ensure that our approach to estimating external SMPF unit cost remains appropriate for the total SMPF volumes, we have used external SMPF volumes for the 2011/12 base year. We have then forecast external SMPF volumes using our forecast trend (i.e. the forecast percentage change per year) in total SMPF

volumes. The total SMPF volume forecast is explained in Annex 8. This ensures that the unit cost will be relevant for both internal and external volumes.

A13.18 When we estimate the common costs to be recovered from SMPF services which we propose to set at LRIC in 2016/17 (see Section 3), we need to use the total SMPF volumes to estimate the total amount to be recovered from WLR and MPF Rental services. The calculation is:

$$\begin{aligned} &Excess\ cost\ to\ be\ reallocated \\ &\quad = (SMPF\ rental\ Unit\ FAC * Total\ SMPF\ rental\ volumes\ ) \\ &\quad - (SMPF\ rental\ LRIC\ 16/17 * Total\ SMPF\ rental\ volumes) \end{aligned}$$

A13.19 We multiply the FAC and price by total volumes (i.e. internal and external) as we propose that the prices set are applicable to both internal and external volumes. Therefore in order to ensure that Openreach has the opportunity to recover its efficiently incurred costs, the correct volume for this calculation is the total volume. This is applicable to all SMPF services where we set prices either at LRIC or based on the LRIC estimate.

A13.20 As mentioned above, we propose the same cost forecasting approach to estimating the FAC of MPF Tie Cables which have a substantial proportion of internal volumes. MPF Tie Cables are part of the Comingling basket and we set out our proposals on basket design in Section 4, however in calculating the X for the Comingling basket, we use total volumes, not external volumes. The X for the Comingling basket is estimated such that expected joint total revenues for MPF Room build, MPF Tie Cables and MPF Hostel Rentals are brought into line with their expected joint total costs by the end of the charge control period (2016/17). Both the expected joint total revenues and total costs use total volume forecasts for 2016/17 as any price reduction would apply equally to internal and external volumes.

A13.21 We intend to ask BT for further details of the costs of internal SMPF services and MPF Tie Cables to enable us to calculate the costs for total SMPF services and MPF Tie Cables for the purposes of our final statement.

Proposals on modelling approach

A13.22 We propose to calculate the costs of external SMPF services and use the external unit cost as a proxy for the total unit cost for the following SMPF services:

- SMPF Rentals;
- SMPF New Provides;
- SMPF single Migrations;
- SMPF bulk Migrations; and
- we also propose the same approach or MPF Tie Cables.

A13.23 We propose to forecast external volumes in the Cost Model (from which unit costs are derived) using the trend for combined internal and external volumes.

A13.24 We propose to calculate any LRIC adjustment and compute basket controls (i.e. X in CPI-X) using total volumes.

Question A13.1: *Do you agree with our proposed approach to calculating SMPF unit costs? Please provide reasons to support your views.*

BT Pension costs

Regulatory background

A13.25 We consider the treatment of contributions to BT's pension scheme in two parts; first, ongoing pension costs and, second, additional annual payments required to address any funding shortfall in BT's pension scheme.

A13.26 In December 2011, we published the Pension Review Statement[140], (the 'Pension Review') which contained our pension cost guidelines ('the Pension Guidelines'). The Pension Guidelines set out our general policy as to the approach we would normally expect to take in relation to the treatment of BT's pension costs when assessing the efficiently incurred costs of providing relevant regulated products or services.

A13.27 In the Pensions Review we explained that, while we expect the Pension Guidelines to form an important consideration in relevant cases, we intend to apply the Pension Guidelines on a case-by-case basis and will always act consistently with our duties and applicable legal tests under the Act.

A13.28 Although the Pension Guidelines set out the approach that we would normally expect to take, each case will be considered on its own merits.

A13.29 As specified in the Pension Review, if we decide to depart from the Pension Guidelines in a particular case, we will set out our reasons for doing so. As a general rule, unless we consider that there has been a material change in the circumstances and background considered as part of our review, we do not expect to depart from the Pension Guidelines.

A13.30 As set out in the Pension Review, we said that, when considering how pension costs should be treated in the context of setting BT charge controls, pension deficit payments should be disallowed (and any pension holidays should be ignored). We also said that an estimate of ongoing contributions to meet future liabilities based on statutory reporting costs should be included within the cost forecasts used in the charge control.

A13.31 The treatment of deficit repair payments set out in the Pension Guidelines was subject to an appeal brought by BT against the 2011 WBA Charge Control Statement[141]. In that appeal, BT argued that Ofcom should have included some or all of the pension deficit repair payments in its cost forecasts. The CC concluded that Ofcom did not err in refusing to allow BT to recover the costs of pension deficit repair payments, for the reasons set out by BT in its Notice of Appeal.[142]

[140] *Pensions Review - Statement,* 11 December 2011.
http://stakeholders.ofcom.org.uk/binaries/consultations/btpensions/statement/statement.pdf
[141] British Telecom plc v Office of Communications, case 1187/3/3/11, 11 June 2012.
[142] Paragraph 1.416, Competition Commission Determination. British Telecom plc v Office of Communications, case 1187/3/3/11. 11 June 2012.

BT's proposed approach

A13.32 Following the CC's Determination of the WBA appeal, BT has suggested[143] an alternative approach to the treatment of its pension deficit when calculating regulated charges.

A13.33 BT has suggested that a proportion of deficit repair payments should be included in the regulatory asset base (RAB), which could then be amortised over a period of time, consistent with the accounting asset lives for the adjusted assets. The RAB refers to the asset base for all assets used to provide regulated services.[144]

A13.34 BT suggests that the RAB (for copper and duct) is understated, and that the existence of the pension deficit demonstrates this. This is because BT capitalises an element of labour costs relating to both copper and duct. Included in these labour costs (for employees) are the ongoing service costs which BT pays in relation to pensions of current employees.

A13.35 BT argues that the ongoing service costs paid from 1999[145] were too low and as a consequence of BT historically understating ongoing service costs, the pension deficit arose. BT argues that there is a practical way to adjust for the understated pension costs:

> "Summing the annual amounts of pay that would have been capitalised, based on deficit repair payments, multiplied by annual capitalised pay rates, is a pragmatic means of estimating the size of the unrecognised asset.[146]"

A13.36 The starting place for BT's proposed adjustment is the deficit repair payments paid from 1999 onwards. BT then suggests that the deficit payment should be multiplied by the proportion of labour capitalised in that period. The proportion of labour capitalised in relation to copper ranges from 1-5% over the period 1999-2012. The relevant proportion for duct ranges from 0-1%. This means that the majority of the adjustment proposed by BT relates to copper.

A13.37 Based on BT's calculation of the relevant capitalised labour rate multiplied by deficit repair payments made by BT from 1999 to 2012, BT estimates that the RAB should increase by £[✂] relating to copper, which would be spread over an asset life of 18 years. There should be an additional £[✂] increase relating to duct which would be spread over 40 years.

A13.38 The impact of this adjustment would increase revenue from regulated charges by around £10m per year. If this was spread over total copper lines, this would add around £0.40 to the unit cost stacks for MPF Rentals and WLR Rentals in 2016/17.

A13.39 We note that the adjustment above covers deficit repair payments made to date. BT argues that additional adjustments would be required in all future years, which would be calculated as the deficit repair payment made in that year multiplied by the

[143] In BT's 'Pension Deficit Repair payments' presentation to Ofcom on 10 May 2013.
[144] The RAB differs from the RAV, which refers to the treatment of pre-97 copper and duct assets, this treatment is explained in detail in the RAV Annex 5.
[145] In BT's estimate, it assumes that the deficit repair payments prior to 1999, were offset against the pension holidays which were taken in the years 1991 to 1993. Therefore, before deficit repair payments resumed in 1999, the scheme was 'in balance.'
[146] Page 6, Pension Deficit Repair Payments, BT Presentation to Ofcom on 10 May 2013.

proportion of capitalised labour in the year, therefore we would expect the adjustment, as calculated by BT, to increase over time.

Ofcom's analysis and assessment

A13.40 In response to our Pensions Review, BT argued that it should be allowed to recover the entire deficit through regulated charges. BT did not suggest that any adjustment should be made to the RAB, other than noting that we could add the entire deficit into the RAB and amortise it over an appropriate period.

A13.41 This is equivalent to a recovery of the entire pension deficit through regulatory charges and for the reasons set out in the Pensions Review, we concluded that this should not be allowed. This analysis was based on our assessment of pension costs against our duties. In particular, we considered regulatory consistency and certainty and also an analysis of pension costs against the six principles of pricing and cost recovery[147].

A13.42 As part of our Pensions Review, in the second consultation[148] and the statement, we assessed whether, in principle, it would be appropriate to adjust the RAB if we believed that ongoing service payments had been understated in the past. As explained in the Pensions Review, we concluded that such an adjustment would amount to a partial recovery of the deficit. We stated that the arguments which applied to full recovery applied equally to partial recovery and therefore we rejected any adjustment to the RAB.

A13.43 Notwithstanding our conclusion that an adjustment to the RAB would not be appropriate in principle, we also explained the practical complexities of any such adjustment:

> "In the First Consultation we raised the possibility of a partial recovery in some form and invited stakeholders to comment on this. We have not received any responses suggesting that a partial recovery would be appropriate. We have nonetheless reconsidered the option of a partial recovery. Our assessment is that the position is the same or similar to that of full recovery.
>
> In addition, the deficit relates to a range of different factors which are difficult to disentangle. In order to make an assessment of this, we would need to be able to identify factors that led to a deficit (such as demographic factors or tax effects), and establish how and to what extent they did so. Again, we have not received any evidence to support a partial recovery.[149]"

A13.44 We also explained that we did not consider that adjusting the RAB to take account of more recent estimates of pension costs would necessarily lead to an uplift, and it may even lead to a decrease in the asset value:

> "Our original proposal was to adjust the RAB to reflect the costs which a new entrant would need to incur when creating similar assets to BT's and these would include the costs of pension

[147] The six principles of pricing and cost recovery are explained in footnote 57 in Section 3 of this consultation.
[148] *Pensions Review – Second Consultation,* 23 July 2010. http://stakeholders.ofcom.org.uk/binaries/consultations/751766/summary/pensionscondoc.pdf
[149] Paragraphs 3.102-3, *Pensions Review – Second Consultation,* 23 July 2010.

> liabilities based on current estimates of longevity. However, partly in response to increased longevity, firms including BT have in recent years reduced the level of pension benefits in order to reduce costs. It cannot be said for certain that the part of the cost of creating BT's existing stock of assets which reflects pension costs would be higher now than it was at the time the investments were made, even allowing for increased longevity, and it might well be lower. In addition, it is consistent to leave asset values unchanged. We also acknowledge that the assets in the RAB are subject to indexation, and this would include capitalised labour.[150]"

A13.45 We do not consider that BT's proposal about how to calculate an adjustment would change our decision in principle that we do not allow full or partial recovery of the deficit (as explained in the Pensions Review and paragraph A13.42 above).

A13.46 In addition, we do not consider that BT's approach for calculating the adjustment in any case would be appropriate. BT has stated that the adjustment should not apply to pre-97 assets as the scheme was broadly in balance up to 1999. Therefore it argues that the adjustment should be made to post 1999 assets.

A13.47 We note that this approach differs from the adjustment to the RAB which was considered (and ultimately rejected) in the Pensions Review. The adjustment considered in the Pensions Review was an uplift to the indexed HCA of pre-97 assets. BT's suggestion is to uplift post-97 assets. As we value post-97 copper and duct on a CCA basis, assets are valued at their replacement cost[151]. This approach means that it would be inappropriate to adjust the estimated replacement cost, as suggested by BT.

A13.48 We consider that BT's proposal is inconsistent with the principle of CCA, whereby assets are valued at their replacement cost, which should not be uplifted to reflect any potential historical under- or over-estimate of costs. As explained in our Pensions Review, an adjustment to regulated charges (directly or via the RAB) to reflect any under-estimation of ongoing service costs by BT would amount to retrospection, We explained that we do not take retrospective action in our charge controls and set out our reasons for this in the Pensions Review:

> "...in our charge controls, assumptions and forecasts need to be made. Under this approach, it may be the case that costs turn out to be higher or lower than expected. In a new price control period, new information may inform the latest set of assumptions and forecasts, however, we do not take "retrospective" action.
>
> ...we do not make adjustments for potential over or under recovery in the past. There are strong arguments for regulating according to this principle:
>
> -Allowing BT to bear the risks and rewards of costs turning out to be different to forecasts gives it a strong incentive to operate efficiently and minimise costs.

[150] Paragraphs 3.108, *Pensions Review – Second Consultation,* 23 July 2010.

[151] We currently use indexed capital expenditure as a proxy for this. We do this because of the complexities involved in calculating a bottom-up replacement cost for CCA valuation. As a result, we consider that our valuation method captures the cost of replacing the copper and duct assets, which includes the efficient costs of capitalised labour, including the pension costs associated with that labour.

-Adjusting for past under or over recovery of costs could lead to significant investment uncertainty, undermining efficient investment.

We believe that a consistent approach to setting charge controls furthers the interests of consumers and encourages investment and innovation.[152]"

A13.49 In the 2012 WBA determination[153], the CC stated that it considered recovery of pension deficit payments through regulated charges constituted retrospective action and as a result of Ofcom's policy of no-retrospection, Ofcom did not err in disallowing deficit repair payments from regulated charges:

"In our view, the future PDR [pension deficit repair] payments that BT is seeking to recover would involve adjusting prospective regulated charges so as to allow retrospective correction of past forecast errors. The timing of PDR payments does not determine whether they are retrospective: the fact that PDR payments make an adjustment for past pension costs, for which BT had already received an allowance in previous charge controls, is what characterizes them as retrospective...

...Given that Ofcom had a policy of no-retrospection and given that PDRs are retrospective corrective payments, we do not consider that Ofcom's choice to disallow future PDR payments was inappropriate under its existing regulatory practice for the reasons alleged by BT.[154]"

A13.50 We consider that our approach for this review remains consistent with the views expressed by the CC in its 2012 WBA determination.

Proposals on modelling approach

A13.51 Having considered BT's proposed approach in detail, we think that it is appropriate to apply the framework set out in the Pension Guidelines for the purposes of this charge control. Therefore, in our proposed cost forecasts, we have included the cost of ongoing contributions only (at a rate of 13.5% of pensionable salaries, including employee contributions[155]) with no amount included in respect of pension deficit payments.

A13.52 We do not consider that there are any factors relating to the WLR and LLU charge controls in particular which would support the adoption of an alternative approach to that expressed in our Pension Guidelines. In addition, we do not consider that there has been a material change in circumstances since the Pension Review concluded in December 2010 that would cause us to change our approach. We also note that this approach is consistent with the approach to pension costs taken in the March 2012 Statement.

Question A13.2: Do you agree with our proposed approach to BT's pension deficit repair payments? Please provide reasons to support your views.

[152] Paragraphs 4.25-4.27 *Pensions Review - Statement,* 11 December 2011.
[153] 2012 WBA determination, British Telecommunications plc v Office of Communications *Case 1187/3/3/11*
[154] Paragraphs 1.300 and 1.304, 2012 WBA determination. British Telecommunications plc v Office of Communications *Case 1187/3/3/11*
[155] Page 140, BT Group plc Annual Report and form 20-F 2013

Linecards

Regulatory background

A13.53 Linecards are the electronic equipment that connect copper pairs from BT's access network into the BT core at the local exchange. Linecards represent an important input for WLR Rentals but do not form part of the provision of MPF Rentals.

A13.54 In the March 2012 Statement, we explained that BT predominantly uses Time Division Multiplexing (TDM) technology, which utilises PSTN linecards that only recognise voice traffic. When BT provides a data service it generally uses an additional piece of equipment (a DSLAM) that takes the data traffic.

A13.55 We noted that there was equipment available – an MSAN – which contains line cards that have both voice and data capabilities – known as combination cards (or combi cards). An MSAN is capable of supporting both voice and broadband.

A13.56 BT had deployed a limited number of MSANs in certain exchanges as part of a trial, as it planned to install MSANs as a single replacement to both its TDM and DSLAM technology. Within this trial BT only used the MSANs to support voice – the plan was to establish the MSAN voice platform before migrating broadband services onto the MSAN. However, in March 2009, BT decided not to implement these plans. This meant that BT was left with the trial MSANs in its network being used to support voice only.

A13.57 In the March 2012 Statement, we concluded that linecard costs should be estimated based on TDM/PSTN technology. We noted that this was consistent with our approach to anchor pricing.

A13.58 We also explained that the cost of linecards included in the WLR Rental cost stack was lower than it would be in a steady state (ongoing copper network) as linecards had been heavily depreciated.

A13.59 This means that in recent years linecard costs as reported in the RFS are likely to be too low to use to estimate the LRIC costs because they include some fully depreciated equipment.

A13.60 As the CC noted in its determination of the appeals of the 2009 LLU and WLR charge controls[156], there are two effects of Openreach continuing to use fully depreciated linecards. First, if many of the linecards being used are fully depreciated, the more recent CCA FAC figures for linecards would tend to underestimate the LRIC, as these would make no allowance for the cost of capital or depreciation of these assets. Second, because the economic life of the linecards had exceeded the length of time over which they were depreciated (which was ten years), historic CCA FAC figures may overstate the LRIC by depreciating the assets over too few years.

A13.61 In the March 2012 Statement, we considered that a figure of around £11 represented a reasonable estimate of linecard costs in an ongoing copper

[156] Paragraph 3.138, 2009 WLR determination. The Carphone Warehouse Group plc v Office of Communications Case 1149/3/3/09

network[157] we explained that this was based on our analysis of linecard costs over the period 2004-2009 which we considered as a proxy for an ongoing TDM network.

Ofcom's analysis

A13.62 We have considered the line card costs calculated in the Cost Model. The starting point for the Cost Model is BT's 2011/12 RFS data, which includes some fully depreciated linecard assets. The 2011/12 RFS linecard cost is £8.13 per WLR Rental line, and a combi card cost of £0.24 per WLR Rental line. This has fallen from the 2010/11 cost, reported in the RFS, of £8.51 and combi card costs of £0.84 per WLR Rentalline.

A13.63 In the March 2012 Statement, we concluded that a figure of around £11 was within the range of steady state PSTN line card costs in the RFS and was broadly constant in real terms over time. As set out in the March 2012 Statement, the estimated linecard cost in the 2011/12 cost stack was £10.16 per WLR Rental line.[158] The unadjusted linecard cost estimated in the cost Cost Model for 2016/17 is £6.67 per WLR Rental line.

A13.64 We have considered a number of options for adjusting linecard costs to estimate a steady state:

- we could uplift the net replacement cost 'NRC' for the PSTN linecard component to ensure that the unit cost of linecards in 2011/12 (our base year) is equal to £11;
- we could adjust the ratio between the NRC and the gross replacement cost ('GRC') to one which replicated the NRC/GRC ratio over a period which we deemed to be steady state in the March 2012 Statement (e.g. 2004-2009); or
- we could adjust the NRC/GRC ratio to one which we consider replicates a steady state. For example, in previous charge controls such as the 2012 ISDN30 Statement we considered that an appropriate uplift for ISDN30 linecards was 50%. We may also consider an adjustment to the asset life of linecards as done in previous charge controls.

A13.65 The first option is both consistent with our range cited in the March 2012 Statement and with the linecard cost allowed in the FAC for WLR Rental charges in March 2013/14. This would be a simple adjustment, and as we have previously noted that the 2004-2009 figure represented a steady state, we consider that this adjustment will provide a reasonable proxy for ongoing TDM network linecard costs to 2016/17 of £10.36. Making the NRC adjustment in the 2011/12 base year ensures that the linecard cost changes over time in line with our assumptions on inflation, efficiency and volumes which is consistent with our AVE/CVE approach to modelling.

A13.66 We do not currently have sufficient information to calculate the second option for the purposes of this consultation. This would require us gathering additional data from BT as this calculation was not necessary in the previous two charge controls as the costs were included as a transfer from BT Group. The linecard cost

[157] Our reasoning of line cards was set out in A9.15 to A9.22 of the March 2011 Consultation http://stakeholders.ofcom.org.uk/binaries/consultations/wlr-cc-2011/annexes/wlr-cc-annexes.pdf

[158] The reasoning for the line card cost used in the March 2012 Statement was set out in the March 2011 Consultation, but the final figure used was £10.88, rather than the £11.08 reported in the consultation.

previously used therefore included operating costs, depreciation and the unit cost of capital employed associated with the product, but the NRC and GRC were not previously obtained (since the depreciation and cost of capital employed were already provided). We do not currently have the necessary data to implement this adjustment, however, we consider that this would also likely represent a reasonable approach for estimating and implementing a steady state linecard adjustment.

A13.67 The final option, selecting an NRC/GRC ratio which we considered replicated a steady state, would require us to assess whether those estimated for previous charge controls remained appropriate for this charge control. We note that using a 50% NRC/GRC ratio in 2011/12 would increase the 2016/17 cost to around £11.25, which is around £0.40 above the figure used in the previous charge control for 2013/14.[159]

A13.68 We propose to estimate linecard costs by uplifting the NRC of the linecard cost component to set the annual per line cost at £11 in 2011/12. This approach is consistent with the estimate of linecard costs in the March 2012 Statement. However, we propose to gather more data on the NRC/GRC ratios of the linecard assets in order to determine whether this approach could be appropriate. We would welcome stakeholder views on the appropriate method of adjusting linecard costs to replicate a steady state.

A13.69 We implement our proposed approach by adding £690m to the NRC.

A13.70 This approach increases the 2016/17 cost of the line cards by £3.69, compared to the linecard cost forecast in the Cost Model without the adjustment. The NRC/GRC ratio as a result of this approach in 2011/12 is 43%.

Proposals on modelling approach

A13.71 We propose to uplift the costs of linecards in the WLR Rental cost stack to £11 in 2011/12. We propose to implement this by increasing the NRC for the linecard cost component by £690m.

A13.72 The impact of this is to increase the 2016/17 WLR line Rental price by £3.69 per line.

Question A13.3: *Do you agree with our proposed approach to adjusting BT's linecard costs? Please provide reasons to support your views*

Dropwire

Regulatory background

A13.73 Dropwire costs relate to the depreciation of the copper pair and NTE that links the end user premises to the distribution point.

A13.74 Up to 2001, BT expensed the capital cost of dropwires as they were incurred. In 2001 the policy changed and the cost was capitalised and depreciated over 10 years.

[159] These estimates are based on using the asset lives currently estimated in the Cost Model.

A13.75 BT has always recovered dropwire costs through Copper Access Rental Charges. Prior to December 2005 these were controlled at the retail level through the retail price control that had been set in 2003. This was based on the fully expensed cost. In December 2005, we removed the retail price control and in 2006 set Wholesale Price Controls for Copper Access products.

A13.76 The dropwire costs were based on BT's capitalised costs. We recognised, however, that dropwires in use at December 2005 had already been paid for once through the retail price control and that those capital costs should be disallowed to prevent double recovery.

A13.77 Therefore, in both the 2009 WLR and LLU Charge Control Statement and the March 2012 Statement, we made a dropwire adjustment. This adjustment removes the pre-2006 dropwires from the asset base.

A13.78 In the March 2012 Statement, we explained that the difference between the full and the adjusted value (used for setting Rental prices) would fall until all of the pre-2006 dropwires are fully depreciated in 2014/15.

Ofcom's analysis

A13.79 We requested BT's dropwire model, used by BT to calculate any dropwire adjustment, under our statutory information gathering powers.

A13.80 As the final year of our proposed charge control is 2016/17, there will be no pre-2006 dropwires in the cost stack for copper access Rental products. This was confirmed in BT's dropwire model which shows that there is no adjustment in 2016/17.

A13.81 Therefore the dropwire adjustment made in the March 2012 Statement is not necessary for the final year of the proposed control.

Proposals on modelling approach

A13.82 We propose to make no adjustment for pre-2006 dropwire assets in the Cost Model.

A13.83 As there are no assets which require adjusting in the 2016/17 cost stack, we consider that the 2011/12 cost stack, with no adjustment for dropwire is appropriate for forecasting dropwire costs to 2016/17 (using the relevant AVE).

Question A13.4: *Do you agree with our proposed approach to calculating dropwire costs for the purposes of forecasting to 2016/17? Please provide reasons to support your views.*

Test Access

A13.84 Within the Cost Model (and BT's RFS) there are two cost components associated with line testing. These are:

- PSTN line test equipment; and
- Broadband line testing systems.

A13.85 We have assessed these two components separately in the section below.

PSTN line test equipment

Regulatory background

A13.86 The costs included within the PSTN line test equipment component are almost entirely[160] made up of investment in test head equipment, including the costs of the test heads along with software and associated costs to enable the test heads to work effectively.

A13.87 Test heads are used by Openreach to test whether a copper line meets the technical specification SIN349. This sets out physical and electrical connectivity characteristics that must be met by the copper line. In order to carry out a line test, the copper line needs to be connected to a test head.

A13.88 In the March 2012 Statement we used the following allocation for the equivalent line test equipment costs:

Table A13.1 – March 2012 allocation of line testing costs

	WLR Basic Rentals	MPF Rentals	SMPF Rentals
March 2012 Statement allocation of line test equipment costs	1.0	0.0	1.0

A13.89 This allocation was based on data provided by BT prior to the March 2012 Statement. The allocation in the March 2012 Statement was subject to appeal by BT[161]. BT acknowledged in the appeal that the information that it had provided to Ofcom during the administrative process leading up to the March 2012 Statement was incorrect. BT provided updated information to the CC which it said correctly allocated the costs of test heads. On the basis of its revised information, BT argued that Ofcom had not allocated costs of test heads to MPF Rentals, even though they were used to test MPF lines. In addition, BT argued that test heads should not be allocated to both WLR Rentals and SMPF Rentals as the same underlying copper pair was used to deliver the two services therefore this would 'double count' the costs for these services.

A13.90 The CC, in the 2013 LLU and WLR determination, noted that no party to the appeal contended that BT's argument, that Test Heads should be allocated to MPF, was incorrect.

A13.91 The CC, therefore found that Ofcom had erred in its allocation of test head costs by failing to allocate such costs to MPF, it stated that:

> "...the principle of cost causation suggests that MPF services, which use Test Heads, should contribute to the cost of Test Heads".[162]

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[160] ✂

[161] *2013 LLU and WLR Determination* http://catribunal.org/files/1192-93_BSkyB_CC_Determination_270313.pdf

[162] Paragraph 7.29, *2013 LLU and WLR Determination* http://catribunal.org/files/1192-93_BSkyB_CC_Determination_270313.pdf

A13.92 Having found Ofcom to be in error, the CC stated that this error should be corrected by changing the allocation of Test Heads to MPF Rentals to 1, this reflects the fact that MPF should receive an allocation of test head costs.

A13.93 In relation to BT's second argument, that the allocation of test heads to SMPF Rentals amounts to double counting, the CC acknowledged that double-counting exists when comparing WLR + SMPF Rentals to MPF Rentals (once the MPF Rentals allocation is changed to 1). The CC stated that the combined usage factor for WLR + SMPF Rentals should be equal to that of MPF Rentals i.e. 1. The CC considered that the principle of cost causation favours allocating no test head costs to SMPF Rentals, therefore it set a usage factor of 0 for SMPF Rentals.

Ofcom's analysis

A13.94 As explained above, the approach taken in the March 2012 Statement was based on information that BT later corrected. In light of that new information, we consider that the arguments relating to cost causation considered by the CC apply to test heads in the current charge control, i.e. that test head costs (PSTN line testing equipment component) should be allocated to MPF Rentals and WLR Rentals, but not to SMPF Rentals. We propose therefore to allocate costs consistently with the CC's final determination, as follows:

Table A13.2 – Proposed usage factor for PSTN line testing

	WLR Basic Rentals	MPF Rentals	SMPF Rentals
Usage factor for PSTN line testing component in the Cost Model	1.0	1.0	0.0

A13.95 This approach is consistent with BT's allocation in the 2011/12 RFS and therefore no adjustment is required to the Cost Model.

Proposals on modelling approach

A13.96 We propose to make no adjustment to the Cost Model for the component PSTN line test equipment as we consider the usage factor used in BT's 2011/12 RFS reflects the appropriate allocation of test head equipment to WLR and MPF Rental services.

Broadband line testing

Regulatory background

A13.97 The RFS reported costs are at a "super-component" level[163]. The broadband line testing systems super-component, in the RFS, includes Test Access costs[164]. This

[163] The super-components reported in the RFS map one to one to components in most cases. However for broadband line testing, service centre assurance and service centre provision super-

is the technology which allows the test heads to be connected to a copper line. The broadband line testing super-component is comprised of the following two components:

- LLU TAMs (included in the "LLU line testing" component); and
- evoTAMs (included in the "EVO TAMs" component).

A13.98 In the March 2012 Statement, the two costs which make up broadband line testing costs in the RFS, that is, TAMs and evoTAMS, were considered separately.

A13.99 TAMs costs are testing equipment used by MPF lines and in the cost forecasting for the March 2012 Statement, these costs were allocated 100% to MPF Rentals.

A13.100 EvoTAMs are used to test DSL lines, though are not deployed at all exchanges. These are primarily used to test SMPF lines but can also be used to test voice frequencies on DSL enabled WLR lines.

A13.101 In the March 2012 Statement, we explained that as evoTAMs are also used to test voice frequencies on WLR lines, that WLR charges should also pick up an allocation of the evoTAM cost. In the March 2012 Statement, we estimated that around 40% of WLR lines were voice only, which are not capable of being tested by evoTAMs. Therefore we allocated the costs using the following usage factors: 0.6 to WLR and 1.00 to SMPF.

A13.102 In addition, in the March 2012 Statement, we made a 'pricing adjustment' referred to as the 'TAM pricing adjustment'. This reallocated LLU TAM costs (which are only used by MPF) so they were spread across all DSL lines. This was consistent with the practice in previous charge controls. We propose to remove this pricing adjustment when setting the charge controls for the period to March 2017. This is explained in more detail in Section 3.

Ofcom's analysis

A13.103 Although there are two separately identified components, the RFS and input data from BT is reported as one super component of "broadband line testing systems". However, BT has provided us with the allocation of that super component to MPF, SMPF and WLR that is consistent with allocating all TAMs costs to MPF and allocating evoTAM costs to SMPF and WLR using the ratio 1.0:0.6.[165] The resulting allocation of the broadband line testing super component is shown in the final row of the table below, which is consistent with the 2011/12 RFS.

Table A13.3 Allocation of broadband line testing component in 2011/12 RFS

	WLR Basic Rentals	MPF Rentals	SMPF Rentals
LLU TAMs	0.0	1.0	0.0

components there are two components which map onto the one super component. For the two service centre super-components we were provided with sufficient data from BT to model costs at a component level.

[164] Test Access for WLR lines is provided via PSTN line cards. The costs of these are included in the PSTN line card component which is explained in more detail from paragraph A13.53 above.

[165] Presentation by BT to Ofcom on 28th February 2013.

evoTAMS	0.6	0.0	1.0
Broadband line testing component (aggregate)	[✂]	[✂]	[✂]

A13.104 However, for the reasons set out from paragraph 6.137 of section 6, we have not used these allocations and instead have assumed the broadband testing costs for MPF, SMPF and WLR are as in the table below.

Table A13.4: Broadband line testing adjustment:

	Unit cost per 2011/12 RFS	Adjusted 2011/12 unit cost
MPF	£8.47	£3.77
SMPF	£0.86	£3.77
WLR	£0.49	£0.00

A13.105 The adjustment to the 2011/12 costs is calculated by adding the total broadband line testing costs for MPF, SMPF (internal and external) and WLR. We then divide the total cost by total MPF and SMPF lines in 2011/12. This gives a 1:1:0 allocation (between MPF:SMPF:WLR) for broadband line testing costs.

A13.106 We note that in practice this is not possible to do in the Cost Model. This is because the Cost Model is based on total costs in the WFAEL and WLA markets reported in the RFS. This means we do not include costs or volumes related to internal WLA services (namely the SMPF rental inputs). We explain this in detail from paragraph A13.5 above. This means that we would need to remove some 2011/12 costs from our Cost Model as we are reallocating costs from MPF and WLR to SMPF (including internal SMPF). We do not have sufficient detail to robustly model this, and the implications for a significant fall in component volumes would mean that we artificially changed costs as a result of the AVEs and CVEs.

A13.107 We have therefore implemented this adjustment by amending the 2016/17 cost stacks for MPF and SMPF. We note that the 2011/12 estimate of £3.77 would change over time as a result of our volume assumptions, efficiency and inflation assumptions. However, for the purposes of this consultation we propose to simply replace the 2016/17 broadband line testing cost for MPF and SMPF with £3.77.

Proposals on modelling approach

A13.108 As set out in Section 3, we propose to remove the TAMs pricing adjustment for the purposes of setting the charge controls for MPF Rentals and SMPF Rentals. However, this was a pricing adjustment made in the previous charge control and therefore no adjustment is needed in the Cost Model.

A13.109 As set out in Section 6, we have not used the RFS figures for broadband line testing. Instead, for the purposes of this consultation, we have set broadband line testing costs to be equal per line between MPF and SMPF. We are proposing to

investigate the costs of broadband line testing further and would welcome stakeholder comments on our proposed approach, and the expected costs of broadband line testing for both MPF and SMPF. In Sections 3 and 6 we have sought stakeholders' view on these issues.

E-side and D-side copper repairs

A13.110 The E-side and D-side 'copper current' components are repair and maintenance costs of the copper line, split as follows:

- E-side copper current represents the cost of repairs to the copper line between the cabinet and the exchange. The costs of this activity include engineering pay costs and stores costs that are incurred in repairing the exchange side.

- D-side copper current represents the cost of repairs to the copper line between the cabinet and the dropwire. The nature of the costs included within this activity is the same as for E-side copper.

A13.111 Within the Cost Model, and BT's 2011/12 RFS, the same allocation is applied to both E-side and D-side copper current components. The allocation of the cost of both components to LLU and WLR services is driven by fault rates and service levels. In this sub-section we consider fault rates and service levels separately; however they both contribute to the component usage factor which allocates these costs to products.

Fault rates

Regulatory background

A13.112 In the March 2012 Statement, we allocated repair costs based on actual fault rates. We noted that this was a change to the previous approach adopted in the 2009 LLU and WLR Charge Control Statement, where costs were allocated based on expected fault rates.

A13.113 Based on actual fault rates, the allocation used in the March 2012 Statement was:

Table A13.5 – Fault rate allocation in the March 2012 Statement

	WLR Basic Rentals	MPF Rentals	SMPF Rentals
Fault rate allocation	1.0	1.04	0.16

A13.114 As noted in Section 5, Ofcom's approach to fault rates in the March 2012 Statement was appealed by Sky and TalkTalk.

Ofcom's analysis

A13.115 We set out our approach to fault rates in Section 5.

A13.116 In Section 5 we explain that, for the purposes of this consultation, we propose to use the 2011/12 base year costs in the Cost Model, which are consistent with the

level of faults experienced in that year . This means that we do not make any adjustment to the total level of costs in the 2011/12 base year to reflect fault rates.

A13.117 In Section 5, we also explain that, for the purposes of this consultation, we assume that the different allocations set out in BT's RFS are appropriate for the purposes of forecasting costs forward.

A13.118 Within the RFS, and the Cost Model the allocation of fault rates remains at the level set out in the March 2012 Statement (table A13.5 above).

Proposals on modelling approach

A13.119 We propose to make no adjustment to the Cost Model. We propose to use the 2011/12 level of faults implicit in the RFS to forecast costs to 2016/17.

A13.120 We also propose to use the fault rate allocation set out in Table A13.5 above. This is consistent with the 2011/12 RFS therefore no adjustment is required to the Cost Model.

A13.121 We propose to investigate both the total fault rates and the fault rate differential between Rental services further as explained in Section 5.

Service levels

A13.122 We explain our approach to overall service levels in Section 5. However, this section considers the relative difference in costs which result from services having different service levels.

Regulatory background

A13.123 In the March 2012 Statement, we explained that as MPF and WLR premium have a higher service level than WLR basic, MPF and WLR premium should have a greater allocation of repair costs when compared to WLR basic.

A13.124 In the March 2012 Statement, BT estimated that the cost differential between MPF/WLR premium and WLR basic is 20%. BT proposed this differential based on the different service level agreement ('SLA') for MPF and WLR, which guarantees an engineer attends an MPF/WLR Premium fault a day earlier than WLR Basic fault, i.e. MPF and WLR Premium receive Care Level 2 (which is a repair to be completed by the end of the next working day) whereas WLR receives Care Level 1 (which is a repair to be completed by the end of the second working day). In the 2011 Consultation we noted that this may not be an accurate reflection of the cost differential as Openreach may have been over-delivering on WLR basic SLAs.

A13.125 BT provided further information in support of the 20% cost differential in its response to the 2011 Consultation. This was in the form of the results of Discrete Event Simulation undertaken at the Leeds exchange which supported the 20% differential. In the 2012 Statement we explained that whilst the analysis was useful, we were unable to fully test its robustness or assess its applicability as a national benchmark.

A13.126 BT argued that its analysis showed that if all faults are fixed at Care Level 2, 20% more resources would be needed than if they were fixed at Care Level 1 to maintain on-time repair at 98.3%. Alternatively, if resources are not increased, ontime repair

would fall to 88.8%. From this, Openreach submitted that an additional usage factor of 1.2 should be applied to repair resource levels for products on Care Level 2.

A13.127 We explained in the March 2012 Statement that we were cautious about accepting that the results of Openreach's modelling because:

> "The modelling exercise demonstrates the effect of moving all services from Care Level 1 to Care Level 2. We are considering the case where there is a mix of services delivered at the two care levels.
>
> The modelling exercise demonstrates the additional resource needed to support an increase in on-time repair at Care Level 2 from 88.8% to 98.3%. Actual data shows that these levels are not achieved in practice. It shows that on-time fault resolution has been between 80% and 90% for each of WLR, MPF and SMPF in the past year, with the data for September 2011 showing all three to be at approximately 80%. Because the impact on resource of increasing on-time repair is not linear, it is not clear that the data provided about the effect of achieving a very high success rate of 98.3% can necessarily be assumed to be representative of the current allocation of resources, which achieves a lower on-time repair rate.[166]"

A13.128 We did not consider that the evidence provided by BT was sufficient to support a 20% increase in repair costs as a result of a higher service level differential of 20%. We explained that the modelling data provided by BT presented an extreme case of the impact on resources because of these above points and therefore it would not be appropriate to make the adjustment suggested by BT.

A13.129 However, we accepted that in principle, providing services to a higher care level may require more resources, and therefore we agreed with BT that it was appropriate to make an adjustment to reflect the increased cost associated with higher service levels.

A13.130 As BT was unable to provide further evidence to support an increase in the service level differential to 20%, we used a model from the 2009 LLU and WLR Charge Control Statement, updated for 2010/11 data, to estimate of the impact of a higher service level on the allocation of costs. This model estimated the incremental savings assessment i.e. the savings in costs attributed to WLR basic if we removed WLR premium specific costs from the WLR basic cost stack.

A13.131 The model calculates a volume weighted WLR premium and basic unit cost for repair services. It then calculates the aggregate repair costs for WLR premium and basic by multiplying the respective volumes by their unit cost. It then applies a 3.2%[167] (based on BT data) reduction to the total WLR basic cost. The adjusted total cost is divided by the respective volumes to get an adjusted weighted unit cost for WLR basic (the weighted unit cost for WLR premium is unadjusted). The difference between the adjusted WLR basic unit cost and the WLR premium unit

[166] Paragraph A4.293 of the 2012 Statement.
[167] In the March 2012 Statement we noted that Openreach, in 2009, provided evidence which showed that removing the need to carry out faster contractual repairs would reduce the current aggregate repair cost on residential lines by 3.2%.

cost provides an estimate of the unit cost differential. In the March 2012 Statement, we estimated this to be £0.71.

A13.132 In addition, the model took into account jeopardy management costs, these represented the labour activity carried out to improve provision and repair performance. BT Jeopardy management is focussed on more complex jobs, where an engineering visit is required. Jeopardy management costs were estimated to increase the unit cost differential by £0.04.

A13.133 In order to estimate the service level differential, we divided the £0.75 service level differential by the WLR basic unit repair cost in 2010/11 of £13.19. We therefore estimated the Basic and Premium service differentials to be 5.7%

A13.134 Therefore, in the absence of more compelling evidence on the service level differential, for the March 2012 Statement we increased the usage factor for E-side and D-side copper repair costs by 5.7% for the services which have a higher service level. These are MPF, WLR Premium and SMPF. This was consistent with the methodology used in the 2009 LLU and WLR charge control statement.

Table A13.6 – Service level allocation in the March 2012 Statement

	WLR Basic Rentals	MPF Rentals	SMPF Rentals
Service level allocation	1.0	1.057	1.057

A13.135 Our approach in the March 2012 Statement to estimating the costs of a higher service level for MPF/WLR Premium was part of BT's appeal. BT argued that we incorrectly applied the service differential. It argued that the resourcing impact of a change from Care Level 1 to Care Level 2 and vice versa was caused by and impacted only on the repair function, and not on provisioning. BT presented evidence which sought to show that the resourcing changes associated with a higher service level are caused by and only impact repairs (and not provisioning).

A13.136 The CC noted that BT had not produced "...sufficiently compelling evidence that the effects of changing care levels were isolated to the repair function. Absent compelling evidence to the contrary, we would expect movements in care levels to impact both provisioning and repair (although not in equal measure). If the incremental costs of the total engineering resource from Care level 2 were applied only to repair, as BT suggested, this would result in BT's method over-estimating the usage factor premium which should be paid for a Care level 2 service".[168]

A13.137 As noted by the CC, in our estimate of the service differential, we effectively spread the cost of different service levels over repair and provisioning costs.[169] The CC noted that Ofcom's approach could under-estimate the usage factor premium; however it noted that BT's approach could over estimate the usage factor premium.

A13.138 In the 2013 LLU and WLR determination, the CC found that Ofcom did not err in its allocation of the costs of repairing faults. It noted that "neither Ofcom's current

[168] Paragraph 6.63, 2013 CC determination
[169] Paragraph 6.64 ,2013 CC determination

approach nor the approach proposed by BT provided an ideal solution to the issue. However, BT had not provided sufficiently compelling evidence to show that Ofcom was wrong and that BT's approach was clearly better".[170]

A13.139 Another issue that arose in the context of the appeal of the March 2012 Statement was the inclusion of jeopardy management costs in the calculation of the impact of a higher service level. It was noted in the appeal that jeopardy management costs were already captured elsewhere in the model in the form of LLU assurance costs. The CC considered that the impact of removing jeopardy management costs was sufficiently small that it would not require adjustment in the appeal. However, we note that jeopardy management costs should not have been included in the estimate of the service differential as they are captured elsewhere.

A13.140 In the 2013 LLU and WLR determination, the CC estimated this adjustment would remove around £0.04 from the calculation of the costs associated with a higher service level in Ofcom's model used in the March 2012 Statement.

Ofcom's analysis

A13.141 We explain our approach to service levels in Section 5. However, we consider below our approach to estimating the cost differential between WLR basic, and services which have a higher service level (MPF, SMPF and WLR premium). This estimate is based on the different service levels in force at the time of the 2011/12 RFS.

A13.142 We continue to believe that it is appropriate to allocate a higher proportion of repair costs to services with a higher service level. We note the CC's findings in the appeal. However, at the time of preparing this consultation we have not received further evidence from BT which would justify a change to the overall methodology used to calculate the service level differential. In the absence of such robust evidence, we are therefore consulting on the proposal to estimate the service level differential using the methodology established in 2009. This calculation was refreshed for 2010/11 and we consider that remains appropriate for adjusting the base year 2011/12 allocations in the RFS.[171]

A13.143 However as noted by the CC, jeopardy management costs were incorrectly included in the calculation above, therefore we have removed £0.04 from the calculation performed in 2010/11. This reduces the proportion to be allocated to services with a higher service level (MPF, WLR premium and SMPF) from 5.7% to 5.4%.

Proposals on modelling approach

A13.144 In Section 5 we explain that, for the purposes of this consultation, we propose to use the 2011/12 faults related costs within the base year of the Cost Model. This means that no adjustment has been made to the total level of faults in the Cost Model.

A13.145 In Section 5, we also explain that, for the purposes of this consultation, we propose to use the fault rate allocation implicit in the RFS to allocate repair costs to different services.

[170] Paragraph 6.65, 2013 CC determination

[171] We have updated the analysis for 2011/12 volumes and repair costs, based on the RFS and note that there is no material change to the estimate previously calculated.

A13.146 We propose to adjust the RFS allocation for the service level differential. In the RFS, there is a 20% uplift for services with a higher service level. We propose to replace this with 5.4% derived from the methodology used in the March 2012 Statement.

A13.147 We propose to use the usage factors set out in Table A13.7 below for both E-side and D-side copper current components in the Cost Model.

Table A13.7 – proposed allocation for E-side and D-side copper current:

	WLR Basic Rentals	MPF Rentals	SMPF Rentals
Fault rate allocation	1.0	1.04	0.16
Service level allocation	1.0	1.054	1.054
Combined usage factor – used in modelling[172]	1.0	1.10	0.17

A13.148 In addition, we consider that the service differential should be reflected in other component costs related to repairs; namely:

- PSTN drop maintenance; and
- Local exchange general frames current.

A13.149 As noted in Section 5, during the course of our ongoing analysis into Quality of Service and fault rates, we will be considering the question of the cost differential between SL1 and SL2 for WLR and MPF in more detail in the consultation on service level costs in the autumn.

Question A13.5: *Do you agree with our proposed approach to allocating repair costs to services in the Cost Model? Please provide reasons to support your views.*

Pair Gain

Regulatory background

A13.150 The use of Digital Access Carrier System (DACS)[173] allows for 'pair gain' on some WLR voice only lines. Pair gain is where a WLR voice-only line between the dropwire and the exchange can be shared by two end users. This reduces the average amount of copper and duct per WLR customer compared to an MPF customer. This therefore reduces the average cost per copper line of E-side and D-side copper for WLR Rentals, when compared with MPF.

[172] The combined usage factor is calculated as the fault rate allocation multiplied by the service level allocation.
[173] DACS are the equipment which enables more than one circuit to be carried over a copper pair.

A13.151 There is no adjustment for any Pair Gain savings in the 2011/12 RFS, however, we understand that BT intends to reflect the different usage factors associated with Pair Gain in the 2012/13 RFS.

A13.152 In the March 2012 Statement, we adjusted the usage factors applied for the cost categories 'use of D-side copper and duct' and 'use of E-side copper and duct'. These are equivalent to the cost components used in the Cost Model for both D-side copper capital and E-side copper capital respectively.

A13.153 The adjustment in respect of Pair Gain which was applied in the March 2012 Statement was as follows:

Table A13.8 – Allocation of E-side and D-side copper capital in March 2012 Statement (as adjusted for pair gain)

	Pair Gain adjusted usage factor
WLR	0.994
MPF	1.000

A13.154 In the March 2012 Statement, we explained that:

> "The WLR pair usage contains the use of pair gain equipment (DACS) where more than one circuit is carried over a copper pair. Although the use of DACS is diminishing (<1%) it is a factor that is considered when reviewing the overall pair usage of WLR (0.99)[174]"

Responses

A13.155 We understand from BT that there are [✂] DACS currently installed which allow two end users to be served by one copper pair (which amounts to [✂] lines).

A13.156 BT has estimated the impact of pair gain on E-side and D-side copper capital components for 2012/13. If we adjusted the WLR cost stack to reflect the number of end customers who are served by DACS equipment, the WLR usage factor would reduce from [✂]to [✂]for 2012/13.

A13.157 This adjustment is slightly lower than the adjustment made in the March 2012 Statement.

A13.158 BT has explained that where a single copper pair has DACS installed, it will not always carry the maximum number of two end users. This may be because one end user has ceased on the line. Alternatively, BT noted that it may be because a DACS has been installed for voice quality improvement.

Ofcom's analysis

A13.159 We consider that it may be reasonable to make an adjustment to E-side and D-side copper capital cost components to reflect cost savings associated with pair gain,

[174] Paragraph A4.246 of the 2012 Statement.

and that this should be based on the number of end customers who share a line, rather than the number of DACS installed.

A13.160 Using the 2012/13 usage factor of 0.996, estimated by BT, the impact of the adjustment is a decrease in the WLR basic unit cost stack of less than £0.10 per line.

A13.161 However we note that the number of customers served by DACS fell by c.10% from 2011/12 to 2012/13 and BT forecasts a further c.0% fall in end customers served by DACS to 2013/14.

A13.162 If we updated the 2012/13 calculation for the number of end users using DACS forecast, by BT, for 2013/14, the WLR usage factor would be even closer to 1. This would represent a fall of less than £0.05 per line compared to the per line cost arising from a usage factor of 1.

A13.163 Although BT does not forecast the number of DACS beyond 2013/14, based on the trend from 2009/10 to 2013/14, we would expect that end customers using DACS would fall further. We consider that the appropriate adjustment for forecasting costs to 2016/17 is likely to be lower than the adjustment based on 2012/13 or 2013/14 estimates, therefore we do not consider that an adjustment would be material. For this reason we propose to make no adjustment to the D-side copper capital costs or E-side copper capital costs.

A13.164 We note that the costs associated with pair gain are reported separately. This adjustment does not affect the allocation of costs associated with DACS. The costs associated with pair gain are allocated to the cost component 'pair gain' and are allocated 100% to WLR Rental services. The cost per line, based on the Cost Model, in 2016/17 is £0.01.[175]

Proposals on modelling approach

A13.165 We propose to make no adjustment to the usage factors used in the Cost Model to reflect pair gains in use as we do not consider that this adjustment would be material when forecasting the adjustment to 2016/17.

Question A13.6: *Do you agree with our proposed approach of excluding any pair gain adjustment for the purposes of forecasting D-side and E-side copper capital costs to 2016/17? Please provide reasons to support your views.*

[175] We note that the costs associated with pair gain are lower than reported in the RFS of £0.10, the asset life for pair gain component is high, however we propose to make no adjustment in the model as we would not expect the costs of maintaining DACs would be the costs of a steady state copper network used to provide broadband services, in addition the cost impact of any adjustment would be small (less than £0.10).

Annex 14

Treatment of cumulo rates within the charge control

Introduction

Treatment of cumulo rates within the charge control

A14.1 Cumulo rates are the non-domestic (business) rates that BT pays on the rateable assets within its UK network. The rateable assets consist primarily of duct, fibre, copper and exchange buildings. The charge controls previously set by Ofcom have allowed BT to recover a proportion of BT's cumulo rates bill through MPF and WLR charges. We are proposing that this continues to be the case for the proposed charge controls. In this Annex we provide further background to cumulo costs and set out the approach we are proposing to take to their allocation for the purposes of the LLU and WLR charge controls.

A14.2 Cumulo costs to be recovered from MPF and WLR services in the proposed new charge controls depend, firstly, on the cumulo bill faced by BT and, secondly, on how much of that bill is allocated to MPF and WLR services.

A14.3 The allocation of cumulo costs to MPF and WLR services in the March 2012 Statement was appealed by both BT and Sky/TalkTalk. BT's appeal was on a question of fact. The CC found in BT's favour but we do not consider that this decision has ongoing implications for our charging methodology.

A14.4 Sky/TalkTalk appealed against the method we used to allocate cumulo costs. The CC found that we did not err and rejected Sky/TalkTalk's proposed alternative. The appeal findings are discussed in more detail below.

A14.5 The rest of this annex is structured under the following headings:

- how cumulo rates costs are calculated;
- the allocation of cumulo rates costs to MPF and WLR services in the March 2012 Statement;
- appeals of the March 2012 Statement;
- responses to the 2012 FAMR CFI;
- current and forecast trends in BT's cumulo bill;
- the allocation of cumulo rates costs from 2014; and
- our proposed approach.

How cumulo costs are calculated

A14.6 The rateable value (RV) of BT's cumulo rates is assessed by the relevant rating authority, for example the Valuation Office Agency (VOA) in England and Wales.

The RV is a measure of the open market rent for the hereditament.[176] The RV represents the result of negotiations between a hypothetical tenant, who wishes to rent the assets contained within the hereditament, and a hypothetical landlord, who own those assets.

A14.7 The VOA assesses the RV of BT's assets using the "receipts and expenditure" (R&E) method. According to the CC:

> "*This approach estimates the profits of a business that uses the rateable assets and seeks to allocate these profits between a notional tenant (ie user of the assets) and a notional landlord (i.e. owner of the assets). The notional landlord, for the purposes of the charge control, is the public authority which levies cumulo rates. The notional tenant is BT".* [177]

A14.8 The CC described the VOA's calculation of the RV in the following six steps:[178]

a) the revenues are assessed from the services that use the rateable assets;

b) a measure of operating costs relating to those services is deducted;

c) also deducted are a maintenance charge for the landlord's assets and the tenants' own capital expenditure;

d) this gives a 'divisible balance', being a measure of profit from the business;

e) the tenant's return on its investments is deducted from this; and

f) the residual is taken to be the RV.

A14.9 In broad terms, the rates bill is then calculated by multiplying the RV by a centrally set rate in the pound that is the same for all ratepayers. [179]

A14.10 Rating lists[180] are generally updated every 5 years. The last revaluation in England, Scotland and Wales took effect from 1 April 2010. The administrations in each country have however recently announced that the next revaluation will be

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[176] Further background behind rateable values is given on the VOA web-site www.voa.gov.uk, A hereditament is the unit of assessment. For BT's cumulo assessment the hereditament is, under rating law, all of its rateable assets in its UK network, It is called a cumulo assessment because all assets are valued together.

[177] Paragraph 11.7, Competition Commission, British Sky Broadcasting Limited and TalkTalk Telecom Group Plc v Office of Communications, Case1192/3/3/12, Determination 27 March 2013.

[178] Paragraph 11.8, Competition Commission, British Sky Broadcasting Limited and TalkTalk Telecom Group Plc v Office of Communications, Case1192/3/3/12, Determination 27 March 2013.

[179] The rate in the pound (sometimes called the ratepoundage) for England and Scotland, including the supplementary ratepoundage to fund small business relief, was 43.3p in 2011/12, 45.8p in 2012/13 and will be 47,1p in 2013/14. The equivalent numbers for Wales are 42.8p, 45.2p and 46.4p. For an introduction to how rates liabilities are calculated see: http://www.voa.gov.uk/corporate/Publications/businessRatesAnIntro.html

[180] We use the term rating lists to cover lists of RVs (in Northern Ireland the rateable value is called the net annual value or NAV). In England and Wales this list is called the Rating List. In Scotland it is called the Valuation Roll. For more information see http://www.2010.voa.gov.uk/rli/static/HelpPages/English/faqs/faq001-what_is_the_rating_list.html http://www.saa.gov.uk/valroll.html, and http://www.dfpni.gov.uk/lps/index/property_valuation/non-domestic_valuation/about_non-domestic_valuation.htm)

postponed until 2017.[181] RVs generally stay constant over the life of a rating list though a ratepayer may make appeals on the basis that there have been "material changes in circumstance" (MCCs). MCCs are defined under legislation and generally cover physical changes to the rateable assets in question: economic changes do not constitute valid grounds for claiming that there have been MCCs.

The allocation of cumulo costs to MPF and WLR services in the March 2012 Statement

A14.11 For the purposes of setting the 2012 charge controls, we used Openreach's estimate of actual cumulo rates costs for 2009/10 and 2010/11 as the basis for forecasting cumulo costs over the charge control period. We then allocated the cost of Openreach's cumulo rates to services according to the "Profit weighted net replacement cost" (PWNRC) method.

A14.12 The term 'profit' refers to the ROCE in each market and NRC is the depreciated replacement value of capital employed of the rateable assets. The PWNRC is then the product of the ROCE and the NRC for each rateable asset type in question. As ROCE is the ratio of profit to capital employed and NRC is a measure of capital employed, the product of the two is itself a measure of profit.

A14.13 We considered this to be more appropriate than alternative allocation approaches such as on the basis of net profit or by attempting to replicate the VOA's calculations. Cumulo rates are a tax on rateable assets rather than profit, and allocating on the basis of product profitability could lead to costs being allocated to a product which makes little or no use of rateable assets. Profits for individual products also tend to be volatile. Additionally, we considered that it was not possible to replicate the VOA's cash flow calculations at the level of individual services. The VOA was unable to offer advice on the allocation basis to use because the cumulo rates methodology was based on the use of aggregate figures.

A14.14 In the March 2012 Statement, we considered that rather than using current profitability, it would be more appropriate to allocate costs on the basis of profitability at the end of the control period when products could be expected to be earning their regulated returns.[182] We therefore considered that the cumulo allocation to WLR and LLU should be similar. This was because they should earn the same rate of return and involve little or no difference in usage of the rateable assets.

A14.15 We noted that BT could expect to receive rates rebates during the charge control period as a result of MCCs, but said that these would not affect the allocation of costs to MPF and WLR services. This was because the primary trigger for such rebates was a reduction in *downstream* revenues caused by increasing take up of MPF. However, BT later said in evidence to the CC that a proportion of such rebates would flow through to Openreach.[183] Below we consider whether this treatment remains appropriate for the new control.

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[181] For England this was announced in parliament in October 2012. See http://www.voa.gov.uk/corporate/News/2012/newsRelease_November_2012.html. It was announced in late November 2012 in Scotland and in March 2013 in Wales.

[182] Paragraph A4.86, Ofcom, "*Charge control review for LLU and WLR services*", 7 March 2012 http://stakeholders.ofcom.org.uk/binaries/consultations/wlr-cc-2011/statement/statementMarch12.pdf

[183] Paragraph 11.73 Competition Commission, British Sky Broadcasting Limited and TalkTalk Telecom Group Plc v Office of Communications, Case1192/3/3/12, Determination 27 March 2013

Appeals of the March 2012 Statement

A14.16 Both BT and Sky/TalkTalk appealed the cumulo rates allocation to MPF and WLR in the March 2012 Statement. BT alleged that Ofcom had used an incorrect figure for Openreach's cumulo bill, even though it had provided Ofcom with a corrected figure. The CC found in favour of BT but, as this was an error of fact, it has no implications for the methodology we use to allocate cumulo costs to MPF and WLR.[184]

A14.17 Sky/TALKTALK alleged that Ofcom erred in using the PWNRC method to allocate cumulo rates between different products. It argued that this method of allocating BT's cumulo rates costs to MPF and WLR services did not reflect cost causality and was not sufficiently simple or transparent. It said that the appropriate methodology for allocating such costs would be to seek to apply the principles of the aggregate calculation of BT's cumulo rates to individual products. It proposed an alternative methodology which it considered approximated this calculation.

A14.18 Over the course of the appeal process Sky and TalkTalk submitted a number of expert reports challenging Ofcom's treatment of cumulo rates within the charge control. These reports developed an alternative allocation basis that attempted to mimic the outline of the R&E methodology but at a product level – this was referred to as the "Proxy RV" method. The resulting allocations to WLR and particularly to MPF were significantly lower than those that emerged from Ofcom's modelling.

A14.19 The CC found that Ofcom did not err in allocating the costs of BT's cumulo rates. In particular, it found that:

- The PWNRC approach was, to a sufficient degree, consistent with cost causality;
- It was relatively easy to understand, logical, and not unduly reliant on confidential data.[185]

A14.20 By contrast, the alternative method proposed by Sky/TalkTalk gave results which could not be reconciled to the VOA's aggregate valuation and "did not offer a simple or transparent approach" in important respects.[186] The CC agreed with Ofcom that broadly equal allocations between LLU and WLR should be expected given the similarity of these products in their use of the rateable assets and their regulated returns. The CC also agreed with Ofcom that an allocation that was not primarily based on the products' use of assets could lead to counterintuitive results. Finally it considered that allocations should be stable. The method suggested by Sky/TalkTalk was therefore not suitable.

[184] Paragraph 3.64, Competition Commission, British Sky Broadcasting Limited and TalkTalk Telecom Group Plc v Office of Communications, Case1192/3/3/12, Determination 27 March 2013.
[185] Paragraphs 11.97 – 11.98 and 11.112, Competition Commission, British Sky Broadcasting Limited and TalkTalk Telecom Group Plc v Office of Communications, Case1192/3/3/12, Determination 27 March 2013. The CC noted some departure from the principles of the VOA's method but seems to have regarded this as inevitable given the impracticality of using the latter as an allocation methodology.
[186] Paragraph 11.106, Competition Commission, British Sky Broadcasting Limited and TalkTalk Telecom Group Plc v Office of Communications, Case1192/3/3/12, Determination 27 March 2013. See also paragraphs 11.114 – 11.115

Responses to the 2012 FAMR CFI

A14.21 We did not specifically ask for views on the treatment of cumulo costs in the 2012 FAMR CFI and only Sky and TalkTalk commented on cumulo issues in their responses. Whilst not making any further detailed proposals for how to allocate cumulo they made two points.[187]

A14.22 Firstly, they appear to remain of the view that cumulo costs should be allocated using profits. TalkTalk said:

> *"We consider that the allocation rules and costs that should be reviewed include the following:*
>
> - *Cumulo rates. The causality dynamic implicit in the VOA's calculation of cumulo rates is profit which means that the cumulo rates allocated to each product should be in proportion to the profit each generates. Instead, Ofcom have adopted BT's PWNRC (profit weighted net replacement costs) method that in no way reflects the causality implicit in the VOA's method".*

A14.23 The claim that Ofcom's approach did not reflect cost causality was according to the CC "the essence of Sky/TalkTalk's appeal".[188] The CC "did not accept Sky/TalkTalk's criticisms that Ofcom's approach was deficient in being insufficiently causal, simple or transparent".[189]

A14.24 In its response to the 2012 FAMR CFI TalkTalk has not provided any new evidence or reasoning in support of its view that profit should be used to allocate cumulo costs.

A14.25 Whilst we agree that profits are relevant to the VOA calculation, and they are reflected in the PWNRC method (as noted above), our view remains that allocations of cumulo costs using measures of actual product profitability may result in volatile and counter-intuitive allocations. By contrast, the PWNRC method is at least broadly consistent with the VOA's method and has other advantages which are set out above. That view is informed by Sky's and TalkTalk's previous submissions to us and to the CC's determination.[190]

A14.26 Following their submissions Sky and TalkTalk subsequently presented to us on issues surrounding the cumulo allocation. During that meeting they submitted that we should investigate the possibility of disaggregating the model used to set BT's RV to determine whether this could provide an alternative allocation basis. Sky and TalkTalk's expert witnesses had attempted to undertake this exercise for the purposes of the appeal. We note that the CC's determination stated that they had

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[187] Ofcom, Fixed access market reviews, wholesale local access, wholesale fixed analogue exchange lines, ISDN2 and ISDN30, CFI, 9 November 2012 http://stakeholders.ofcom.org.uk/binaries/consultations/fixed-access-markets/summary/condoc.pdf. Sky and TalkTalk's responses are at http://stakeholders.ofcom.org.uk/consultations/fixed-access-markets/?showResponses=true&pageNum=1#responses

[188] Paragraph 11.2, Competition Commission, British Sky Broadcasting Limited and TalkTalk Telecom Group Plc v Office of Communications, Case1192/3/3/12, Determination 27 March 2013.

[189] Paragraph 11.112, Competition Commission, British Sky Broadcasting Limited and TalkTalk Telecom Group Plc v Office of Communications, Case1192/3/3/12, Determination 27 March 2013.

[190] Paragraphs 11.112 – 11.116, Competition Commission, British Sky Broadcasting Limited and TalkTalk Telecom Group Plc v Office of Communications, Case1192/3/3/12, Determination 27 March 2013.

said that “a more complicated full receipts and expenditure calculation had proved impossible to replicate”. [191]

A14.27 We subsequently met the VOA to discuss the principles behind BT’s valuation model and whether it was possible to disaggregate the BT rating valuation model along the lines that Sky and TalkTalk had suggested.[192] The VOA’s view is that the BT valuation model was created for the specific purpose of informing a rating valuation. It was not constructed in such a way as to allocate costs between different services or asset types. The VOA confirmed that the calculations were generally done at an aggregate level and did not consider a disaggregation of the existing valuation model by product is possible.

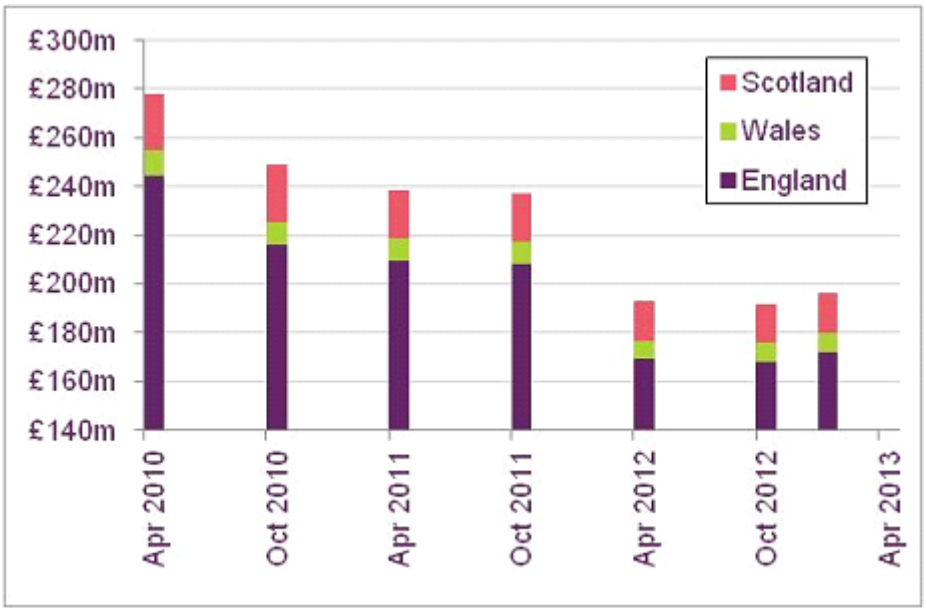
A14.28 In the light of the above, we propose to use the PWNRC method to allocate cumulo costs for the purposes of setting the MPF and WLR charge controls to apply from 1 April 2014. We continue to consider that the PWNRC method is consistent with cost causation, is readily understandable and transparent. We have also looked at the results obtained using this method to make sure that the allocation remains reasonable.

Current and forecast trends in BT’s cumulo bill

A14.29 BT’s RV in Great Britain has decreased in recent years from around £280m at the start of the current rating list (1 April 2010) to just under £200m currently. This is shown in the Figure 14.1 below[193]. (These exclude RVs relating to Northern Ireland. These NI RVs add around [3%][194] to the totals shown).

[191] Paragraph 11.32, Competition Commission, British Sky Broadcasting Limited and TalkTalk Telecom Group Plc v Office of Communications, Case1192/3/3/12, Determination 27 March 2013.
[192] Ofcom meeting with VOA: 16th May 2013
[193] These RVs have been extracted from the VOAs and Scottish Assessors’s websites. See for example: http://www.voa.gov.uk/rli/static/HelpPages/English/help/help153-central_rating_list.html. and http://www.saa.gov.uk/renfrewshire/search.php?SEARCHED=1&ST=advanced&SEARCH_TABLE=valuation_roll&TYPE_FLAG=C&STREET=&TPTLA=&POSTCODE=&ASSESSOR_ID=&CLASS=0020&FEFFECTIVE_DATE=&TEFFECTIVE_DATE=&MIN_RV=&MAX_RV=&AS_UARN=&DISPLAY_COUNT=100&x=5&y=9&ORDER_BY=SET+DESC&SEARCH_TERM=&PT=1&UARN=Z99655%2F0067&PPRN=67173845&ASSESSOR_IDX=12&DISPLAY_MODE=FULL_HISTORY#results
[194] Information on BT plc’s cumulo net annual values in Northern Ireland has been obtained from Land and Property Services division of the Department of Finance and Personnel, Northern Ireland (DFNPI),

Figure 14.1 BT plc rateable value since April 2010



A14.30 We understand from the VOA that most of these changes in RVs were associated with two main MCCs: (i) reductions as a result of increasing MPF volumes, offset by (ii) increases due to increasing NGA (fibre) connections. The latest changes in January 2013 increased BT's RV slightly.

A14.31 BT is able to challenge its cumulo rateable value by lodging appeals with the relevant rating valuation authority, for example the Central Valuation Officer in England and in Wales. There are several appeals outstanding with the Central Valuation Officer. We understand that the only appeal that has been finally settled is the April 2010 value and that all other Central Rating list changes remain under appeal. When these appeals are finally settled BT's RVs may change.

A14.32 Our calculations, using publicly available information, suggest that total BT cumulo liabilities will have decreased from just over £135m in 2010/11 to around £98m in 2012/13.[195] Stripping out the effect of increases due to NGA volumes reduces the 2012/13 liabilities from £98m to around £92m. [196]

A14.33 It is difficult to forecast BT's cumulo liabilities. Increasing MPF volumes have led to decreases in BT's RV and it is reasonable to assume that additional switching to MPF in future will cause BT's liability (for an all copper network) to continue to decrease over the period of the new charge control. However, we have not found a robust correlation between the changes to BT's rateable value and the number of MPF lines and so it is only possible to make relatively broad forecasts of BT's total cumulo liability. Using our base-case forecasts of MPF volumes and making assumptions about the loss in RV for each additional MPF line we estimate that total BT liabilities for the copper network might fall by 15-25% in nominal terms by 16/17 compared to around £92m in 2012/13.

[195] We have calculated these from published RVs and rates in the pound and included a small mark-up for Northern Ireland. BT's actual liabilities may differ from these as a result of movements in provisions and other one-off, non-ongoing costs such as rebates relating to previous rating lists.

[196] ✂ (http://www.voa.gov.uk/corporate/Publications/Manuals/RatingManual/RatingManualVolume5/sect873/toc.html)

The allocation of cumulo costs from 2014

A14.34 As noted above, MPF and WLR charges depend on how the cumulo bill is allocated as well as on the total liability. We believe the method used to allocate cumulo costs in the March 2012 Statement remains in large part appropriate for the new control. However, below we consider two issues concerning the allocation of BT's cumulo costs which were not addressed in detail when setting the last charge control or at the CC.

- The first issue concerns the treatment of incremental rates on BT's NGA assets. These were sufficiently small in 2010 to have a negligible impact on the cumulo bill, but NGA will become more important during the new charge control period.

- The second issue is the allocation of any reductions in liabilities as a result of increasing MPF volumes. The CC did not reach a view on the appropriate treatment of such reductions since it was able to conclude that Ofcom's method of allocation in the March 2012 Statement was superior to the alternative proposed by Sky/TalkTalk without doing so. However, as we explain below, MPF volumes are expected to increase over the new charge control period, which, under the current rating framework, will lead to lower liabilities for BT on its copper network. We have therefore reconsidered the treatment of these reductions, which we shall refer to as "rebates" [197] for the proposed control.

A14.35 BT allocates any incremental rates associated with NGA assets directly to NGA products and services.[198] These incremental liabilities are not included within the base year costs (2011/12) of our model for the WFAEL and WLA markets.[199] This is consistent with our modelling approach, which is of a copper only network.

A14.36 BT allocates reductions from MPF related MCCs on a similar PWNRC basis to the main pre-reduction liabilities but only across those rateable assets it classifies as part of its core network (i.e. not part of the access network in which MPF and WLR sit). The justification for this separate allocation base is that the loss of RV from increasing MPF (i.e. full unbundling of its exchanges) is due to losses in downstream activities – notably wholesale calls and wholesale broadband access. We have confirmed with the VOA that future changes to BT's RV aim to capture this effect, together with the valuation impact of any other relevant MCCs be they positive or negative in value terms.[200]

A14.37 BT's position on the implications of its approach to allocating rebates changed during the course of the appeal.[201] After making what it described as a correction, BT said that "a proportion of rebates arising from an increase in the number of MPF lines would flow through to Openreach services". However, this proportion is significantly below the proportion of cumulo costs before rebates which is allocated to Openreach. BT's allocations of cumulo costs to WLR and MPF rentals are largely

[197] BT may not receive rebates as a result of these reductions in liabilities from increasing MPF demand. Its RV may increase if these reductions are more than offset by increases in liabilities due to increasing NGA volumes or other material changes in circumstance.
[198] See BT's DAM, p55. The treatment of NGA is referred to in the description of the CUMNORM base.
[199] BT response to Q4 on cumulo rates in Ofcom's.S135 notice dated 18 March 2013.
[200] Ofcom meeting with VOA on 16 May 2013
[201] Paragraphs 11.108 – 11.109, Competition Commission, British Sky Broadcasting Limited and TalkTalk Telecom Group Plc v Office of Communications, Case1192/3/3/12, Determination 27 March 2013.

unaffected by reductions arising from MPF related MCCs[202]. The treatment of these rebates means that the Openreach proportion of overall liabilities increases over the life of the list. We comment further on this below.

A14.38 This approach will also lead to a discontinuity in the way BT's cumulo costs are allocated when there is a new rating list. In the first year of any new list the allocation will effectively revert to the main PWNRC allocation on all rateable assets.

A14.39 The increase in the number of MPF lines and the treatment of the associated rebates has led to Openreach's share of BT's non NGA cumulo liabilities increasing from 78% in 2010/11, to 84%[203] in 2011/12. Our estimates suggest that, if the allocation procedures are unchanged, this will increase to 92-94% in 2012/13 with further increases expected in future.

A14.40 We stated in Section 2 that it is usually efficient for charges to reflect forward-looking costs. We believe that, by considering forward-looking costs, we can obtain further insight into two key issues:

- the allocation between MPF and WLR; and
- the allocation between access products and the rest of BT and whether to take account of rebates and if so how.

A14.41 On the allocation between MPF and WLR, we believe that any allocation of cumulo costs should result in the per line charges for MPF and WLR being similar. Setting charges on this basis is consistent with the view that any difference in (forward-looking) usage of rateable assets between MPF and WLR is minimal. This would also be consistent with our proposal to align price differentials and incremental cost differentials. Setting charges in this way will give CPs an incentive to make the input choice (between MPF and WLR) which minimises overall costs and maximises efficiency.

A14.42 That leaves the allocation between access products and the rest of BT and the approach to rebates**.** We noted earlier that the last revaluation was carried out in 2010 and the next will now not take place until 2017. In the interim, BT's RV can only be changed if there have been MCCs. Migration from WLR to MPF is specifically identified as a "valid" MCC but, with this exception, increasing competition and reductions in asset values have no effect on BT's RV. This is because forward-looking views of these were reflected in BT's original 2010 RV. Given this, BT's cumulo rates bill can be viewed as a fixed cost that is not related to BT's current output or the size of the access network over the period covered by the charge control. One way to approach this issue would then be to consider how to recover this fixed cost in the least distortionary way.

A14.43 In theory, the most efficient way to recover a fixed cost is by means of Ramsey pricing. As described in Section 2, applying the Ramsey principle would mean that the allocation of cumulo costs between access services (on the one hand) and other BT services would be inversely related to their price elasticties of demand.[204] As we

[202] BT response to Q4 on cumulo rates in Ofcom's S135 notice dated 18 March 2013
[203] BT response to Q4 on cumulo rates in Ofcom's S135 notice dated 18 March 2013. BT responses to Q5-7 on cumulo rates in Ofcom's S135 notice dated 17 April 2013.
[204] Ramsey pricing is not relevant to the allocation of cumulo costs between MPF and WLR since these are substitute services, either of which can be used to provide the same downstream services. The main concern here is therefore with productive rather than allocative efficiency. In these

also noted in Section 2, it is it is typically impractical to set prices on this basis, although the Ramsey pricing principle can still be informative. Demand for basic access services is likely to be relatively insensitive to price changes and, because such services also account for a significant share of BT's total asset base, it is to be expected that access services will bear a significant share of cumulo cost. However, it is much less likely that applying efficient pricing principles should lead to a sharply rising share of cumulo costs being allocated to Openreach, especially as it starts from an already high level. Further increases above the 2012/13 level could mean that the share allocated to Openreach would approach 100%, which we do not consider likely to be appropriate.

A14.44 Whilst between revaluations it may be appropriate to regard cumulo costs as fixed, in the longer run cumulo rates can be considered as part of the forward-looking incremental costs of an access line. In the long-run, after the next revaluation, the rates bill will change as a result of revised views about future cash flows in conjunction with changes to the size of BT's network – both the access and the core parts of network. Viewed in this light current or projected values seem more relevant than historic ones and using these would also avoid the discontinuity problem which arises when a new rating list is produced, which we described above. In the case of an expansion in the total number of access lines for example, we would expect the incremental effect on BT's cumulo bill to be related to the additional assets employed and the expected return on them. We therefore consider that the PWNRC method, combined with a forward-looking view of BT's RV, is in principle consistent with an efficient allocation of cumulo costs.

A14.45 If, in principle, we are trying to identify forward-looking cumulo costs in the final year of the control, then the most consistent approach is to assess this cost after any rebates granted for that year (even if they are actually paid later). This is because rebates are given to compensate for an overstatement of the rate base in a relevant year, as a way of allowing for the effect of MCC's on the rate base between the last valuation and the relevant year.[205] However, the VOA only calculates the rates bill and the rebates at the level of BT as a whole. As it is unlikely to be possible to forecast rebates accurately, a less complex method is needed to arrive at final year costs.

Our proposed approach

A14.46 The cost model used for the purpose of setting the current charge controls is based on the use of BT's components as set out in its RFS. The cost of each component embeds the cumulo liabilities allocated to that component for the year in question.

A14.47 The cumulo costs projected to be recovered over the control period are therefore a function of the base year costs allocated to components in the cost model. Provided cumulo costs are included at an appropriate level in the component costs in the base year, the cost model will then generate an appropriate set of forecasts for the charge control period.

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circumstances, productive efficiency is promoted by setting the charge differential equal to the LRIC differential and recovering similar amounts of common costs from each service.

[205] In evidence to the CC, BT also described rebates as "alterations to the rateable value". See paragraph 3.43, Competition Commission, British Sky Broadcasting Limited and TalkTalk Telecom Group Plc v Office of Communications, Case1192/3/3/12, Determination 27 March 2013.

A14.48 The 2011/12 allocations within the RFS to WLR and MPF are £3.31[206] and £3.16[207] per line respectively, which implies WLR contributing £0.15 more per line to cumulo costs (i.e. less than 5%). This is consistent with our view that MPF and WLR should make similar contributions to the recovery of common costs when price differentials are set to equal LRIC differentials.

A14.49 We have sought to investigate whether the base year allocation is broadly reasonable by means of a simple calculation using PWNRC at the market level, with MPF and WLR ROCEs set equal to the cost of capital. As we are proposing to set the new charge controls so that, on a forecast basis, BT only earns its cost of capital in the final year of the control, a version of PWNRC can be generated by multiplying asset values by the relevant cost of capital.

A14.50 Our proposed approach therefore is to calculate an allocation for the WFAEL and WLA markets by computing their share of PWNRCs for landlord (rateable) assets similar to the BT calculation but undertaken at a market level and using the appropriate cost of capital. For example, the allocation to the WFAEL and WLA markets is the WFAEL and WLA WACC x NRC (of WFAEL and WLR) divided by the sum of similar calculations (WACC x NRC) for all wholesale markets. We use this as a cross-check on the base year allocation[208].

A14.51 This calculation results in shares for the WFAEL and WLA markets of around 68% compared to the 74%[209] that emerges from the current BT allocations. Given the degree of uncertainty over future cumulo costs, this cross-check provides a reasonable assurance that the base year allocation is at an appropriate level.

A14.52 As noted above, net cumulo costs (after the application of rebates secured from appeals to the VOA) are embedded in the costs of the components within the base year of the cost model. The cost forecasting approach therefore projects cumulo costs forward using the cost volume elasticities and estimates of efficiency and input price inflation in the model. The combined effect of these is projected to reduce the overall cost of components and hence the cumulo costs borne by the regulated services over the period to 2016/17. This approach is more likely to keep the proportion of the cumulo bill allocated to MPF and WLR services stable through time, and consistent in the long-run with changes in total line volumes, than the increasing allocation over time that we might expect to see from the continued use of BT's allocation method.

A14.53 Given the uncertainties noted above and the cross-checks we have undertaken, we propose not to make any adjustments to the base year (2011/12) allocation of cumulo costs in the cost model. The advantages of this simple approach are:

- it will continue to allocate a similar amount of cumulo cost to each of WLR and MPF. As we noted above we believe this is a desirable outcome of any allocation procedure; and

[206] BT response to Q4 on cumulo rates in Ofcom's S135 notice dated 18 March 2013. Product volumes from BT response to Q3 in Ofcom's S135 notice dated 8 February 2013.
[207] BT response to Q4 on cumulo rates in Ofcom's S135 notice dated 18 March 2013. Product volumes from BT response to Q3 in Ofcom's S135 notice dated 8 February 2013.
[208] We have used the following pre-tax WACCs: 8.8% for Access markets, 9.9% for the rest of BT. We have extracted estimates of Net Replacement Costs from p.25 of BT's 2011/12 RFS and have defined rateable assets as comprising Land and Buildings, Access-Copper, Access- Fibre and Access –Duct.
[209] The 74% give here is lower than the 84% given in paragraph A14.29 as the latter includes other Openreach supplied products, for example AISBO services.

- the amount of cumulo costs which is recovered from the regulated access services will follow an appropriate time path and be consistent with the regulated services earning their cost of capital over the control period.

Question A14.1: *Do you agree with our proposed approach to the treatment of BT's cumulo costs in the calculation of regulated charges for WLR and MPF? If not please explain why and tell us how you would propose to treat these costs and outline the calculations that would be involved.*

Annex 15

Cost of capital

Introduction

A15.1 In this Annex, we set out our proposed estimate for BT's weighted average cost of capital (WACC). This is to be used in the charge controls we have proposed in this consultation in respect of WLR and LLU services.

A15.2 We estimate and apply a different WACC for different parts of BT because the different parts of BT have different systematic risk profiles. We estimate the WACC for BT Group plc (BT Group), this is then split into the following:

- a WACC for the copper access network assets and services operated by Openreach (which we refer to as "Openreach"[210]); and
- a WACC for the rest of BT, which is not covered by the Openreach WACC (i.e. the Rest of BT).

A15.3 The WACC is important for setting charge controls, particularly as it makes up a significant proportion of the cost of most regulated telecommunications services. It is also particularly important to investors to provide them with a reasonable expectation that they can recover their investment including the opportunity cost of capital employed.

A15.4 This means, in turn, that we attach weight to the objective of promoting regulatory predictability by ensuring a consistent regulatory approach over appropriate periods, provided that we are satisfied that the circumstances of a specific case do not warrant us taking a different approach.

Our proposals

A15.5 For this consultation, we propose to use a base case pre-tax nominal WACC for Openreach of 8.8%. This is consistent with the WACC estimated in the 2013 Business Connectivity Market Review Statement (2013 BCMR Statement)[211], published in March 2013. However, in recognition that certain parameters of the WACC could change between now and our final statement for these market reviews, in our sensitivity analysis we have used a range for the pre-tax nominal WACC for Openreach of 7.8% to 9.8% (see Section 6 of this Consultation).

A15.6 The estimates of the WACC for BT Group, Openreach and the Rest of BT are shown in Table A15.1 below.

[210] For consistency with previous Ofcom consultations and statements we continue to refer to the WACC applicable to the copper access network as "Openreach". We note that the Openreach business includes assets and services which are not part of the copper access network covered by LLU and WLR. The services which sit outside the copper access network (such as WBA and NGA) are not included in our estimate of the Openreach WACC.

[211] Annex 14 of http://stakeholders.ofcom.org.uk/binaries/consultations/business-connectivity/statement/annexes8-17.pdf .

Table A15.1: Estimate of BT WACC, March 2013

	Openreach	BT Group	Rest of BT
Real risk-free rate	1.3%	1.3%	1.3%
Inflation	2.8%	2.8%	2.8%
Nominal risk-free rate	4.1%	4.1%	4.1%
Equity beta (mid-point)	0.90	1.01	1.13
Asset beta (mid-point)	0.60	0.67	0.74
ERP	5%	5%	5%
Gearing	40%	40%	40%
Debt premium	1.7%	1.7 – 2.3%	2.3%
Debt beta	0.15	0.15	0.15
Tax rate	20%	20%	20%
Pre-tax real WACC	5.9%	6.4%	6.9%
Pre-tax nominal WACC	8.8%	9.3%	9.9%

A15.7 Note that the inflation forecast used in March 2013 is RPI inflation, and the "real" WACC reported is the nominal WACC deflated by RPI.

A15.8 In 2013 BCMR Statement, we stated that whilst we used our known and understood methodology in order to estimate the WACC for that charge control, we intended to undertake a wider review of our methodology in the consultation for LLU and WLR services.

A15.9 We also expressed our intention to perform a wider review of our approach as part of the proposed charge controls in the 2012 FAMR CFI. Most respondents did not comment on our approach to the WACC.

A15.10 BT noted Ofcom's intention to review its methodology and re-evaluate the parameters for calculating BT's WACC. It stated that it was logical to consider these as part of the market review. However, BT expressed concerns that:

> "...any potential for the value of WACC to change significantly from one charge control to another risks sending the wrong signals to the market, especially at a time when we are midway through a significant investment programme ..."[212]

A15.11 BT also quotes the CC's comment in its 2009 LLU and WLR Determination which stated that:

> "...in industries with long-lived assets regulators should take a long-term view of the cost of capital and adjust components only when they believe there has been a permanent shift in the pricing of risk".[213]

A15.12 Sky and TalkTalk jointly commissioned Europe Economics to produce a report on aspects of the cost of capital methodology in response to our 2012 FAMR CFI.

A15.13 The Europe Economics report covers our general approach (i.e. our use of the capital asset pricing model Capital Asset Pricing Model (CAPM) and also some

[212] Pages 27-28, BT, *Response to the November 2012 CFI*, January 2013, http://stakeholders.ofcom.org.uk/binaries/consultations/fixed-access-markets/responses/BT.pdf.
[213] Paragraph 2.368 CC Final Determination, CPW v. Ofcom, Case 1111/3/3/09.

specific aspects of our WACC estimation. These include options for additional data sources and cross-checks. They set out some areas where they agree with our approach, for example, estimating a separate debt premium for the copper access network and the Rest of BT. Europe Economics also suggests areas where we should focus our attention in this consultation, including our approach to disaggregation. However, we note that Europe Economics does not suggest that any significant changes should be made to our overall approach to estimating the cost of capital.

A15.14 We address any specific concerns or comments made in relation to our estimates of individual parameters of the WACC in response to the 2012 FAMR CFI in the relevant sub-sections below.

A15.15 In this Consultation, we are seeking stakeholder comments on both our general approach and our approach to specific parameters. Given the broad consensus on our general approach to estimating the WACC and the risks identified by BT with making significant changes from one charge control to the next – which echoes a similar point made by the CC in 2009 – we have taken as our starting point the approach as set out in the 2013 BCMR Statement. We have then considered whether our conclusions in the 2013 BCMR Statement remain appropriate. In light of this review and for the reasons set out in this section, for the purposes of this consultation, we propose to use a WACC estimate consistent with that estimated for the 2013 BCMR Statement.

A15.16 We propose to review the individual parameters of the WACC prior to setting the LLU and WLR charge controls and will update our estimate of the WACC for the Statement where this is appropriate.

Overview of Ofcom's methodology

Regulatory background

A15.17 Companies have two basic ways of obtaining funding, either through debt or through equity. By knowing the proportion of each type of funding, and estimating the cost of each, we can estimate the cost of capital as weighted between the two forms of funding.

A15.18 The model we have consistently used for estimating the cost of equity is the CAPM, which the Competition Commission found to be the most robust way for a regulator to measure the returns required by shareholders.[214]

A15.19 In its simplest form, the weighted average cost of capital for a firm is derived as follows:

$$WACC = Ke * (1 - g) + Kd * g$$

- Where Ke = the cost of equity which is given by reference to the risk-free rate (Rf), the expected return on a basket of equities (the equity risk premium, or ERP) and the perceived riskiness of the asset in question (β) such that:

$$Ke = Rf + ERP * \beta;$$

[214] Paragraph 19, Page N4, Competition Commission, *Bristol Water plc: A reference under section 12(3)(a) of the Water Industry Act 1991*, 4 August 2010.

- Kd = the cost of debt, which is given by reference to the risk-free rate and the debt premium of the firm, dp, such that:

$$Kd = Rf + dp$$

- and g = gearing, which is defined as net debt divided by enterprise value. Enterprise value is defined as net debt plus market capitalisation.

A15.20 In addition to the equations set out above, we need to take into account the relative tax treatment of debt and equity, and define a WACC that can be applied at a pre-tax level.

A15.21 When we set charge controls for BT Group, we estimate the return that investors require on their invested capital by multiplying the estimated WACC by the asset base (as valued net of accumulated depreciation).

A15.22 In this charge control, we are estimating the cost of capital for a 3 year charge control period. The methodology that we use to calculate such charge controls typically means that we estimate the efficiently-incurred costs in the final year of the control, and then calculate a glide path towards that level of costs in the first and second years of the control.

A15.23 In this Annex we set out calculations that are relevant for the period April 2016 to March 2017. This is the final year of the proposed charge controls for LLU and WLR services.

A15.24 We note that our approach to the WACC has been appealed on a number of occasions. Most recently, two aspects of the WACC estimate in the 2011 WBA Charge Control Statement were appealed. BT appealed our approach to gearing and embedded debt. The CC found that Ofcom did not err in either of these aspects. We discuss these in more detail below in paragraphs A15.81-2 and A15.65 respectively.

Responses to 2012 FAMR CFI

A15.25 As noted above, we received two responses to the 2012 FAMR CFI which commented on our approach to the WACC, from BT[215] and from Europe Economics[216], in a report commissioned by Sky and TalkTalk.

A15.26 In this sub-section we discuss comments on whether our overall methodology of using CAPM is the most appropriate method to estimate the cost of capital for the purposes of this charge control.

A15.27 Europe Economics stated that:

> "In our view CAPM remains appropriate as the main method for regulatory cost of capital determination for several reasons, including an intuitive theoretical base enabling discussion by non-technical

[215] BT, *Response to the November 2012 CFI*, January 2013, http://stakeholders.ofcom.org.uk/binaries/consultations/fixed-access-markets/responses/BT.pdf.
[216] Europe Economics *Methodological issues regarding BT's WACC Determination,* 28 January 2013. Available at: http://stakeholders.ofcom.org.uk/consultations/fixed-access-markets/?showResponses=true

> stakeholders, its track record in past regulatory determinations and the lack of viable alternatives".[217]

A15.28 Europe Economics discusses a number of alternative or complementary models including the Fama and French three factor model, the Dividend Growth Model and the Residual Income Model and the Third Moment CAPM. However, Europe Economics concludes that CAPM should be the main approach, with the third moment CAPM being used to inform the point estimate within the CAPM range.

Ofcom's analysis and assessment of responses

A15.29 We agree with Europe Economics that the CAPM is the most appropriate method for estimating the cost of equity in regulatory determinations. In addition, we place weight on consistency in our approach to estimating the WACC over time.

A15.30 We note that the CC has previously found CAPM be the most robust way for a regulator to measure the returns required by shareholders. In its Bristol Water Determination in September 2010, the CC said the following:

> "In our 2007 report on Heathrow and Gatwick, we looked at alternatives to CAPM and found that:
>
> (a) CAPM remains the tool with the strongest theoretical underpinnings;
>
> (b) it is not at all clear from the academic literature that other models have better predictive power, particularly when applied to UK companies; and
>
> (c) none of the alternative models helps to overcome the problems that CAPM has in dealing with limited market data.
>
> We believe that these points remain valid. Hence, we also continue to believe that although the CAPM has its limitations, it is the most robust way for a regulator to measure the returns required by shareholders. Moreover, we have placed considerable weight on the CAPM in previous regulatory inquiries and we see benefits in consistency".[218]

A15.31 As a result of the above analysis, and the broad support from stakeholders, we propose to continue using CAPM to estimate the cost of capital. Whilst we note that CAPM has limitations, we consider that it remains the most appropriate method for estimating the cost of capital for regulatory purposes. This is consistent with the approach taken by other UK regulators and supported by the CC.

A15.32 Europe Economics suggests using the third moment CAPM to inform any point estimate of the WACC from an overall range. The third moment CAPM attempts to adjust the WACC for skewness (i.e. the third moment of the distribution of equity returns). Skewness measures the extent of asymmetry in the distribution of returns. Positive skewness arises when "upside" risk is greater than the "downside" risk.

[217] Paragraph 2.1, Page 6, Europe Economics *Methodological issues regarding BT's WACC Determination,* 28 January 2013.
[218] Paragraph 19, Page N4, Competition Commission, *Bristol Water plc: A reference under section 12(3)(a) of the Water Industry Act 1991*, 4 August 2010.

A15.33 Academic literature suggests that it may be appropriate to make an adjustment for skewness. In practice this means an increase to the cost of equity when there is greater downside than upside risk and vice versa a reduction in the cost of equity when there is more upside than downside risk.

A15.34 Europe Economics cites the following examples of risk for regulated companies:

- downside risk where the entity is subject to material capacity constraints which means any potential upside is restricted by both a price-cap and capacity constraint; or

- upside risk: where technological or innovative opportunities create "blockbuster" opportunities for upside tail risk which would provide upside risk.

A15.35 Europe Economics considers the application of the two types of risk to Openreach [✂].

A15.36 [✂] we do not consider that either of these examples would necessarily apply to Openreach. Although Openreach is subject to price-cap regulation of many services delivered over the copper access network, we do not believe that it is subject to material capacity constraints. For example, it is anticipated that projected demand over the control period can be readily accommodated and even if this were to require additional investment (which would be captured via the AVEs and CVEs in the Cost Model), we are not aware of any constraints that would restrict the ability to meet the extra demand. Nor do we consider that there are significant blockbuster opportunities associated with the copper access services delivered by Openreach. Even if innovative services delivered over the copper access network might be considered blockbusters, the additional value of these services should be reflected in the pricing of those incremental or downstream services to the copper access network, not the wholesale charges for WLR and LLU. Innovative services might include new voice and/or broadband services.

A15.37 We therefore do not think that there would be any material impact on the Openreach cost of capital as a result of positive skewness, which would warrant a reduction in the cost of equity.

Proposals

A15.38 We propose to continue to use CAPM to estimate the WACC for BT Group which relies only on the mean, variance and covariance of the distribution of returns, not higher moments (such as skewness).

Real risk-free rate

Regulatory background

A15.39 The risk-free rate influences both the cost of equity and the cost of debt. It is also a very useful reference point to assess required rates of return against (as we do from paragraph 15.130 below).

A15.40 We need to be mindful that this charge control is for a 3 year period, and therefore our estimate of the WACC needs to be relevant for that period, and in particular for the final year of the charge control (2016/17), which is the year in which we estimate BT's costs.

A15.41 Our approach is to estimate a WACC that is based on historic and current data, but which should be relevant for the period covered by the control.

A15.42 In previous estimates of the WACC we have estimated the real risk-free rate by reference to:

- historical averages of indexed linked gilts;
- current spot rates on indexed linked gilts;
- forward rates on indexed linked gilts; and
- regulatory decisions made by other regulators and/or the CC.

A15.43 In the 2013 BCMR Statement, we noted that historical averages of indexed linked gilts continued to be negative over short averaging periods (e.g. up to two years) and low over longer averaging periods. We noted that the observed yields and forward rates had continued to fall since the previous estimate of the risk-free rate in the 2011 WBA Charge Control Statement.

A15.44 We explained that we believed that a degree of caution was required when interpreting the data. This is because of the high level of uncertainty which has persisted. In addition, we noted that the effects of quantitative easing and a flight to safety still remained. We also noted that the purpose of the charge controls for leased lines services was to set prices for 2015/16, therefore our forecast real risk-free rate is one which should remain appropriate for the end of that charge control period.

A15.45 In the 2013 BCMR Statement we reduced our estimate of the real risk-free rate from 1.4% to 1.3% to reflect the fact that observed data which we use to inform our estimate of the real risk-free rate had continued to fall.

A15.46 In estimating the appropriate reduction to the real risk-free rate, we also considered the implications on the equity risk premium (ERP). We explained that if we believed that the risk-free rate had fallen because equities had become more risky or because investors were becoming more risk averse, then we would expect an increase in the ERP to reflect this. [219]

A15.47 We considered that there is a relationship between the risk-free rate and the ERP, however we found no evidence to support an increase in the ERP and we were therefore reluctant to make any significant change to the real risk-free rate.

Responses to 2012 FAMR CFI

A15.48 Europe Economics suggests that we should consider the risk-free rate and the ERP as parts of a total market return. It argued that total market returns can be estimated by reference to macro-economic forecasts, which seemed to suggest that the total market return may have declined.

[219] For example, if equities are considered to be riskier than previously, investors may require a greater premium to compensate them for this risk. At the same time, there may be a substitution effect whereby investors reduce their holding in risky equities and increase their holding in lower risk assets (such as government bonds), the increased demand in government bonds may result in a reduction in the risk-free rate.

A15.49 Europe Economics therefore suggests that we should consider to what extent prevailing conditions can credibly be described as temporary or whether we are in a 'new normal' period of extended slump which could cover the period of the charge control.

A15.50 Consistent with this, Europe Economics suggests estimating the risk-free rate by reference to estimates of the sustainable growth rate in the economy. It presents a time series from 1985 to 2001 to demonstrate the correlation of the risk-free rate with the growth in quarterly GDP and notes that if we had reliable estimates of the growth in potential output for the next ten years, we could use these to estimate the risk-free rate.

A15.51 Finally, Europe Economics asks for greater transparency around how Ofcom arrives at an estimate of the risk-free rate, given that recent estimates are higher than the prevailing spot rates and short term historic averages.

Ofcom's analysis and assessment of responses

A15.52 The estimate of the real risk-free rate in the 2013 BCMR Statement of 1.3% was based on movements in historical averages of yields on RPI indexed-linked gilts to March 2013. We have updated our analysis to take account of data to June 2013 and note that whilst the spot rate remains broadly similar to the estimate at 6 December 2012, used in the 2013 BCMR Statement, longer term averages have continued to fall slightly as negative yields on indexed linked gilts have persisted.

Table 15.2: Yields on indexed linked gilts estimated in December 2012

Averaging period[220]	5 year gilt %	10 year gilt %
6 December 2012	-1.4	-0.7
1 Month	-1.4	-0.6
3 Months	-1.4	-0.6
1 Year	-1.0	-0.2
2 Years	-0.7	0.1
5 Years	0.2	0.6
10 Years	1.0	1.2

Source: Bank of England, Ofcom analysis.

[220] The percentages shown in Table A15.2 and A15.3 are the spot yield on a 5 year and 10 year gilt, averaged over the period in column 1. This means that where the averaging period is described as a single date, this is the spot rate observed on that date. Where the averaging period is longer e.g. 1 month, the yield is an average of the spot rates observed over the 1 month prior to the date of the calculation (i.e. for the 6th December estimate this is the 1 month from 7th November 2012 to 6th December 2013.)

Table A15.3: Yields on indexed linked gilts estimated in June 2013

Averaging period	5 year gilt %	10 year gilt %
24 June 2013	-1.4	-0.6
1 Month	-1.6	-0.8
3 Months	-2.0	-1.1
1 Year	-1.7	-0.8
2 Years	-1.5	-0.6
5 Years	-0.2	0.4
10 Years	0.8	1.0

Source: Bank of England, Ofcom analysis.

A15.53 As shown in Table A15.3 above, the downward trend in rates has continued, however the longer term rates are not materially different to those estimated in December 2012. We therefore consider that the rate of 1.3% estimated for the 2013 BCMR Statement remains reasonable for the purposes of this Consultation, although we propose to update our analysis for the purposes of the Statement.

A15.54 We continue to believe that there is a link between the ERP and the risk-free rate. The CC noted the interaction between the ERP and the risk-free rate, in the Mobile Call Termination appeal in 2011, in response to an argument by Dr Hird that Ofcom had not reflected the tendency of the risk-free rate (RFR) to fall during a crisis, at the same time as the tendency of the ERP to increase. The CC noted that Ofcom did not err in this regard as:

> "Ofcom was mindful of the tendency of the RFR and ERP to move in opposite directions". [221]

A15.55 We accept Europe Economics' suggestion that there may have been a step change in total market return which could explain a situation where the risk-free rate fell without a concurrent increase in the ERP. Europe Economics justifies this by referring to recent downgrades in macro-economic forecasts. However, we are cautious about placing too much weight on short term economic forecasts which are subject to fluctuations in themselves.

A15.56 Europe Economics suggests that an alternative way to estimate the risk-free rate is by reference to the growth rate in the economy, or at least the forecast growth rate. This is an interesting suggestion, and one in which we would be interested in stakeholder views. However, one concern with the approach is that it involves forecasting one uncertain and inherently unobservable variable (the real risk-free rate) with another uncertain, but more readily quantifiable, variable (the rate of economic growth). For this reason, we would prefer to place more weight on evidence from observed yields on indexed linked gilts and by using forward rates on indexed linked gilts.

[221] Paragraph 3.915, page 3-156, Competition Commission, *Determination: Everything Everywhere Limited v Office of Communications Case 1181/3/3/11*, 9 February 2012.

A15.57 Nevertheless, consideration of the forecast rate of growth of GDP may provide a useful sense check on the expected direction of change for the real risk-free rate. In so far as there might be a stable relationship between GDP growth and the real risk-free rate, it seems that the average of independent forecasts compiled by HM Treasury points not only to positive GDP growth over the control period, but to a small increase in the rate of growth in GDP over this period.[222] This suggests that going forward, the real risk-free rate may not be as close to zero as implied by consideration of recent yields on index linked gilts alone would imply.

A15.58 Europe Economics argues that Ofcom should provide more detailed explanation as to how it has arrived at the estimate of the risk-free rate, given the prevailing data is so low. We think that, given the current market conditions, we should exercise regulatory judgement to balance observed data about past or future conditions, with the need to estimate a rate which is appropriate for estimating costs in 2016/17.

A15.59 We continue to believe that it is appropriate to exercise caution when interpreting data which may be distorted by current market conditions, for example, the impact of quantitative easing. However there is no consensus on the impacts of such policy actions. In estimating the WACC, we take account of a range of data sources and in particular consider movements in the trend to assist us in exercising our regulatory judgement.

Proposals

A15.60 We propose to continue to estimate the WACC using historical averages of the yields on indexed linked gilts and estimates of forward yields.

Debt Premium

Regulatory background

A15.61 In estimating BT's cost of debt we require two inputs.

- the risk-free rate; and
- BT's debt premium.

A15.62 We set out our views on the risk-free rate in paragraphs A15.39 - A15.60 above.

A15.63 In the past we have estimated the debt premium based on observed yields on BT's Sterling denominated debt, over and above benchmark gilt yields. In recent charge controls, we have used BT's 2016 GBP bond for the purpose of estimating the debt premium for BT Group.

A15.64 When estimating the cost of debt, we consider that BT's current estimate of debt is a good proxy for the efficiently incurred forward looking cost of debt to be included in the WACC estimate. This means that we do not include an adjustment for

[222] See p.18 of *HM Treasury Forecasts for the UK economy: a comparison of independent forecasts*, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/199018/201305_-_Forecasts_for_the_UK_economy.pdf. GDP growth is projected to increase from 0.8% in 2013 to 2.2% by 2017. Other forecasts such as the Office of Budget Responsibility also point to positive and increasing GDP growth over the control period, from 0.6% in 2013 to 2.8% in 2017 (see Table M1 of https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/199018/201305_-_Forecasts_for_the_UK_economy.pdf).

embedded debt (the payments that BT has committed to make on debt issued in the past). We explained our reasons for this in the 2011 WBA Charge Control Statement:

> "We note that our normal approach to setting regulated charges involves a forecast of the costs of providing a service. Where costs need to be estimated, the risks of under-recovery sit with BT and the rewards of over-recovery accrue to BT. We would not seek to claw-back any previous over recovery which BT received. In the same regard, we do not consider it appropriate to include the costs associated with historic debt. Under this approach, it may be the case that costs turn out to be higher or lower than expected. In a new price control period, new information may inform the latest set of assumptions and forecasts, however, we do not take "retrospective" action".[223]

A15.65 BT appealed this aspect of the 2011 WBA Charge Control Statement, however, the CC found that Ofcom did not err in its approach to estimating the cost of debt:

> "...we have found that Ofcom did not err for the reasons that BT alleged and that the incorporation of the embedded debt premium would not be a better regulatory practice for Ofcom than its current approach, as alleged by BT".[224]

Responses to 2012 FAMR CFI

A15.66 Europe Economics notes that, in the 2012 WBA determination, the CC found that Ofcom did not err in its approach to estimating the cost of debt. In particular, it argues that the use of embedded debt adjustments is incompatible with regulation which aims to mimic the constraints on pricing that would be provided in a competitive or contestable market.

Ofcom's analysis and assessment of responses

A15.67 We propose to estimate the cost of debt for BT based on the cost of new debt. This is consistent with our previous approach, explained in the 2011 WBA Charge Control Statement.

A15.68 We have updated our analysis of BT's Sterling denominated debt and consider that the evidence to March 2013 (consistent with our beta estimation period) shows that the spread of yields on BT Group debt has not changed significantly from that estimated for the 2013 BCMR Statement.

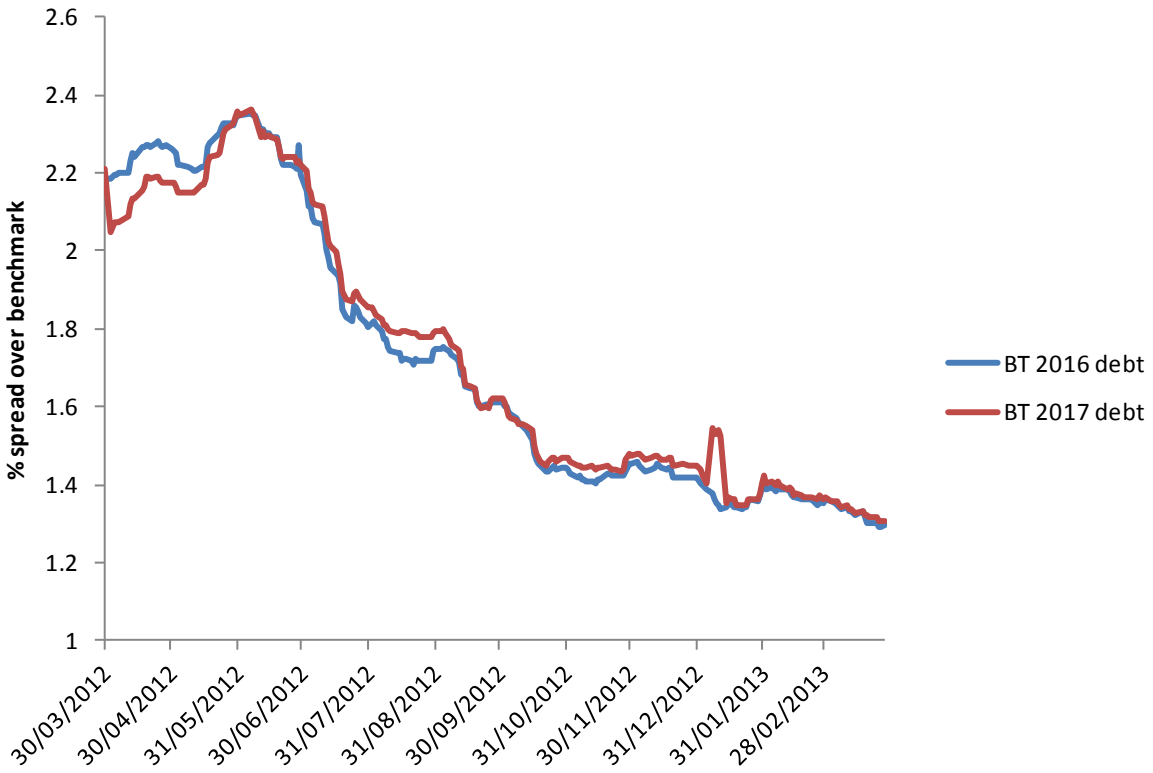
A15.69 In arriving at the estimate of 1.7-2.3% in the 2013 BCMR Statement, we took into account the average spread of BT's 2016 gilts over the benchmark gilt yield over the 12 months prior to December 2012 as well as the downward trend to December 2012. The debt premium range used in that statement was higher than the latest

[223] Paragraph 6.70, Ofcom, *WBA Charge Control, Charge Control framework for WBA Market 1 Services*, Statement, 20 July 2011.
http://stakeholders.ofcom.org.uk/binaries/consultations/823069/statement/statement.pdf
[224] Paragraph 2.238 Competition Commission, *British Telecommunications plc v Office of Communications supported by British Sky Broadcasting Limited TalkTalk Telecom Group plc Case 1187/3/3/11,* 11 June 2011.
http://www.catribunal.org.uk/237-7278/1187-3-3-11-British-Telecommunications-plc-Wholesale-Broadband-Access-Charge-Control.html

observed spreads at the time of the 2013 BCMR Statement (i.e. around December 2012), as we considered that we should also place weight on the historical values of the spread of BT's gilts over benchmark yields (see Figure A15.1 below).

A15.70 Although the data to March 2013 shows a continued fall, this has been more gradual when compared to the sharp fall observed in the period prior to December 2012. The average premium on BT's 2017 debt over the 12 months to March 2013 is within the range estimated in the 2013 BCMR Statement.

Figure A15.1: Spread of BT's 2016 and 2017 Sterling denominated debt over benchmark yields



Source: Bloomberg, Ofcom analysis

A15.71 We continue to estimate a separate debt premium for the copper access network and the Rest of BT, as discussed from paragraph A15.210 below.

Proposals

A15.72 We propose to continue to estimate the debt premium for BT Group by reference to the historic yields on BT's s denominated bonds. For this consultation, we consider that focussing on BT's debt which matures in 2016 and 2017 is appropriate.

A15.73 We propose to maintain the range estimated in the 2013 BCMR Statement which considered data to December 2012. Having updated the yields to March 2013, we note that the reduction in yields observed in December 2012 has persisted, with recent yields now slightly lower than in December 2012. However, as noted above, the average yield on BT's debt over the 12 months to March 2013 remains within the range estimated in the 2013 BCMR Statement.

A15.74 We therefore propose to maintain a range for BT's debt premium of 1.7%-2.3%. We will update our analysis for the Statement and will take into account recent movements in BT's debt premium.[225]

Gearing

Regulatory background

A15.75 Debt funding has a lower cost than equity, because debt is less risky. However, companies need to balance debt and equity financing, since, as the debt level increases, the returns to shareholders become more volatile which will increase the risk (and hence cost) of equity financing.[226] However, debt funding is also more tax-efficient than equity funding. So a higher gearing tends to slightly lower the WACC.

A15.76 Within the framework of the CAPM, gearing is the way we measure the level of debt funding. It is defined as a company's net debt divided by its enterprise value, where the enterprise value is the sum of the net debt and the market capitalisation.

A15.77 We use gearing within the WACC calculation for three purposes:

- in the WACC calculation in paragraph A15.19 as the weight of debt and equity;
- when de-levering the equity beta to arrive at an asset beta for BT Group in paragraphs A15.107 below; and
- when re-levering the asset beta to arrive at a forward looking equity beta.

A15.78 For the first two calculations, in our recent WACC calculations we have used the average gearing for BT Group over the period of measurement for the equity beta. Therefore, in the past we have relied on the 2 year average gearing for BT Group. We have then used BT's current gearing as a proxy for its forward looking gearing when estimating the forward looking equity beta.

A15.79 BT appealed our approach to assessing gearing in the 2011 WBA Charge Control Statement. BT argued that the gearing used to de-lever the equity beta to arrive at an asset beta for BT Group should not be the average gearing observed over the beta estimation period. Instead, it stated that the gearing should be the expected gearing.

A15.80 We argued that the use of expected, not actual gearing, is not consistent with the Modigliani-Miller theorem on the cost of capital.[227] The CC explained the argument put forward by Professor Franks as:

> "...if an equity beta could be de-levered by signalled forward-looking gearing, then this would allow the possibility of two companies, with similar operating characteristics and current gearing levels, offering different levels of return and being priced differently on the basis of

[225] We have used data to March 2013 to be consistent with our estimation of BT's equity beta, taken from the Brattle Report (Annex 16) which uses data to March 2013.
[226] This is consistent with Modigliani and Miller's 1st proposition which states that absent financial market imperfections such as taxation and the costs of financial distress, the overall cost of capital (WACC) will be the same regardless of the firm's capital structure (i.e. the mix of debt and equity).
[227] F. Modigliani and M.H. Miller, *The cost of capital, corporation finance and the theory of investment",* American Economic Review 48 (June 1958).

> one of them signalling a change in future gearing. In his [Professor Franks'] view, this would create an arbitrage opportunity and risk violating "the law of one price". [228]

A15.81 The CC did not accept BT's argument in relation to the gearing used to de-lever the equity beta. In its determination, it explained that:

> "...The conventional approach to de-levering, as adopted by Ofcom, is based on a definitional relationship between the asset beta, the debt beta and the equity beta reflecting the fact that share price movements are amplified by the proportion of debt in the value of a company. Neither BT nor its witness statements (including their reference to Bruner et al) have provided a convincing alternative account of the de-levering relationship in which current gearing is replaced by expected gearing".[229]

A15.82 The CC stated that the gearing used to re-lever the asset beta should be the current gearing, as a proxy for the forward looking gearing.[230]

Ofcom's analysis and assessment of responses

A15.83 We considered our approach to gearing in the 2011 WBA Charge Control Statement, and later Appeal. We continue to believe that the gearing used to de-lever the equity beta should be the average gearing observed over the beta estimation period.

A15.84 We note that the CC found that Ofcom did not err in it approach to de-levering the BT Group beta.

A15.85 We therefore consider that our previous approach of using the average gearing over the beta estimation period remains the most appropriate way to de-lever the equity beta.

A15.86 We agree with the CC's comments that a forward looking gearing estimate should be used to re-lever the asset beta. We consider that the current observed gearing would be an appropriate proxy for the forward looking gearing estimate.

A15.87 As set out in the April 2013 Brattle Report (Annex 16), the average 2 year gearing used to de-lever the 2 year equity beta was 40% as at March 2013. This is the same as the gearing used in the December 2012 analysis.

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[228] Paragraph 3.77 Competition Commission, *British Telecommunications plc v Office of Communications supported by British Sky Broadcasting Limited TalkTalk Telecom Group plc Case 1187/3/3/11,* 11 June 2011. http://www.catribunal.org.uk/237-7278/1187-3-3-11-British-Telecommunications-plc-Wholesale-Broadband-Access-Charge-Control.html

[229] Paragraph 3.110 Competition Commission, *British Telecommunications plc v Office of Communications supported by British Sky Broadcasting Limited TalkTalk Telecom Group plc Case 1187/3/3/11,* 11 June 2011. http://www.catribunal.org.uk/237-7278/1187-3-3-11-British-Telecommunications-plc-Wholesale-Broadband-Access-Charge-Control.html

[230] Paragraph 3.53 Competition Commission, *British Telecommunications plc v Office of Communications supported by British Sky Broadcasting Limited TalkTalk Telecom Group plc Case 1187/3/3/11,* 11 June 2011. http://www.catribunal.org.uk/237-7278/1187-3-3-11-British-Telecommunications-plc-Wholesale-Broadband-Access-Charge-Control.html

Proposals

A15.88 We propose to continue to estimate the gearing based on BT's actual gearing, using an average over a period consistent with the beta estimation period in order to de-lever the equity beta and to calculate the WACC.

A15.89 In addition, we propose to continue to use this current gearing as a proxy for the forward looking gearing over the period of the charge control.

Equity beta for BT Group

Regulatory background

A15.90 The value of a company's equity beta reflects movements in returns to shareholders relative to movements in the return from the equity market as a whole.

A15.91 In previous estimates of BT's WACC, we have estimated the 1 year and 2 year daily betas and the 5 year weekly beta. However, we have generally placed most weight on the 2 year beta. This is because we consider that it provides the most appropriate balance between a short enough estimation period to remain relevant whilst having enough data points to be sufficiently statistically robust.[231]

A15.92 Where we have placed most weight on the 2 year beta at the time of estimation, we have also used the 1 and 5 year betas as a cross-check, to ensure that the 2 year beta does not appear distorted.

A15.93 In arriving at a beta estimate, we have commissioned the Brattle Group to calculate the 1 and 2 year betas for BT Group. Brattle also run a number of statistical tests to ensure that the beta estimate is sufficiently robust. These include tests for trading illiquidity and time distortions, and tests to ensure that the beta estimates satisfy the standard conditions underlying ordinary least squares regression.

Responses to 2012 FAMR CFI

A15.94 Europe Economics notes that, prior to the financial crisis, the standard approach to considering an appropriate data estimation period was the trade-off between statistical uncertainty and up-to-date data.

A15.95 Europe Economics argues that the financial crisis has added further complexity to the trade-off discussed above. It argues that in extremely volatile market conditions, the period of estimation may include time when the markets are "adjusting between informational equilibria and re-establishing informational efficiency".[232]

A15.96 Europe Economics states that this does not mean that CAPM is not relevant in periods of financial crisis, but that it affects the appropriate period of estimation. It considers that, rather than focusing on the one or two year average beta, the approach should be more flexible. This would require consideration of the rolling average beta over time. If the rolling beta is relatively stable over time (Europe

[231] Smithers and Co, *A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the U.K.*, February 13 2003. http://ofwat.gov.uk/publications/commissioned/rpt_com_costofcapital130203.pdf

[232] Page 13, Europe Economics *Methodological issues regarding BT's WACC Determination,* 28 January 2013.

Economics suggests analysis over the period of the previous price control) then it may mean that market volatility has not had a significant impact on beta estimates.

A15.97 If, however the rolling beta was not stable, Europe Economics suggests a judgement call would be required to identify whether this was a temporary effect or an underlying change. This would in practice mean sometimes giving more weight to longer estimation periods, and sometimes to shorter estimation periods.

Ofcom's analysis and assessment of responses

A15.98 We continue to believe that the 2 year beta estimate provides the most appropriate balance between up-to-date data and a sufficient number of data points to be sufficiently statistically robust.

A15.99 However, we recognise that in periods of unusual market conditions, this may introduce greater volatility into our WACC estimates. We think that using a 1 year beta and a 5 year beta to provide a cross-check is appropriate to identify whether the 2 year beta is unduly affected by market conditions which we consider to be temporary. If, based on this data, we considered that the 2 year beta was distorted by temporary market factors we would consider giving greater weight to beta estimates that were not affected by temporary distortions.

A15.100 Europe Economics suggests that our approach should be flexible to take into account unusual market conditions, and as a result to give greatest weight to different estimation periods where appropriate. We consider that performing a cross-check with the 1 year and 5 year beta estimates will enable us to be flexible in our approach. Moreover, there will be difficulties which may arise when classifying unusual market conditions as either temporary or permanent changes.

A15.101 In addition, if we observe unusual market conditions over a period of 18 months prior to the WACC estimate, all three beta estimates would be distorted. Although the 5 year beta would be the least distorted, it would include a significant period of distortion and would include data points from 5 years ago which may not be as relevant for forecasting forward.

A15.102 We consider that it may be appropriate to consider the trend in the beta over time, for example by looking in detail at the evolution of the BT Group 2 and 1 year beta. This may assist us in identifying whether changes in the beta are likely to be temporary or permanent, which would inform us when we propose to make a change to the equity beta estimate for BT Group.

A15.103 This is consistent with our desire to give weight to consistency in estimates of the WACC, particularly between charge controls.

A15.104 We note that the BT Group 2 year equity beta (against the FTSE All-share) at the end of March 2013 of 1.03 is very similar to that estimated for the 2013 BCMR Statement using data to December 2012 of 1.01. We therefore consider that the estimate from the 2013 BCMR Statement remains appropriate for the current charge control.

Proposals

A15.105 We propose to continue to give most weight to the 2 year equity beta, however we recognise that in periods of unusual market conditions, this may introduce greater volatility into our WACC estimates.

A15.106 As we give weight to consistency in estimates of the cost of capital, we propose to also give weight to the evolution of the 2 and 1 year beta estimates over time and to take this into account in addition to the most up to date estimates of BT's beta.

Asset Beta

Regulatory background

A15.107 In order to estimate the asset beta for BT Group, we use the following formula:

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

A15.108 Therefore, we need to estimate the debt beta for BT Group, alongside the equity beta and gearing discussed above.

A15.109 We discuss our approach to estimating the debt beta in paragraph A15.115 below.

Ofcom's analysis

A15.110 We did not receive any specific comments from stakeholders in response to the 2012 FAMR CFI in relation to the calculation of the BT Group asset beta. The latest data, as presented in the Brattle Report shows the BT Group asset beta as follows.[233]

A15.111 The Brattle Report shows the 2 year asset beta estimate for BT Group as at March 2013 of 0.68, using a debt beta of 0.15. The 2 year asset beta estimated in the 2013 BCMR Statement was 0.67 using a debt beta of 0.15.

A15.112 We note that the 1 and 2 year asset betas have not changed significantly from those estimated for the purposes of the 2013 BCMR Statement (which used data to December 2012). We therefore consider that the data to March 2013 remains appropriate.

A15.113 As with the equity beta, we propose to consider longer run rolling betas in order to assist us in identifying whether changes in the asset beta estimates are likely to be temporary or permanent.

Proposals

A15.114 We propose to estimate the asset beta using the 2 year beta, using the 1 year and 5 year beta estimates as a cross-check. We propose to consider the rolling beta over time in order to help our analysis of changes to the asset beta.

Debt Beta

Regulatory background

A15.115 The beta of debt is intended to measure the covariance of the return on debt to the return on the market. The debt beta is used to de-lever the equity beta to estimate the asset beta, if the equity beta has changed substantially, where the debt beta is static, it would imply a big change the asset beta, however it may be that some of the change in the equity beta is related to movements in the debt beta therefore it is important to consider changes in the debt beta.

[233] Based on a debt beta of 0.15

A15.116 However, we note that there are significant practical difficulties in estimating debt betas robustly.[234] Where we have attempted to estimate debt betas in the past, we have found that the correlation between returns to debt holders and returns to the market has been weak and that direct estimations of debt betas produce quite volatile (and often negative) estimates.

A15.117 This is consistent with the CC's finding when estimating debt betas in the Heathrow and Gatwick review as noted in its subsequent review of Stansted Airport:

> "the regression-based approach was hampered by poor data quality and models with poor statistical properties".[235]

A15.118 We have therefore considered other sources of evidence such as academic text and previous CC determinations:

- Brealey, Myers and Allen in their textbook *Principles of Corporate Finance* estimate that debt betas of large, blue chip firms (which would include BT) are in the range of 0.1 to 0.3; and

- the CC, in its Heathrow and Gatwick review used a point estimate of 0.1 where the debt premium was 1.4 to1.7%.

A15.119 In the 2011 WBA Charge Control Statement, we used a debt beta range of 0.1 to 0.2 and a point estimate of 0.15 this was higher than that estimated in the consultation of 0.125. The increase was because we considered that a part of the debt premium can be attributed to the debt beta. As the debt premium for BT Group had increased to 2 to 2.5% at the time of the 2011 Statement, we used a higher debt beta point estimate of 0.15 to de-lever the equity beta.

Responses to 2012 FAMR CFI

A15.120 Europe Economics suggested that we should pay more attention to debt betas, particularly when asset beta movements are volatile. It explains why debt betas may move around:

> "A firm's asset beta is reflected in both equity and debt betas. Events that materially affect the outlook for equity may also affect the outlook for debt. For example, it is widely acknowledged that from 2007 on credit market functioning became impaired and the perceived riskiness of debt rose, and that coincided with a deep recession in many countries. It would thus be unsurprising if there were a rise in debt betas — since these are a measure of the coincidence of default risk with all-economy downturns".[236]

[234] It is technically possible to calculate a beta of debt where, as in the case of BT, the debt is traded using the CAPM formula. However, equity values fluctuate more than the value of debt therefore the correlation between debt returns and market returns is weak.
[235] Paragraph 7, Page L34, *Competition Commission report: Stansted Airport Ltd - Q5 price control review:* 23 October 2008, http://www.caa.co.uk/docs/5/ergdocs/ccstanstedl.pdf
[236] Page 19, Europe Economics *Methodological issues regarding BT's WACC Determination,* 28 January 2013.

A15.121 As a result it noted that Ofcom's methodology, which it considered was to assume "a broadly invariant debt beta, introduced more volatility into its asset beta estimates for BT than was probably accurate".[237]

A15.122 Europe Economics then argues that:

> "We would recommend that if debt premia become elevated again, Ofcom should pay more attention to debt beta".[238]

Ofcom analysis and assessment of responses

A15.123 In the 2011 WBA Charge Control Statement, which Europe Economics refers to, we took account of its argument that an increase in the debt premium is likely to be in part attributable to an increased debt beta. We increased the debt beta from a mid-point of 0.125 to 0.15, which is a 20% increase in the debt beta. We therefore disagree with Europe Economics statement that we assumed a broadly invariant debt beta. Europe Economics suggested that the assumed increase in the debt premium could be around 50%, however the evidence provided to support this was not statistically robust.

A15.124 We consider that Europe Economics' suggestion that we should take account of movements in the debt beta has merit. However we note the practical difficulties in estimating debt betas. Europe Economics, in its response to the 2011 WBA Charge Control Statement, noted the difficulties in estimating debt betas. When justifying its assumption that 50% of the increase in the debt premium should be attributable to the debt beta, it noted that its estimates of the debt beta are "unreliable, non-robust and not supportive of"[239], but broadly consistent with, the 50% assumption.

A15.125 We recognise that during periods of volatility, there may be movements in the debt beta and we propose to take account of high-level expected movements in the debt beta, as we did in the 2011 WBA Charge Control Statement. However, we do not consider that a direct estimate of the debt beta would be sufficiently robust, therefore we do not propose to undertake such analysis.

A15.126 In the 2013 BCMR Statement, we used an estimate of BT Group's debt premium of 1.7% to 2.3%[240] and used a debt beta of 0.15 to de-lever the equity beta. We are proposing to continue to use these for this consultation.

A15.127 We note from paragraph A15.67 that the most recent evidence for BT's debt premium suggests that the range might be slightly lower than estimated in March 2013. This may suggest a slightly lower debt beta than the current 0.15, however, the only gradual change noted since we last concluded our WACC calculations for BT (i.e. the 2013 BCMR Statement) means that we have not proposed changing the base case asset beta for this Consultation.

[237] Page 19, Europe Economics *Methodological issues regarding BT's WACC Determination,* 28 January 2013.
[238] Page 19, Europe Economics *Methodological issues regarding BT's WACC Determination,* 28 January 2013.
[239] Page 39, Europe Economics *Estimating BT's cost of capital,* 24 June 2011.
[240] We note that this is lower than the range estimated for the WBA Charge Control Statement, and is closer to the top end of the range estimated by the CC where a debt beta of 0.1 was used.

Proposals

A15.128 We propose to maintain a base case for the debt beta of 0.15, although we note the slight reduction in BT's debt premia since our last statement on the WACC (2013 BCMR Statement). If taking account of the data which will become available between now and the Statement we consider that it is appropriate to change the debt premium and the debt beta, we would expect such a change to be no greater than the sensitivities we are consulting on in this document.

Equity Risk Premium

Regulatory background

A15.129 The Equity Risk Premium (ERP) is a key component of the estimate of a company's WACC.

A15.130 Under the CAPM the ERP represents the extra return that investors require as a reward for investing in equities rather than a risk-free asset. It is market-specific, not company-specific.

A15.131 Academics and other users of the CAPM have conducted a large number of investigations into the value of the ERP, using quantitative techniques and surveys. These have produced a range of widely differing estimates, which means that we (and other economic regulators) have to choose a value from within the plausible range implied by these studies.

A15.132 In previous estimates of the cost of capital, we have estimated the ERP by taking into account the following sources:

- historical data on the premium of UK equities over and above UK Government gilts;
- academic/user surveys (although we have tended to place little weight on this); and
- regulatory benchmarks which show recent ERP estimates, by the UK's economic regulators.

A15.133 In estimating the ERP, we have tended to place most weight on long-run historical averages. In the 2013 BCMR Statement, we considered the latest historical ERP evidence reported by Professors Dimson, Marsh and Staunton (DMS), in the 2012 sourcebook[241], which showed that the historical premium of equities over bonds for the UK was 5%.

A15.134 In addition, in the 2012 report, DMS suggested a long-run arithmetic mean premium for the world index of around 4.5% to 5%.

A15.135 We also considered recent survey evidence which did not suggest that a rate of 5% was inappropriate.

A15.136 Finally, in more recent estimates of the cost of capital, we have considered volatility in the UK stock market (as proxied by the FTSE All-share) to inform movements in

[241] Dimson, Marsh and Staunton, "Credit Suisse Global Investment Returns Sourcebook 2012", Credit Suisse Research Institute

our estimate of the ERP. We noted that the latest evidence at the time of the 2013 BCMR Statement suggested that volatility had fallen, and was closer to its long-run mean. We considered that this did not support an increase to the ERP.

A15.137 However, there is some evidence that the volatility itself has been more variable in recent years. That is to say, the uncertainty about market volatility has increased, and it may be that this increased uncertainty has led to higher expected returns on equities. In other words, the market may require a risk premium for the uncertainty with respect to market volatility. If this were the case, we noted that we might wish to reconsider the level at which we set the ERP.

A15.138 We explained that it may be that this increased uncertainty is related to the financial crisis, and as this abates the uncertainty will decline. Including a risk premium for such uncertainty amounts to a departure from the underlying assumptions of the CAPM and therefore such an adjustment is not to be considered lightly.

A15.139 We noted that, although there is an interesting argument that an increase in the volatility of market volatility could result in investors demanding a higher premium above the ERP previously identified, we consider that the evidence about the persistence of such uncertainty in the future is not conclusive and the method by which we would incorporate any such risk premium into our existing methodology is also not clear.

A15.140 Finally, in the 2013 BCMR Statement, we considered the link between the ERP and the risk-free rate. We noted that the risk-free rate and the ERP tend to move in opposite directions.

Responses to 2012 FAMR CFI

A15.141 Europe Economics notes that we place greatest weight on the DMS long term historical estimate of the ERP, whereby long-run data is used to attempt to identify statistically robust long-run average expected values. Europe Economics states that insofar as the estimate is intended to identify long-run appetite for risk, a long-run ERP would be appropriate. It notes, however that:

> "...during the peak of the 2008-9 crisis determinations acknowledged evidence that, in fact, the ERP is not invariant but, instead, becomes temporarily elevated during severe recessions by around 20 per cent. Given the principle of variation in the ERP is established, it is of interest to consider the implications for forwards-looking ERP estimation".[242]

A15.142 Europe Economics argues that, more recently, the CC has placed greater weight on total market returns (i.e. the combination of the ERP and the risk-free rate).

A15.143 Europe Economics suggests taking account of economic data, such as forecasts for the UK economy to assist in estimating the forward looking ERP. For example it suggests that during a prolonged economic slump, we would expect to see a lower total market return. Conversely, where a recovery is forecast, we would expect to see higher expected returns. Europe Economics notes that at the time of its response to the 2012 FAMR CFI, the UK economy's growth over the medium term

[242] Page 16, Europe Economics *Methodological issues regarding BT's WACC Determination,* 28 January 2013.

had been downgraded and that Office for Budget Responsibility had downgraded its assessment of the rate of growth in potential output.

Ofcom's analysis and assessment of responses

A15.144 We discuss the total market return and the link with the risk-free rate from paragraph A15.54 above.

A15.145 We continue to believe that estimating the risk-free rate based on long-run historical averages remains appropriate. However, we propose to take account of implied volatility on the FTSE All-share index to ensure that the long-run estimate remains appropriate for forecasting costs to 2016/17.

A15.146 We believe that using academic survey evidence as a cross-check will take into account the extent to which current market conditions are temporary or represent 'a new normal.'

A15.147 The most recent, 2013 sourcebook[243], shows that the historical premium of equities over bonds for the UK was 5%.

A15.148 In addition, in the 2013 report, DMS suggest a long-run arithmetic mean premium for the world index of around 4.5%-5%.

A15.149 We consider that the point estimate of 5% used in the 2013 BCMR Statement remains appropriate for the purposes of this consultation.

Proposals

A15.150 We propose to estimate the ERP by reference to historical averages, as well as consideration of implied volatility on the FTSE all share index and recent survey evidence.

Tax rate

Regulatory background

A15.151 In the 2013 BCMR Statement, we took account of the Chancellor's 2013 budget which announced a fall in the forecast corporation tax rate for 2015/16 to 20%.

Proposals

A15.152 We propose to estimate the tax rate for 2016/17 by reference to the proposed tax rate for 2016/17 (or where this is not available, by reference to the 2015/16 rate) as announced by the Government.

Inflation

Regulatory background

A15.153 In the 2013 BCMR Statement, we noted that our inflation assumption should be estimated in a consistent way as the forecast inflation for the final year of the charge control. In that Statement, we used an estimate of RPI of 2.8%.

[243] Dimson, Marsh and Staunton, "Credit Suisse Global Investment Returns Sourcebook 2013", Credit Suisse Research Institute.

Ofcom's analysis

A15.154 We propose to continue to estimate the inflation assumption to be used in the WACC using RPI forecasts from HM Treasury. We consider that it is appropriate to calculate the real risk-free rate by reference to RPI, because indexed linked gilts, which we use to inform our estimate of the risk-free rate are linked to RPI. Combining the real risk-free rate with our RPI forecast for 2016/17 enables us to calculate a nominal risk-free rate.

A15.155 Our current proposal is to use CPI in the charge control formula (see Section 3 of this consultation). However, this relates to how the cap is set to get from current charges to the forecast cost-based charges at the end of the control period. We have forecast costs in nominal terms and where the cost of capital is built up from a real risk-free rate derived from RPI index linked gilts, it is appropriate to generate a nominal WACC consistent with that index – i.e. forecast RPI, rather than forecast CPI.

A15.156 If we were to estimate a real WACC (as is the case for some models used by Ofcom to forecast BT's costs), we would calculate the nominal WACC (using forecast RPI added to real risk-free rate derived from yields on RPI indexed gilts). We would then express the real WACC relative to CPI or RPI depending on which is appropriate for that charge control. In this case, the real WACC relative to RPI would differ from the real WACC relative to CPI if the forecast values of RPI and CPI differed (which typically they do).

Proposals

A15.157 We propose to estimate the nominal WACC using forecast RPI for the final period of the charge control (i.e. 2016/17). We note that the most recent forecasts as complied by HM Treasury show that inflation for 2016/17 is greater than that forecast in the 2013 BCMR Statement. We propose to reflect the latest available inflation estimates at the time of our WLR/LLU statement.

Disaggregation of BT Group beta

Our approach in previous charge controls

Disaggregating BT Group's asset beta

A15.158 In the 2013 BCMR Statement we noted that the difference between the BT Group estimate and that of the UK network utilities had increased, mainly due to the increase in BT Group's asset beta (with the peer-group average asset beta estimate for network utilities remaining relatively stable since our estimate in July 2011).

A15.159 We similarly considered asset beta estimates for the closest comparators to Rest of BT available, in particular, TalkTalk and Colt. We explained that the asset betas of these two companies had fallen below that of BT Group: Colt's two year daily asset beta against the FTSE All share index was 0.5 and TalkTalk's was around 0.47 in December 2012.

A15.160 As we considered that Openreach and the Rest of BT each accounted for roughly half of BT Group's assets, we considered it appropriate to increase and decrease the BT Group asset beta by equal amounts to derive individual asset betas. We decided to reduce the BT Group asset beta by 10% (the same differential used in the 2009 PFFO Statement and 2011 WBA Charge Control Statement) to derive the

Openreach asset beta, and to increase the BT Group asset beta by 10% to obtain the Rest of BT asset beta. This resulted in asset betas of 0.60 for Openreach and 0.74 for the Rest of BT.[244]

Disaggregating BT Group's debt premium

A15.161 As noted above, in the 2011 WBA Charge Control Statement we estimated BT Group's debt premium to be within the range 2-2.5%.[245] In the 2013 BCMR Statement we updated our analysis in light of the recent evidence on the falling spread over gilts of BT's 2016 bond and used a range of 1.7-2.3% as a proxy for BT Group's debt premium.[246]

A15.162 In disaggregating the BT Group debt premium, we considered the range of debt premia observed for the UK network utilities (around 0.9-1.3%) which was lower than the range for the network utilities observed at the time of the 2011 WBA Charge Control Statement (then 1-1.5%). We considered that applying a debt premium of 1.7% for Openreach and 2.3% for Rest of BT would be a reasonable approximation of the relative risk of each of these parts of the BT Group.[247]

Responses to 2012 FAMR CFI

A15.163 The only comments on our approach to disaggregating BT Group's beta and to estimating its debt premium were from Sky and TalkTalk who, as noted above, commissioned a report from Europe Economics.[248]

A15.164 In its report, Europe Economics reviewed our approach to disaggregating BT Group's beta and identified some ideas where we might expand or improve our analysis. In particular, Europe Economics asked whether:

- the available accounting data might allow fundamental beta analysis to estimate the asset beta for Openreach and the Rest of BT;
- we could identify other pure-play comparators for the current or future activities of the Rest of BT, particularly, thinking of the ways in which BT's new innovations (e.g. NGA and sports) have changed the Rest of BT and whether this could imply that the wedge between Openreach and Rest of BT has increased;
- there were other or better direct comparators for Openreach's cost of copper business (e.g. international comparators), particularly, reflecting on whether 'safe haven' effects in recent years may suggest that Openreach is more like a network utility[249] than previously thought; and

[244] 2013 BCMR Statement, paragraph A14.108 to A14.112, http://stakeholders.ofcom.org.uk/binaries/consultations/business-connectivity/statement/Sections1-4.pdf.
[245] 2011 WBA Charge Control Statement, paragraph 6.54 to 6.78, http://stakeholders.ofcom.org.uk/binaries/consultations/823069/statement/statement.pdf.
[246] 2013 BCMR Statement, paragraph A14.30 to A14.34.
[247] 2013 BCMR Statement, paragraph A14.113 to A14.117.
[248] http://stakeholders.ofcom.org.uk/binaries/consultations/fixed-access-markets/responses/BSkyB_Europe_Economics_Repo1.pdf.
[249] Network utilities are companies providing essential services such as supply of water, energy or sewerage. These companies operate large networks which typically have the characteristics of

- Openreach could, as a standalone entity, be closer to a network utility in terms of the premium it paid on its debt even if not more similar to a network utility in respect of its equity.

Ofcom's analysis and assessment of responses

Disaggregating BT Group's asset beta

Fundamental beta analysis

A15.165 We understand that fundamental beta analysis, an approach advocated by Europe Economics, consists of estimating the equity beta of a company using accounting and market information as follows:

- select certain accounting and/or financial variables (e.g. leverage, earnings volatility, etc.);
- identify a suitable pool of comparator companies;
- estimate the relationship between the beta of these companies and the selected accounting/financial variables over a set period of time; and
- apply the estimated equation for beta as a function of the financial variables to estimate the beta of a specific company using the values of the accounting/financial variables for that company.

A15.166 Europe Economics quotes three academic papers that have used fundamental beta analysis in its response to the CAA's consultation on the estimation of Heathrow's cost of capital.[250] The first of these papers provides an overview of both empirical and theoretical relationships of equity beta with financial and accounting variables (e.g. leverage, accounting beta[251], earnings variability, etc.) that have been reported in the literature.[252] In the second article the authors develop a theoretical model that derives the equity beta as a function of the level, growth rate and volatility of several variables (including firm-specific accounting ratios). The authors then test this model empirically with a sample of firms in the S&P 500 index and find support for the model's predictions.[253] The third investigates the relationship between accounting variables (e.g. dividend payout, growth in earnings, leverage, etc.) and market measures of risk (i.e. the variance of returns). Using a sample of firms the authors find that there exists significant correlation between the two.[254]

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natural monopoly and so are currently subject to economic regulation, with many parts of the business subject to price control regulation.

[250] Europe Economics, *Heathrow Airport's Cost of Capital – A report on behalf of Heathrow*, February 2013, pp. 61-62, http://www.caa.co.uk/docs/78/HeathrowCostOfCapitalStudy.pdf.

[251] Equity betas are usually estimated using market returns. However, when stock market returns are not available an accounting beta may be estimated using accounting statements (e.g. earnings variability).

[252] Lawrence, E.R.; Mishra, S. and Prakash, A.J. (2004), 'A synthesis of theoretical relationship between systematic risk and financial and accounting variables'. *International Journal of Banking and Finance*, Vol. 2: Issue 1, Article 2.

[253] Gwangheon, H. and Sudipto S. (2007), 'Equity Systematic Risk (Beta) and Its Determinants', *Contemporary Accounting Research*, Vol. 4, No. 2, pp. 423-66.

[254] Beaver, W.; Kettler, P. and Scholes, M. (1970), 'The Association Between Market Determined and Accounting Determined Risk Measures', *The Accounting Review*, October.

A15.167 From our own research there does not appear to us to be a large body of academic research on this approach to beta estimation, although the references provided by Europe Economics show that there has been some academic research on the relationship between accounting variables and systematic risk. For example, we are not aware of any academic paper that may have considered whether fundamental analysis could be seen as superior to an approach based on the CAPM (i.e. the approach we are proposing to continue using).[255]

A15.168 We are also not aware of other sector regulators (e.g. Ofgem, Ofwat or ORR) or the Competition Commission having previously used fundamental beta analysis to support the calculation of the WACC for regulatory purposes. Europe Economics' response to the CAA's consultation on the cost of capital for Heathrow airport quotes a study by Oxera[256] in 2006 on behalf of BAA that purportedly used fundamental beta analysis. However, as far as we are aware this analysis was not used by the CAA when setting the price cap at Heathrow at this time. In circumstances similar to that under consideration here (i.e. a regulated firm that is not listed but is part of a wide corporate group), the CAA is proposing not to use the fundamental beta analysis advocated by Europe Economics to estimate the WACC for Heathrow in its current review of the airport's regulation.[257]

A15.169 While the fundamental beta analysis advocated by Europe Economics may have some merit, we do not propose to use fundamental beta analysis in setting the charge controls for LLU and WLR. The main reason for this is that it is unclear whether fundamental beta would be superior to the approach we are proposing to use to disaggregate BT Group's beta and it is a relatively complex approach, requiring further regression analysis with a large sample of firms and a significant degree of judgment in terms of sample selection and choice of accounting variables (many of which may vary for reasons of accounting treatment rather than the fundamental characteristics of the firm). We consider that these factors may also explain the lack of any precedent of use of fundamental beta analysis in a regulatory context.

Comparison with UK network utilities

A15.170 We compare BT Group's asset beta against a group of UK network utility comparators. The latest analysis commissioned from Brattle implies an asset beta range for the UK network utilities of 0.28-0.33 (the average being 0.30) using a debt beta of 0.15, as shown in Table A15.4 below.

[255] Fundamental beta analysis also does not appear to be mentioned in a number of standard texts on the subject. For example, fundamental beta analysis is absent from Brealey/Myers/Allen (2012) or Copeland, Weston and Shastri (2005).
[256] Oxera, *Stand-alone costs of capital of Heathrow, Gatwick and Stansted Airports*, 2006.
[257] CAA, *Economic regulation at Heathrow from April 2014: initial proposals,* para. 9.107, published April 2013: http://www.caa.co.uk/docs/33/CAP%201027%20Economic%20regulation%20at%20Heathrow%20from%20April%202014%20initial%20proposals.pdf.

Table A15.4: Comparison of BT Group's asset beta against other UK Utilities

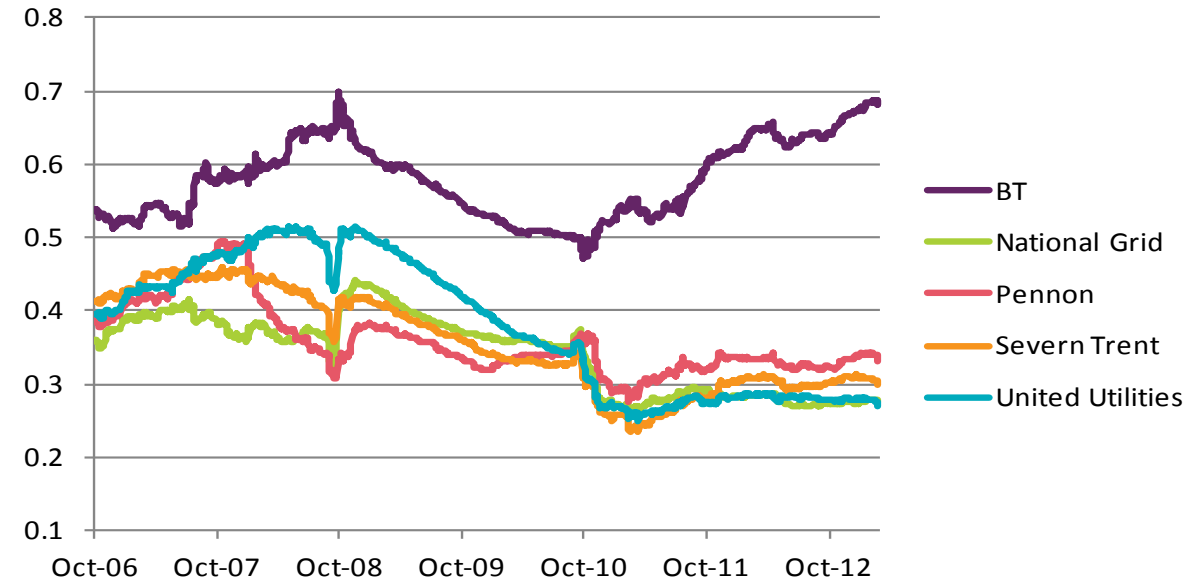
Company	Sector	Asset beta (2 year)	
		2013 BCMR Statement	Updated
BT Group	Telecoms	**0.67**	**0.69**
National Grid	Multi utility	0.28	0.28
Pennon Group	Water and waste	0.34	0.33
Severn Trent	Water	0.31	0.31
United Utilities	Multi utility	0.28	0.28
Average utilities		**0.30**	**0.30**

Source: January 2013 and April 2013 Brattle Report.

A15.171 The evidence shows that the asset beta of UK network utilities (0.28-0.33) is significantly below that for BT Group (0.69). As noted above, Europe Economics asked whether 'safe haven' effects in recent years may suggest that Openreach is now closer to network utilities than previously thought.

A15.172 In considering the safe haven effects raised by Europe Economics, it is useful to look at the two-year rolling asset betas for BT Group and the network utilities in Figure A15.2 below (taken from Figure 8 of the Brattle Report).

Figure A15.2: Two year rolling asset betas BT Group and UK network utilities



Source: Brattle Report, Figure 8.

A15.173 As can be seen from Figure A15.2 above, in the one instance in the recent past when the BT Group asset beta converged a little with that of the network utilities this was short lived (i.e. around October 2010). Since then the BT Group asset beta has diverged markedly from that of the network utilities. So while the BT Group asset beta falling in line with that of the network utilities in the period up to October 2010 might be consistent with investors treating BT Group a bit more like a utility (because of the presence of Openreach), this effect may either have been temporary or since dominated by other factors.

A15.174 The increase in BT Group's asset beta after October 2010 may be the result of either (i) an increase in both Openreach and the Rest of BT's systematic risk or (ii) an increase in the systematic risk of the Rest of BT (while Openreach's systematic

risk may have remained relatively stable). We consider that scenario (i) may be less plausible, as it seems less likely that the systematic risk of BT's copper access activities has increased since October 2010. While there may be factors explaining an increase in the systematic risk of the Rest of BT (relative to Openreach), the extent of this is uncertain. We consider some of the possibilities later in this section, but welcome views from stakeholders on whether the systematic risk faced by the Rest of BT may have increased and what, if any, adjustment is required (or appropriate) for the way we disaggregate the BT Group asset beta.

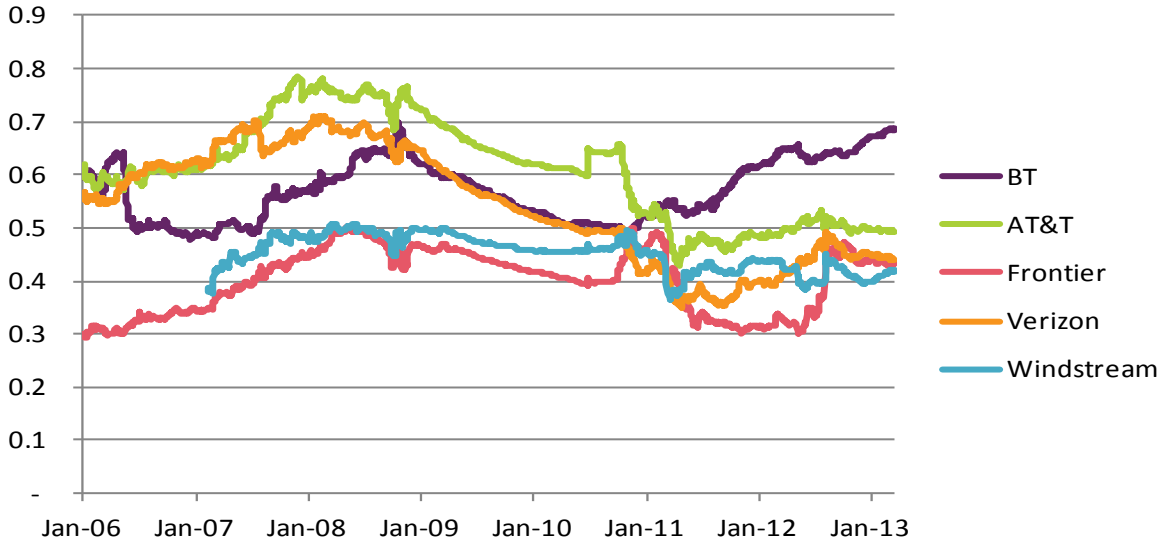
Analysis of US telecoms operators

A15.175 We have sought to evaluate whether the evidence for US telecoms may be informative in deriving the asset beta for operators significantly involved in the provision of fixed line access.

A15.176 The Brattle Report has conducted research on four US telecommunications operators, namely: Frontier, Windstream, AT&T and Verizon. Frontier and Windstream's core activities involve local loop access and the provision of associated services (telephone services and broadband), whereas AT&T and Verizon combine both wireline and wireless activities in roughly equal measure.[258]

A15.177 In the case of the pure-play wireline US operators (Frontier and Windstream) the asset betas against the S&P 500 lies below the level for BT Group against the FTSE All share index for nearly the entire period considered in Figure A15.3 below. Furthermore, since the end of 2010 the gap between BT and these two companies has grown, with the asset beta of Frontier and Windstream remaining in the 0.3-0.5 range, whereas the BT Group asset beta rises from around 0.5 to 0.7 over the same period.

Figure A15.3 Two year rolling asset betas for BT Group and US telecoms operators



Source: Brattle Report, April 2013, Figure 11.

A15.178 Similarly, since late 2010 investors seem to have viewed BT Group as more risky than AT&T and Verizon (which have moved within the 0.35-0.55 range). It also appears that investors have tended to consider AT&T and Verizon as slightly more

[258] Annex 16, Brattle Report, p. 13.

risky than the two pure-play fixed line operators, although this difference has become less pronounced in the last year.

Comparison with Chorus (New Zealand)

A15.179 New Zealand has taken separation further than any other jurisdiction by de-merging the former telecoms incumbent into two separate entities: "Chorus" and "Telecom". Chorus was separated from Telecom on 1 December 2011, although 2011/12 was a transitional year when Chorus and Telecom operated as a combined entity for the first 5 months of the 2011/12 financial year and separate entities for the remaining 7 months of the year.[259]

A15.180 The UK and New Zealand models of separation have been relatively similar, the main differences between Openreach and Chorus are:

- Chorus does not supply "active" wholesale services such as Openreach's WLR or ISDN services.[260] It only supplies unbundled loops and backhaul and controls the network assets needed for those services, while Telecom Wholesale supplies all active services; and

- Chorus shares some information and technology systems with Telecom, whereas Openreach and BT have completely separate systems.[261]

A15.181 We present Chorus' asset beta in Table A15.5 below.

Table A15.5: Equity and asset beta benchmarks – Chorus

Company	Equity beta (2 year)	Market value of equity (£bn)	Book value of debt (£bn)	Gearing D/(D+E)	Asset beta (2 year)
Chorus	1.13	1,209.16	1,590.00	57%	0.57

Note: Equity betas for Chorus were estimated for the period from 22 November 2011 to 15 March 2013 using daily return data against the NZX All-index. Market capitalisation and Net debt data correspond to FY 2012.
Source: Bloomberg.

A15.182 The asset beta of Chorus (0.57) is significantly above that of the UK network utilities presented above. We recognize that Chorus and Openreach are not pure like-for-like comparators, although the evidence above is consistent with operators of national fixed line telecoms infrastructure having different systematic risk from that of network utilities.

Analysis of UK telecoms operators

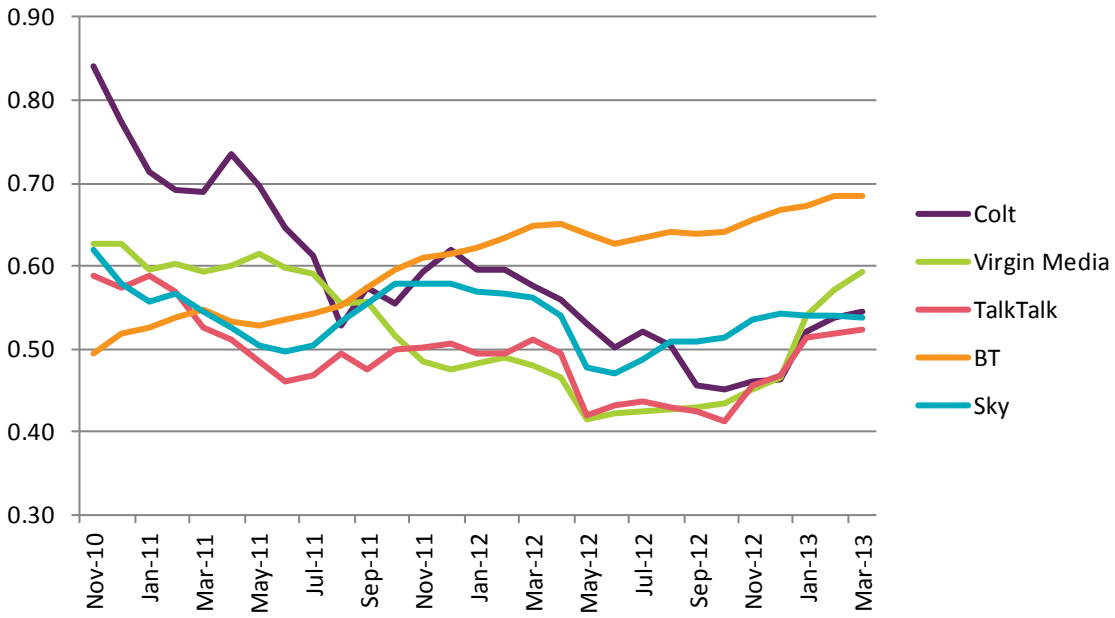
A15.183 We recognise that there may be comparators that we can use to benchmark the Rest of BT asset beta. In Figure A15.4 below we present the 2-year daily rolling asset betas of BT and 4 UK telecoms operators (TalkTalk and Colt, which we

[259] Commerce Commission, *Annual Telecommunications Monitoring Report 2012*, April 2013, p. 6, http://www.comcom.govt.nz/assets/Telecommunications/Market-Monitoring/2012-Annual-Telecommunications-Report-3-May-2013.pdf
[260] A list of the services offered by Chorus can be found at http://www.chorus.co.nz/our-products.
[261] Gilbert Tobin, *Separation regulation of dominant telecommunications operators in today's legacy networks and tomorrow's next generation networks*, http://www.gtlaw.com.au/wp-content/uploads/Separation-regulation.pdf. For a list of Chorus' services see http://www.chorus.co.nz/our-products.

included for comparison in the 2011 WBA Charge Control Statement, to which we have now added Virgin Media and Sky). We recognise that these operators are not pure-play comparators to either of Openreach or the Rest of BT, however, Virgin Media and Colt are vertically integrated operators controlling both fixed line access infrastructure as well as managing retail operations. These operators therefore share characteristics with BT Group – although we recognise that there are differences (e.g. Colt's primary focus on business customers).

A15.184 TalkTalk and Sky are involved in very similar activities to BT Retail and also compete with BT in certain wholesale markets. However, TalkTalk and Sky do not own the underlying fixed line access infrastructure they use (since they rent this from Openreach). Moreover, Sky has also invested significantly in satellite TV broadcasting, although we note that both BT Retail and TalkTalk have recently begun to invest in pay-TV operations.

Figure A15.4: Rolling asset betas of benchmark UK telecoms operators[262]



Note: Average monthly gearing was derived using market capitalisation and net debt data from Bloomberg. Monthly equity betas were obtained from Bloomberg (with the exception of BT). These are monthly 2-year equity betas based on daily return data against the FTSE All-share index. BT asset betas are taken from Brattle Report.
Source: Brattle Report, Bloomberg and Ofcom calculations.

A15.185 The evidence shows that since around mid-2011 the asset betas of the 4 UK comparator CPs have varied within the range 0.4-0.6 (all ending within the range 0.5-0.6 by March 2013). In the case of Virgin Media, which operates its own cable network and therefore could be considered closer to BT Group than Rest of BT, its asset beta has varied significantly from 0.60 (between November 2010 and mid-2011) down to 0.4 around May 2012 and increased again to around 0.6 by the end of the period. In contrast, the asset beta of BT Group has trended upwards over the period and increasingly diverged from that of the other UK fixed CPs.

[262] We did not include CWW as it was acquired by Vodafone on 27 July 2012. In addition, Verizon UK is not listed in the FTSE. The period shown in the chart corresponds to the period for which the equity beta for the five UK telecommunications providers was available from Bloomberg.

A15.186 Although it is difficult to get a like-for-like comparator, given the demand characteristics of the Rest of BT (and BT Retail in particular), we would be uncomfortable supporting the view that the Rest of BT should be perceived as significantly more risky than implied by the BT Group asset beta, given BT Group's asset beta estimate when compared to that of comparable UK operators (which would be the corollary of setting a much lower asset beta for Openreach relative to BT Group and Rest of BT).

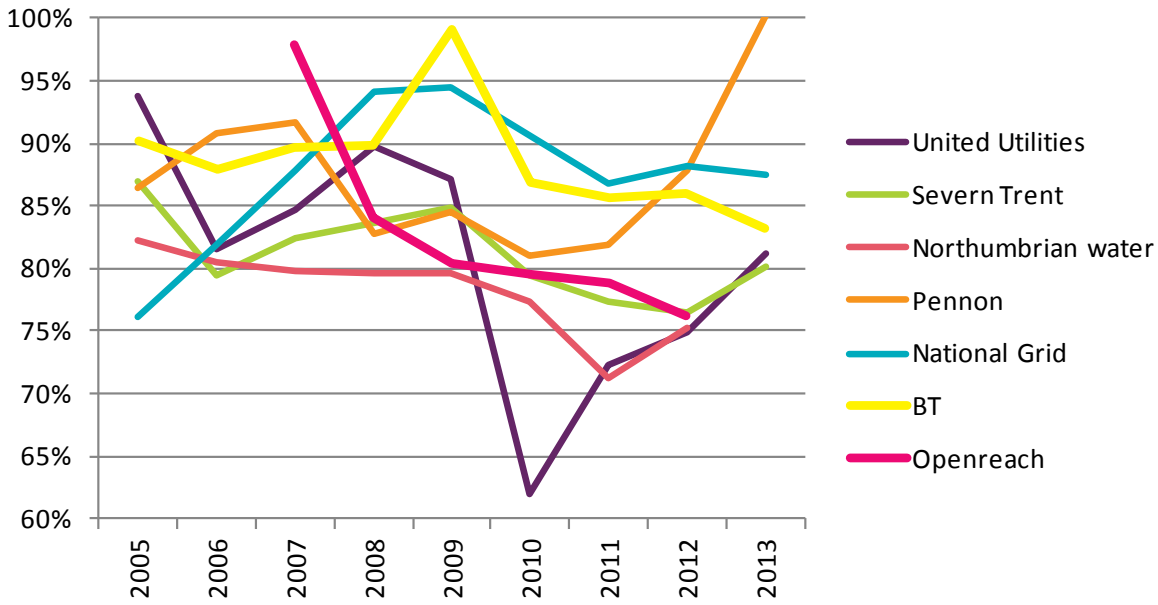
Assessment of operating leverage and volatility of returns

A15.187 In addition to the analysis above, we are proposing to consider other determinants of asset beta, in order to identify what the appropriate asset betas for Openreach and Rest of BT are. We propose to follow the approach taken in the 2011 WBA Charge Control Statement[263] where we looked at:

- Operating leverage: the ratio between 'cash out' and 'cash in' for BT, Openreach and the network utility comparators over the previous 5 years; and
- Volatility of returns: looking at profitability and its volatility over the previous 5 years.

A15.188 We present our analysis of the operating leverage in Figure A15.5 below.

Figure A15.5: Variation in operating leverage

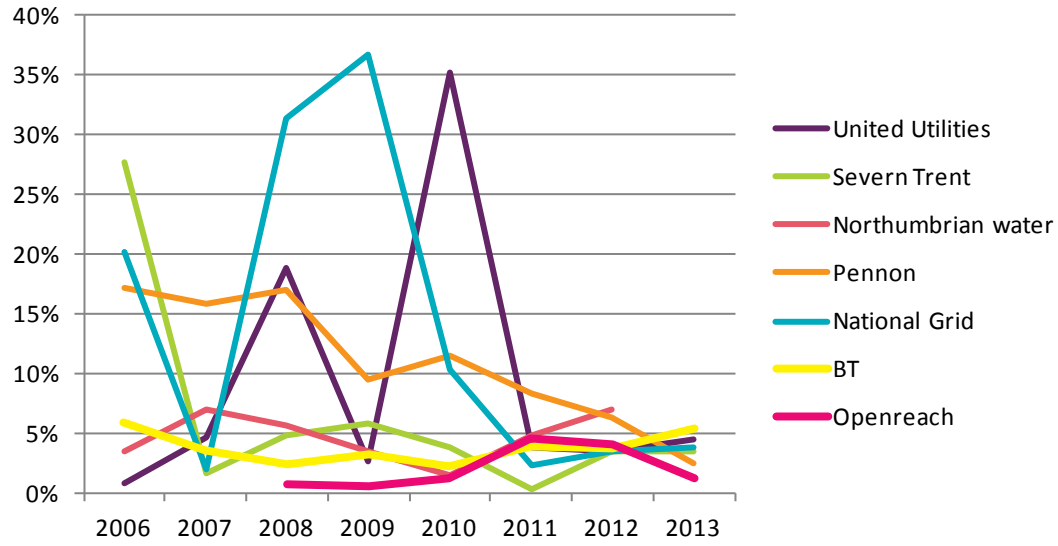


Note: Operating leverage is obtained dividing total cash out by the turnover.
Source: Bloomberg and BT's Annual Accounts (for Openreach).

A15.189 We assess the volatility of returns by looking at the variation in turnover as a proxy in every year (relative to the previous year), as shown in Figure A15.6 below.

[263] 2011 WBA Charge Control Statement, p. 128: http://stakeholders.ofcom.org.uk/binaries/consultations/823069/statement/statement.pdf

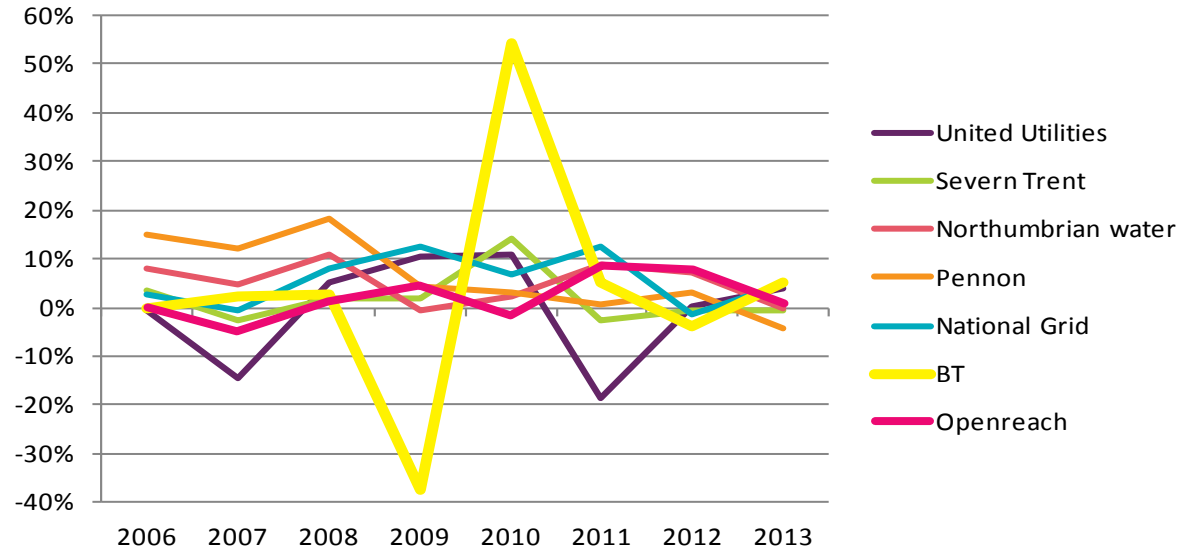
Figure A15.6: Variation in turnover



Source: Bloomberg and BT's Annual Accounts (for Openreach).

A15.190 We have similarly assessed the volatility of returns by looking at the annual variation in the EBITDA of BT, Openreach and the network utilities in Figure A15.7 below.[264]

Figure A15.7: Variation in EBITDA



Source: Bloomberg and BT's Annual Accounts (for Openreach).

A15.191 While some of the evidence above might suggest that the asset beta of Openreach would be closer to that of a network utility, the evidence on this is mixed. For example,

- over time Openreach's operating leverage has declined recently and is well within the range for a network utility, however, this is also the case for BT Group;

[264] We used EBITDA (rather than EBIT) as EBITDA is readily available from *Bloomberg*.

- Openreach's EBITDA volatility seems lower than that of BT Group, but the EBITDA volatility of Openreach has in recent years been towards the upper end of the network utility comparators (and in the last two years has been similar to or somewhat above that of BT Group).

A15.192 Therefore, we do not see that the above analysis points to setting a lower asset beta for Openreach relative to BT Group than currently.

Assessment of the riskiness of BT's investments

A15.193 In its response to our CFI, Europe Economics questioned whether the new innovations by BT, namely its investments in NGA and sports, may have changed the riskiness of the Rest of BT business and increased the wedge between Openreach and the Rest of BT.

A15.194 We recognise that in principle if there was more systematic risk associated with NGA, then this would, other things equal, increase the asset beta for BT Group. But since we are interested in the asset beta for the copper access network business (for which we use "Openreach" as short-hand), NGA investment should not affect the systematic risk associated with that business (although it would increase the wedge between Openreach and the Rest of BT).

A15.195 However, there are two important considerations to consider: first, it is only systematic risk that matters for beta and the WACC, i.e. the WACC should not reflect project-specific risk of failure; second, there are many factors that will contribute to the BT Group asset beta.

A15.196 On the question of systematic risk versus project-specific risk, we consider that it is unclear whether investments in NGA and the cash flows associated with superfast broadband are more correlated with the economy (and therefore subject to more systematic risk) than current generation broadband (or voice). Investment in NGA may well be risky, just as investment in current generation broadband to replace narrowband (dial up) internet may have been risky at the time. But if the project shares the same (or similar) systematic risk as the rest of the business this should not affect the firm's asset beta.

A15.197 Since the take off in superfast broadband in 2010, take-up of both broadband and superfast broadband have steadily increased despite the recent economic recession, as shown by the evidence in Table A15.6 below.

Table A15.6: Take up of broadband and superfast broadband in the UK (m connections)

	2007	2008	2009	2010	2011	2012
Broadband	15.6	17.3	18.2	19.5	20.6	21.7
% change		*10.9%*	*5.2%*	*7.1%*	*5.6%*	*5.3%*
Superfast broadband	0.0	0.0	0.0	0.4	1.1	3.3
% change					*175.0%*	*200.0%*

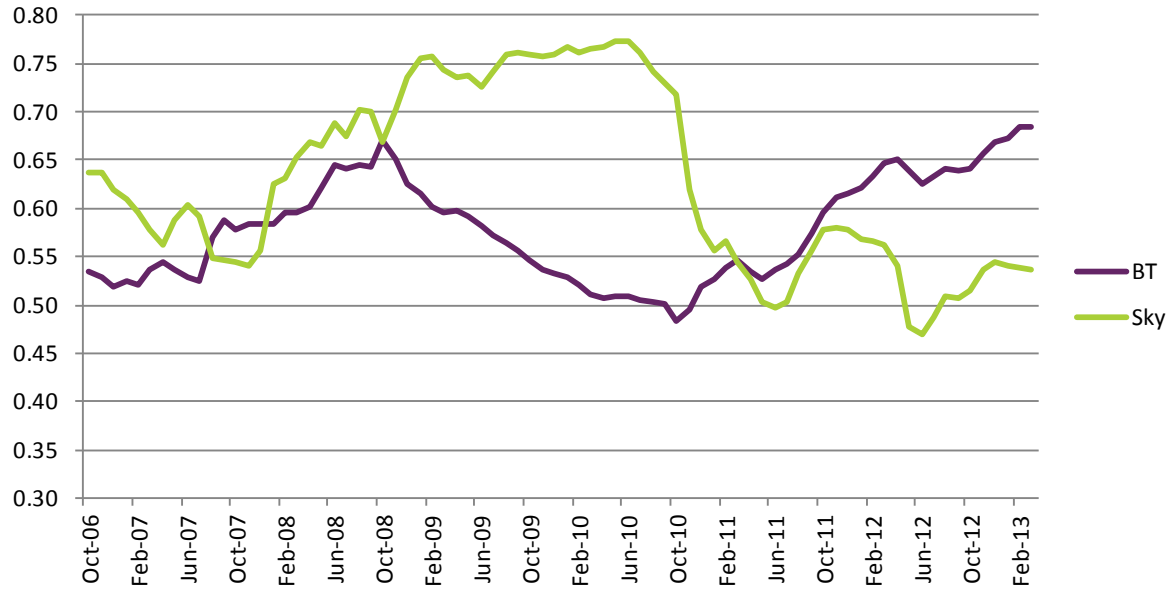
Source: Ofcom.

A15.198 We also note that Virgin Media, which has similarly invested in its own superfast broadband network and has a greater number of superfast broadband subscribers

than BT[265], has tended to have a lower asset beta than BT, as shown above in Figure A15.4. This seems to suggest that investments in NGA do not necessarily imply a higher asset beta.

A15.199 In relation to BT's investment in sports rights, the most obvious comparator would seem to be Sky given its large pay-TV subscriber base and investment in content rights. We present in Figure A15.8 below the rolling asset betas of Sky and BT for the period from January 2006 until January 2013.

Figure A15.8 Rolling asset betas of BT and Sky (2006-2013)



Note: Sky average monthly gearing was derived using market capitalisation and net debt data from Bloomberg. Sky monthly equity betas were obtained from Bloomberg. Sky and BT asset betas are monthly 2-year equity betas based on daily return data against the FTSE All-share index.
Source: Bloomberg (Sky) and Brattle Report (BT) and Ofcom calculations.

A15.200 The evidence shows that Sky's asset beta increased significantly from mid 2007 but then decreased to similar levels to those observed before 2007 by the end of 2010. This seems to suggest that Sky's asset beta increased during the economic downturn and decreased once the downturn started to recede. This alone might suggest that sports TV (a significant part of the premium TV content offered by Sky in the UK) may be more highly correlated with the general economy.

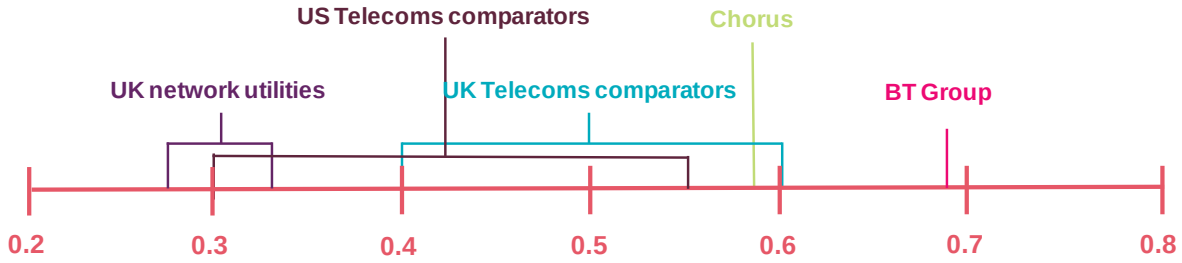
A15.201 However, we note that the increase in BT Group's asset beta started around the first quarter of 2009, while BT's acquisition of sports rights, particularly the English Premier League, was only announced in June 2012.[266] Similarly, BT Group has been active in the pay TV market since it launched BT Vision in December 2006, well before 2009.[267] We therefore consider that the increase in BT Group's asset beta cannot be clearly attributed to BT Group's activities in the TV sector, as suggested by Europe Economics.

[265] In Q1 2013 the number of superfast broadband subscribers on BT's network was 1.5m, compared to Virgin Media's 2.5m (according to both companies' quarterly reports).
[266] http://www.bbc.co.uk/news/business-18430036.
[267] http://news.bbc.co.uk/1/hi/technology/6213960.stm.

Conclusion

A15.202 In Figure A15.9 below we plot the range of asset betas for BT Group and the comparators discussed above.

Figure A15.9: Range of asset betas for BT Group and comparators



A15.203 The evidence presented above shows that BT Group's asset beta has been increasing since October 2010 and is currently above that of other comparable UK telecoms operators. While some of the analysis presented might suggest that the gap in the systematic risk between Openreach and the Rest of BT may have increased, other evidence suggests that the Openreach asset beta should not be moved closer to that of the network utilities (at least not without careful consideration of the implications for the asset beta for the Rest of BT). A possible explanation for the increase in BT Group's asset beta may be the entry of BT into activities such as pay-TV or its investments in NGA. However, this would seem difficult to square with some of the additional evidence we have considered, for example, the asset beta observed for other vertically integrated UK fixed CPs also active in the area of NGA and pay-TV. Nevertheless, there may be these and/or other factors which together add to the systematic risk faced by the Rest of BT.

A15.204 Alternatively, it might be appropriate to consider other ways to disaggregate the BT Group asset beta. Historically, we have determined the weights of Openreach and the Rest of BT based on the accounting value of their assets. In the past this has suggested an approximately equal weighting between Openreach and the Rest of BT). In 2011 Openreach's mean capital employed represented 52% of the total of BT Group's assets and this increased to 58% in 2012.[268]

A15.205 An alternative approach could be to increase the weight ascribed to the Rest of BT, for example if it were thought that the economic value of the assets for the Rest of BT was higher than that implied by the book value or if it were thought that a more suitable weighting to reflect the balance of systematic risk between the different parts of BT could be found. This could result in a reduction in the Openreach asset beta (without causing the asset beta for the Rest of BT to move too far away from that for suitable comparators to the Rest of BT such as other vertically integrated UK fixed CPs), while at the same time maintaining the BT Group asset beta consistent with empirical estimates based on market data.

A15.206 We recognise that our existing approach is based on proxies for inferring the true split of systematic risk between Openreach and the Rest of BT, and any alternative would also be based on the use of proxies (albeit either drawing on different evidence and/or making different regulatory judgments).

[268] These figures are derived from BT's 2012 RFS. In 2011 Openreach's assets represented £9.3bn out of BT's £17.9bn, that is, 52% (see BT's 2012 RFS, pp. 89 and 84). In 2012 Openreach's assets represented £9.0bn out of BT's £15.7bn – i.e. 58% (see BT's 2012 RFS, pp. 88 and 84).

A15.207 We are therefore mindful to exercise caution in changing from one analytical approach to another, particularly when the evidence or means to implement an alternative approach is uncertain. We place some weight on the stability of our analytical approach to calculation of the WACC, as we consider that this is likely to be conducive to providing a stable climate for investment.[269] This is consistent with the CC's view in the 2010 Local Loop Unbundling Appeal:

> "in industries with long-lived assets regulators should take a long-term view of the cost of capital and adjust components only when they believe there has been a permanent shift in the pricing of risk".[270]

A15.208 In light of this, for the purposes of this consultation we have continued to assume that Openreach's asset beta is 10% below that of BT Group and that the asset beta of the Rest of BT is 10% above the level of BT Group. Earlier in this Annex we explained our proposal to adopt the same asset beta for BT Group for this consultation that we used in the 2013 BCMR Statement (i.e. 0.67). This implies an Openreach's asset beta estimate of 0.60 and that the Rest of BT asset beta estimate would be 0.74.

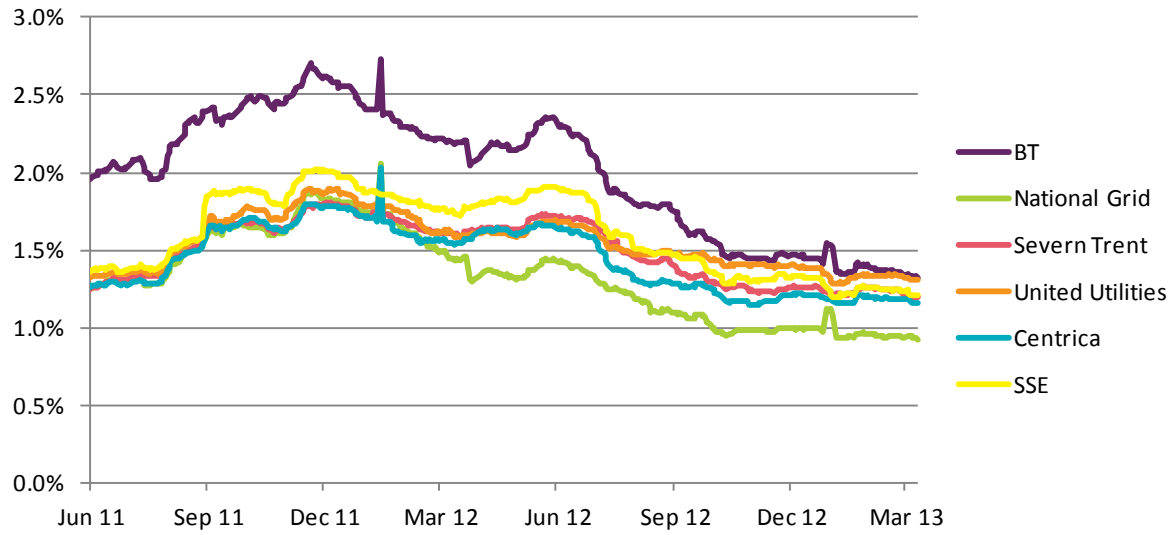
A15.209 We welcome stakeholder views on our assessment of the evidence presented above.

Disaggregating BT Group's debt premium

A15.210 Earlier in this section we explained that we are proposing to assume a debt premium of 1.7-2.3% for BT Group. In order to estimate an appropriate debt premium for Openreach and the Rest of BT we have compared BT Group's debt premium to the range observed for the selected UK network utilities, as shown in Figure A15.10 below. In the chart we use BT's 2017 GBP bond.

[269] See, for example, 2005 Cost of Capital Statement, para. 6.3, http://stakeholders.ofcom.org.uk/binaries/consultations/cost_capital2/statement/final.pdf.
[270] Competition Commission, *The Carphone Warehouse Group plc v Office of Communications,* Case 1111/3/3/09, 31 August 2010, paragraph 2.380, http://www.catribunal.org.uk/files/1.1111_Carphone_Warehouse_CC_Determination_310810.pdf

Figure A15.10: BT and network utilities' corporate bonds spread over benchmark treasury yields (%)

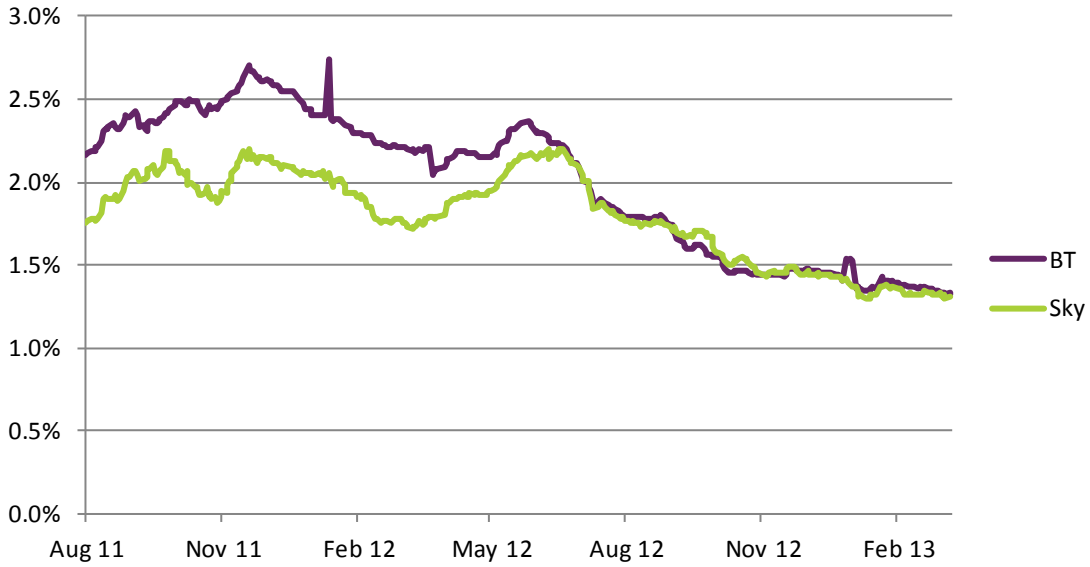


Note: The maturity of the corporate bonds used is: BT 23 June 2017; National Grid 7 June 2017; Severn Trent 22 Jan 2018; United Utilities 14 May 2018; Centrica 24 October 2016; SSE 1 October 2018. There was no corporate bond information available from Bloomberg.
Source: *Bloomberg*

A15.211 The evidence in Figure A15.10 above shows that the gap between the debt premium for BT Group and the network utilities (which was largest around December 2011) has closed although the spread for BT Group debt is at the top of the range of the comparators. The range for the network utilities is now 0.7-1.2%, although in the last year it was around 0.7-1.9%.

A15.212 We have similarly compared the debt premia for BT Group to that of other UK telecoms operators. This is shown in Figure A15.11 below.

Figure A15.11: BT and Sky corporate bonds spread over benchmark treasury yields (%)



Note: The maturity of the corporate bonds used is: BT 23 June 2017 and Sky 20 October 2017. There was no GBP-denominated corporate bond information available from Bloomberg for TalkTalk, Colt and Virgin Media.
Source: *Bloomberg* ('Mid Sprd BM (SRC:BGN)).

A15.213 Figure A15.11 above shows that the gap between the debt premium of Sky and BT Group has closed since around June 2012.

A15.214 We believe that the above evidence, which shows convergence in the debt premium of BT Group, the network utilities and Sky, as well as a declining trend, could suggest that the gap between the debt premium for Openreach and the Rest of BT may have also reduced. However, in principle we would expect that a business with a lower perception of default risk (such as Openreach) may have a lower cost of debt than the Rest of BT and closer to that of the network utilities. Consistent with our approach on the debt premium for BT Group (explained earlier in this section), we are proposing to maintain the debt premia estimates that we used in the 2013 BCMR Statement.

A15.215 Therefore, for the purposes of this consultation, we propose that Openreach's debt premium should be 1.7% (the lower bound of the debt premium range for BT Group) and that for Rest of BT should be 2.3% (the upper bound of the range). However, as explained previously in this annex, as further data becomes available, we will review the range for BT Group itself and BT Group relative to suitable comparators (e.g. network utilities and Sky) in our final statement for the WLR and LLU charge controls.

Question A15.1: *Do you agree with our proposed approach to estimating the cost of capital of BT Group, Openreach and Rest of BT? Please provide reasons to support your views.*

Annex 16

Brattle Group Report on BT Group Beta

A16.1 Please see the PDF document published alongside this consultation entitled Fixed access market reviews consultation on approach to setting LLU and WLR charge controls ESTIMATE OF BT'S EQUITY BETA April 2013.pdf available here: http://stakeholders.ofcom.org.uk/consultations/llu-wlr-cc-13.

Annex 17

Draft legal instruments

Charge control conditions

PART I: PROPOSALS ON SETTING OF SMP CONDITIONS FOR LLU

NOTIFICATION OF PROPOSALS UNDER SECTIONS 48A OF THE COMMUNICATIONS ACT 2003

Proposals for the setting of SMP services conditions in relation to BT under section 45 of the Communications Act 2003

Background

1. On 3 July 2013, OFCOM published a document entitled "*Fixed access market reviews: wholesale local access, wholesale fixed analogue exchange lines, ISDN2 and ISDN30 Consultation on the proposed markets, market power determinations and remedies*" (the "**FAMR Consultation**").[271]

2. Annex 11 to the FAMR Consultation, sets out the notification under sections 48A and 80A of the Communications Act 2003 (**"the Act"**), in accordance with sections 48(1) and 80(1) of the Act, in which OFCOM proposes to:
   - identify certain markets;
   - make market power determinations; and
   - set SMP services conditions.

   (the **"FAMR Notification"**)

3. In the FAMR Notification, OFCOM proposes to identify, among others, the market for the supply of copper loop-based, cable based and fibre-based wholesale local access at a fixed location in the United Kingdom excluding the Hull Area for the purpose of making proposed market power determinations. The FAMR Notification

[271] http://stakeholders.ofcom.org.uk/consultations/fixed-access-market-reviews/

also proposes to make a determination that BT has significant market power on that market over the period of the review undertaken in the FAMR Consultation.

4. In the FAMR Notification, OFCOM proposes to set SMP services conditions on BT, Conditions 1 and 2.1A, which together impose a requirement on BT to provide network access in the form of a Local Loop Unbundling service. The FAMR Consultation, which accompanied the FAMR Notification, proposed that, in principle, a charge control on the Local Loop Unbundling service is necessary. However, it explained that OFCOM would set out its full cost analysis and specific pricing proposals in a separate consultation.

5. Accordingly, in this notification, OFCOM specifies its proposed SMP price control conditions in that regard for the reasons set out in the consultation document attached to this notification. These proposals are made by reference to the proposed market power determination in the FAMR Notification and, as such, are to be treated as supplementary to the FAMR Notification.

Proposals

6. OFCOM hereby gives notice of its proposals, in accordance with section 48A of the Act in relation to the market for the supply of copper loop-based, cable-based and fibre-based wholesale local access at a fixed location in the United Kingdom excluding the Hull Area to set the SMP price control conditions on BT as set out in Schedule 1 to this notification, pursuant to their powers under section 87(9) of the Act. It is proposed that these conditions shall have effect from 1 April 2014.

7. The proposed SMP price control conditions in paragraph 6, above, are set out in the Schedule to this notification. The effect of, and OFCOM's reasons for making, the proposal set out in the Schedule to this notification are contained in the consultation document accompanying this notification.

OFCOM's duties and legal tests

8. For the reasons set out in the consultation document accompanying this notification, OFCOM is satisfied that all applicable legal tests would be met if the proposed SMP price control conditions were to be imposed on BT, including the requirements of sections 45 to 47, 87 and 88 of the Act as appropriate.

9. For the reasons set out in the consultation document accompanying this notification, in proposing to set the SMP price control conditions in Schedule 1, OFCOM has:

- considered and acted in accordance with their general duties set out in section 3, and the six Community requirements in section 4, of the Act; and
- taken due account of all applicable recommendations in accordance with section 4A of the Act.

Representations

10. Representations may be made to OFCOM about the proposals set out in this notification and the accompanying consultation document no later than 25 September 2013.

11. A copy of this notification and the accompanying consultation document have been sent to the Secretary of State, in accordance with section 48C(1) of the Act.

Interpretation

12. For the purpose of interpreting this notification—

(a) except in so far as the context otherwise requires, words or expressions have the meaning assigned to them in paragraph 13 below, and otherwise any word or expression has the same meaning as it has in the Act;

(b) headings and titles shall be disregarded;

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

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

13. In this notification—

(a) "**BT**" means British Telecommunications plc, whose registered company number is 1800000, and any of its subsidiaries or holding companies, or any subsidiary of

such holding companies, all as defined in section 1159 of the Companies Act 2006;

(b) "**Hull Area**" means the area defined as the 'Licensed Area' in the licence granted on 30 November 1987 by the Secretary of State under section 7 of the Telecommunications Act 1984 to Kingston upon Hull City Council and Kingston Communications (Hull) plc (now known as "KCOM");

(c) "**OFCOM**" means the Office of Communications as established pursuant to section 1(1) of the Office of Communications Act 2002 (c. 11); and

(d) "**United Kingdom**" has the meaning given to it in the Interpretation Act 1978 (c.30).

14. Schedule 1 to this notification shall form part of this notification.

Signed by

David Clarkson
Competition Policy Director, OFCOM

A person duly authorised in accordance with paragraph 18 of the Schedule to the Office of Communications Act 2002

11 July 2013

Schedule 1

[DRAFT] SMP services condition 7A imposed on BT under the Communications Act 2003 as a result of the market power determination made by OFCOM in which it has been determined that BT has significant market power

Condition 7A – LLU charge control

7A.1 The Dominant Provider shall take all reasonable steps to secure that, at the end of each Relevant Year, the Percentage Change (determined in accordance with conditions 7A.3 and 7A.4, as applicable) in:

(a) the aggregate of charges for SMPF Ancillary Services;

(b) the aggregate of charges for MPF Ancillary Services;

(c) the aggregate of charges for Co-Mingling Services;

(d) the charge for MPF Rental, except for the First Relevant Year in relation to which the charge ceiling specified in condition 7A.2(a) applies;

(e) the charge for SMPF Rental, except for the First Relevant Year in relation to which the charge ceiling specified in condition 7A.2(b) applies,

(f) the charge for MPF Single Migration, except for the First Relevant Year in relation to which the charge ceiling specified in condition 7A.2(c) applies;

(g) the charge for SMPF Single Migration, except for the First Relevant Year in relation to which the charge ceiling specified in condition 7A.2(d) applies;

(h) the charge for MPF New Provide, except for the First Relevant Year in relation to which the charge ceiling specified in condition 7A.2(e) applies;

(i) the charge for SMPF New Provide, except for the First Relevant Year in relation to which the charge ceiling specified in condition 7A.2(f) applies;

(j) the charge for MPF Bulk Migration, except for the First Relevant Year in relation to which the charge ceiling specified in condition 7A.2(g) applies;

(k) the charge for SMPF Bulk Migration, except for the First Relevant Year in relation to which the charge ceiling specified in condition 7A.2(h) applies;

(l) the charge for MPF Expedite;

(m) the charge for SMPF Expedite;

is not more than the Controlling Percentage (as determined in accordance with condition 7A.6).

7A.2 The Dominant Provider shall not charge more than:

(a) for MPF Rental, the amount of £[82.81 to 89.55] in the First Relevant Year;

(b) for SMPF Rental, the amount of £[7.92 to 9.39] in the First Relevant Year;

(c) for MPF Single Migration, the amount of £[28.90 to 31.04] in the First Relevant Year;

(d) for SMPF Single Migration, the amount of £[28.90 to 31.04] in the First Relevant Year;

(e) for MPF New Provide, the amount of £[40.19 to 43.38] in the First Relevant Year;

(f) for SMPF New Provide, the amount of £[27.06 to 29.20] in the First Relevant Year;

(g) for MPF Bulk Migration, the amount of £[23.95 to 25.94] in the First Relevant Year;

(h) for SMPF Bulk Migration, the amount of £[23.95 to 25.94] in the First Relevant Year;

(i) for MPF Cease, the amount of £0.00 in each Relevant Year; and

(j) for SMPF Cease, the amount of £0.00 in each Relevant Year.

7A.3 The Percentage Change for the purposes of each of the categories of products and/or services (each of which is known as a 'Basket') specified in conditions 7A.1(a) to 7A.1(c) shall be calculated for the purposes of complying with condition 7A.1 by employing the following formula:

$$C_t = \frac{\sum_{i=1}^{n}\left[R_i \frac{(\overline{p}_{t,i} - \overline{p}_{t-1,i})}{\overline{p}_{t-1,i}}\right]}{\sum_{i=1}^{n} R_i}$$

Where:

C_t is the Percentage Change in the aggregate of charges for the services in the Basket for Relevant Year *t*;

n is the number of individual services in the Basket;

i is a number from 1 to *n* for each of the *n* individual services in the Basket;

R_i is the revenue during the Prior Year in respect of the individual service *i* that forms part of the Basket calculated to exclude any discounts offered by the Dominant Provider;

t refers to the Relevant Year;

t-1 refers to the Prior Year;

$\bar{p}_{t,i}$ is the weighted average charge made by the Dominant Provider for the individual service *i* that forms part of the Basket during the Relevant Year excluding any discounts offered by the Dominant Provider:

Where such Relevant Year Weighted Average Charge shall be calculated by employing the following formula:

$$\bar{p}_{t,i} = \sum_{j=1}^{m}\left(w_{j,t,i}\, p_{j,t,i}\right)$$

Where:

m is the number of periods for which there are distinct charges during the Relevant Year;

j is a number from 1 to *m* for each of the *m* periods during which a distinct charge is in effect;

$w_{j,t,i}$ is the proportion of the Relevant Year in which each charge, $p_{j,t,i}$, is in effect, calculated by the number of days during which the charge is in effect and dividing

1) for the First Relevant Year, by 365;
2) for the Second Relevant Year, by 366; and
3) for the Third Relevant Year, by 365.

$p_{j,t,i}$ is the charge for the specified period, *j*, during the Relevant Year *t* for the individual service, *i*;

$\bar{p}_{t-1,i}$ is the weighted average charge made by the Dominant Provider for the individual service *i* that forms part of the Basket during the Prior Year excluding any discounts offered by the Dominant Provider;

Where such Prior Year Weighted Average Charge shall be calculated by employing the following formula:

$$\bar{p}_{t-1,i} = \sum_{j=1}^{m} \left(w_{j,t-1,i}\, p_{j,t-1,i} \right)$$

Where:

m is the number of periods for which there are distinct charges during the Prior Year;

j is a number from 1 to *m* for each of the *m* periods during which a distinct charge is in effect;

$w_{j,t-1,i}$ is the proportion of the Prior Year in which each charge, $p_{j,t-1,i}$, is in effect, calculated by the number of days during which the charge is in effect and dividing

1) for the Prior Year when considering the First Relevant Year, by 365;

2) for the Prior Year when considering the Second Relevant Year, by 365;

3) for the Prior Year when considering the Third Relevant Year, by 366;

$p_{j,t-1,i}$ is the charge for the individual period, *j*, during the Prior Year, for the individual service, *i*.

For the avoidance of doubt, for the purpose of calculating the Percentage Change for the Basket specified in condition 7A.1(c), the revenues for Co-Mingling Services shall be taken to include all revenue from selling Co-Mingling Services and/or other services irrespective of their use.

7A.4 The Percentage Change for the purposes of each of the products and/or services specified (each of which is referred to in this condition as a "single charge category") in conditions 7A.1(d) to 7A.1(m) shall be calculated for the purposes of complying with condition 7A.1 by employing the following formula:

$$C_t = \frac{\left(\overline{p}_t - \overline{p}_{t-1}\right)}{\overline{p}_{t-1}}$$

Where:

C_t, is the Percentage Change in charges for the specific product and/or service in the single charge category in question for the Relevant Year *t*;

t refers to the Relevant Year;

t-1 refers to the Prior Year;

$\bar{p}_t$ shall be calculated by employing the formula set out in condition 7A.3 above for the Relevant Year Weighted Average Charge and its references to individual service *i* shall be treated as references to charges for the specific product and/or service in the single charge category in question; and

$\bar{p}_{t-1}$ shall be calculated by employing the formula set out in condition 7A.3 above for the Prior Year Weighted Average Charge and its references to individual service *i* shall be treated as references to charges for the specific product and/or service in the single charge category in question.

7A.5 In the case of each of the categories of products and/or services that form part of a Basket specified in conditions 7A.1(a), 7A.1(b) and 7A.1(c) respectively, the Dominant Provider shall also and, in any event, take all reasonable steps to secure that, at the end of each Relevant Year, the Percentage Change in discrete charges for each and every product and/or service falling within the Basket in question is no more than the Controlling Percentage increased by [5-7.5] percentage points.

For the purposes of this condition 7A.5:

(a) the Controlling Percentage is the Controlling Percentage (as determined in accordance with condition 7A.6) for the Basket within which the product and/or service falls to which the discrete charges relate; and

(b) the Percentage Change shall be calculated by employing the formula set out in condition 7A.4 and its references to a single charge category shall be treated as references to charges for the specific product and/or service falling with the Basket in question.

7A.6 The Controlling Percentage in relation to any Relevant Year for each of the categories of products and/or services specified in condition 7A.1(a) to 7A.1(m) shall be calculated by employing the following formula:

$$CP_t = \{(100\% + CPI_t + X) \times \ Prior\ Year\ Adjustment\ Ratio_t\} - \ 100\%$$

Where:

CP_t means the Controlling Percentage for Relevant Year *t*;

CPI_t is *CPI for the Relevant Year t*

$Prior\ Year\ Adjustment\ Ratio_t$ is the Prior Year Adjustment Ratio for Relevant Year *t* as determined in condition 7A.7 below

X means:

(a) for the category of products and/or services specified in condition 7A.1(a) [-5% to -12%] percentage points;

(b) for the category of products and/or services specified in condition 7A.1(b) [-5% to -12%] percentage points;

(c) for the category of products and/or services specified in condition 7A.1(c) [-8% to -14%] percentage points;

(d) for the category of products and/or services specified in condition 7A.1(d) [+4% to -4%] percentage points;

(e) for the category of products and/or services specified in condition 7A.1(e) [-6% to -21%] percentage points;

(f) for the category of products and/or services specified in condition 7A.1(f) [-1% to -8%] percentage points;

(g) for the category of products and/or services specified in condition 7A.1(g) [-1% to -8%] percentage points;

(h) for the category of products and/or services specified in condition 7A.1(h) [-7% to -14%] percentage points;

(i) for the category of products and/or services specified in condition 7A.1(i) [-7% to -14%] percentage points;

(j) for the category of products and/or services specified in condition 7A.1(j) [-11% to -18%] percentage points;

(k) for the category of products and/or services specified in condition 7A.1(k) [-11% to -18%] percentage points;

(l) for the category of products and/or services specified in condition 7A.1(l) [0%] percentage points;

(m) for the category of products and/or services specified in condition 7A.1(m) [0%] percentage points.

For the avoidance of doubt, the MPF Rental, SMPF Rental, MPF Single Migration, SMPF Single Migration, MPF New Provide, SMPF New Provide, MPF Bulk Migration and SMPF Bulk Migration charges are constrained by 7A.2 in the First Relevant Year.

7A.7 The Prior Year Adjustment Ratio in relation to any Relevant Year for each of the categories of products and/or services specified in condition 7A.1(a) to 7A.1(m) shall be:

(a) one for the First Relevant Year; and

(b) calculated by employing the following formula for the Second Relevant Year and Third Relevant Year:

$$Prior\ Year\ Adjustment\ Ratio_t = (100\% + CP_{t-1}) \,/\, (100\% + C_{t-1})$$

Where:

CP_{t-1} means the Controlling Percentage for the relevant categories of products and/or services specified in Condition 7A.1(a) to 7A.1(m) for the Prior Year, which shall be equal to:

1) the Controlling Percentage for the First Relevant Year when considering the Second Relevant Year;
2) the Controlling Percentage for the Second Relevant Year when considering the Third Relevant year;

C_{t-1} means the Percentage Change for the relevant categories of products and/or services specified in Condition 7A.1(a) to 7A.1(m) for the Prior Year, which shall be equal to:

1) the Percentage Change for the First Relevant Year when considering the Second Relevant Year;
2) the Percentage Change for the Second Relevant Year when considering the Third Relevant year.

7A.8 The Dominant Provider shall ensure that during each Relevant Year:

(a) the charge made by it for MPF Special Fault Investigation 2 (SFI2) - Base module is the same as the charge made by it for SMPF Special Fault Investigation 2 (SFI2) - Base module;

(b) the charge made by it for MPF Special Fault Investigation 2 (SFI2) - Network module is the same as the charge made by it for SMPF Special Fault Investigation 2 (SFI2) - Network module;

(c) the charge made by it for MPF Special Fault Investigation 2 (SFI2) - Frame module is the same as the charge made by it for SMPF Special Fault Investigation 2 (SFI2) - Frame module;

(d) the charge made by it for MPF Special Fault Investigation 2 (SFI2) - Internal Wiring module is the same as the charge made by it for SMPF Special Fault Investigation 2 (SFI2) - Internal Wiring module;

(e) the charge made by it for MPF Special Fault Investigation 2 (SFI2) - Internal equip module is the same as the charge made by it for SMPF Special Fault Investigation 2 (SFI2) - Internal equip module;

(f) the charge made by it for MPF Special Fault Investigation 2 (SFI2) - Coop module is the same as the charge made by it for SMPF Special Fault Investigation 2 (SFI2) - Coop module; and

(g) the charge made by it for MPF Special Fault Investigation 2 (SFI2) - Frame direct module is the same as the charge made by it for SMPF Special Fault Investigation 2 (SFI2) - Frame direct module.

For the avoidance of doubt, nothing in this condition 7A.8 shall prevent the Dominant Provider from increasing and/or decreasing the charges made for each of the services at conditions 7A.8 (a) to (g) above provided the requirements set out in condition 6.1 (basis of charges) and this condition 7A.8 are complied with.

7A.9 The Dominant Provider shall ensure that during each Relevant Year:

(a) the charge made by it for MPF Service Maintenance Level 3 is the same as the charge made by it for WLR Service Maintenance Level 3;

(b) the charge made by it for MPF Service Maintenance Level 4 is the same as the charge made by it for WLR Service Maintenance Level 4;

(c) the charge made by it for SMPF Service Maintenance Level 3 is the same as the charge made by it for WLR Service Maintenance Level 3; and

(d) the charge made by it for SMPF Service Maintenance Level 4 is the same as the charge made by it for WLR Service Maintenance Level 4.

For the avoidance of doubt, nothing in this condition 7A.9 shall prevent the Dominant Provider from increasing and/or decreasing the charges made for each of the services at conditions 7A.9 (a) to (d) above provided the requirements set out in this condition 7A.9 are complied with.

7A.10 Where:

(a) the Dominant Provider makes a material change (other than to a Charge) to any Charge Controlled Service for which a Charge is charged;

(b) the Dominant Provider makes a change to the date on which its financial year ends; or

(c) there is a material change in the basis of the Consumer Prices Index,

conditions 7A.1 to 7A.9 shall have effect subject to such reasonable adjustment to take account of the change as OFCOM may direct to be appropriate in the circumstances. For the purposes of this condition 7A.10, a material change to the Charge Controlled Service includes (but is not limited to) the introduction of a new product and/or service wholly or substantially in substitution for that existing Charge Controlled Service.

7A.11 The Dominant Provider must record, maintain and supply to OFCOM in an electronic format, no later than three months after the end of each Relevant Year, the data necessary for OFCOM to monitor compliance of the Dominant Provider with the price control. The data must include:

(a) pursuant to Condition 7A.3 and 7A.4, as applicable, the calculated Percentage Change relating to each category of products and services listed in conditions 7A.1(a) through to 7A.1(m);

(b) all relevant data the Dominant Provider used in the calculation of the Percentage Change as set out in Conditions 7A.3 and 7A.4 above, including for each specific service;

(c) all charges, excluding any discounts, published by the Dominant Provider from time to time during the Relevant Year and the Prior Year, including the periods such charges were in force;

(d) the Relevant Year Weighted Average Charges and the Prior Year Weighted Average Charges for all of the services for which Conditions 7A.3 and 7A.4 apply and calculations thereof; and

(e) other data necessary for monitoring compliance with the charge control,

whereby all relevant revenues in respect of a specific service in the Basket are provided to at least the nearest £1,000.

7A.12 If it appears to OFCOM that the Dominant Provider is likely to fail to secure that the Percentage Change does not exceed the Controlling Percentage for the Third Relevant Year, the Dominant Provider shall make such adjustment to any of its charges for the provision of Charge Controlled Service and by such day in the Third Relevant Year (or if appropriate in OFCOM's opinion, by such day that falls after the end of the Third Relevant Year) as OFCOM may direct for the purpose of avoiding such a failure.

7A.13 Conditions 7A.1 to 7A.12 shall not apply to such extent as OFCOM may direct.

7A.14 The Dominant Provider shall comply with any direction OFCOM may make from time to time under this Condition.

7A.15 In this Condition:

(a) "**Basket**" shall be construed in accordance with condition 7A.3;

(b) "**Charge**" means for the purposes of condition 7A.10, the charge (being in all cases the amounts offered or charged by the Dominant Provider) to a communications provider for the Charge Controlled Service;

(c) "**Charge Controlled Service**" means a service or Basket of services listed in 7A.1(a) to 7A.1(m);

(d) "**Co-Mingling Services**" means all of the products and/or services listed from time to time for the purpose of Part 3 of the Annex to this Condition;

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

(f) "**Controlling Percentage**" is to be determined in accordance with condition 7A.6;

(g) "**CPI**" means the amount of the change in the Consumer Prices Index in the period of twelve months ending on 31 October immediately before the beginning of a Relevant Year, expressed as a percentage (rounded to two decimal places) of that Consumer Prices Index as at the beginning of that first mentioned period;

(h) "**Dominant Provider**" means British Telecommunications plc, whose registered company number is 1800000, and any of its subsidiaries or holding companies, or any subsidiary of such holding companies, all as defined in section 1159 of the Companies Act 2006;

(i) **"Metallic Path Facilities"** means a circuit comprising a pair of twisted metal wires employing electric, magnetic, electro-magnetic, electro-chemical or electro-mechanical energy to convey signals when connected to an electronic communications network;

(j) "**MPF Ancillary Services**" means all of the products and/or services listed from time to time for the purpose of Part 2 of the Annex to this Condition;

(k) **"MPF Bulk Migration"** shall be construed as having the same meaning as 'MPF Same CP Mass Migration charge - Normal hours' as provided by the Dominant Provider on its website for definitions and explanations of its products;

(l) "**MPF Cease**" shall be construed as having the same meaning as 'MPF Cease charge' as provided by the Dominant Provider on its website for definitions and explanations of its products;

(m) "**MPF Expedite**" shall be construed as having the same meaning as 'MPF Expedite' as provided by the Dominant Provider on its website for definitions and explanations of its products;

(n) "**MPF New Provide**" shall be construed as having the same meaning as 'MPF Connection charge – New Provide Standard' as provided by the Dominant Provider on its website for definitions and explanations of its products;

(o) "**MPF Rental**" shall be construed as the annual rental of access to Metallic Path Facilities;

(p) "**MPF Single Migration**" shall be construed as having the same meaning as 'MPF Connection charge - Singleton migrations (Transfer from WLR/SMPF or Change of CP migrations)' has as provided by the Dominant Provider on its website for definitions and explanations of its products;

(q) "**MPF Service Maintenance Level 3**" shall be construed as having the same meaning as 'Service Maintenance Level 3 (Annual Rental)' in respect of the feature 'LLU MPF', as provided by the Dominant Provider on its website for definitions and explanations of its products;

(r) "**MPF Service Maintenance Level 4**" shall be construed as having the same meaning as 'Service Maintenance Level 4 (Annual Rental)' in respect of the feature 'LLU MPF', as provided by the Dominant Provider on its website for definitions and explanations of its products;

(s) "**MPF Special Fault Investigation 2 (SFI2) - Base module**" shall be construed as having the same meaning as 'MPF Special Fault Investigation 2 (SFI2) - Base

module' as provided by the Dominant Provider on its website for definitions and explanations of its products;

(t) "**MPF Special Fault Investigation 2 (SFI2) - Coop module**" shall be construed as having the same meaning as 'MPF Special Fault Investigation 2 (SFI2) - Coop module' as provided by the Dominant Provider on its website for definitions and explanations of its products;

(u) "**MPF Special Fault Investigation 2 (SFI2) - Frame direct module**" shall be construed as having the same meaning as 'MPF Special Fault Investigation 2 (SFI2) - Frame direct module' as provided by the Dominant Provider on its website for definitions and explanations of its products;

(v) "**MPF Special Fault Investigation 2 (SFI2) - Frame module**" shall be construed as having the same meaning as 'MPF Special Fault Investigation 2 (SFI2) - Frame module' as provided by the Dominant Provider on its website for definitions and explanations of its products;

(w) "**MPF Special Fault Investigation 2 (SFI2) - Internal equip module**" shall be construed as having the same meaning as 'MPF Special Fault Investigation 2 (SFI2) - Internal equip module' as provided by the Dominant Provider on its website for definitions and explanations of its products;

(x) "**MPF Special Fault Investigation 2 (SFI2) - Internal Wiring module**" shall be construed as having the same meaning as 'MPF Special Fault Investigation 2 (SFI2) - Internal Wiring module' as provided by the Dominant Provider on its website for definitions and explanations of its products;

(y) "**MPF Special Fault Investigation 2 (SFI2) - Network module**" shall be construed as having the same meaning as 'MPF Special Fault Investigation 2 (SFI2) - Network module' as provided by the Dominant Provider on its website for definitions and explanations of its products;

(z) "**OFCOM**" means the Office of Communications as established pursuant to section 1(1) of the Office of Communications Act 2002;

(aa) "**Percentage Change**" has the meaning given to it in condition 7A.4 and 7A.5, as applicable;

(bb) "**Prior Year**" means the period of 12 months ending on 31 March immediately preceding the Relevant Year;

(cc) **"Prior Year Adjustment Ratio"** shall be construed in accordance with condition 7D.7;

(dd) "**Relevant Year**" means each of the following three periods:

(1) the period beginning on 1 April 2014 and ending on 31 March 2015 (the "**First Relevant Year**");

(2) the period beginning on 1 April 2015 and ending on 31 March 2016 (the "**Second Relevant Year**");

(3) the period beginning on 1 April 2016 and ending on 31 March 2017 (the "**Third Relevant Year**");

(ee) **"Shared Access"** means the non-voice band frequency of Metallic Path Facilities;

(ff) "**SMPF Ancillary Services**" means all of the products and/or services listed from time to time for the purpose of Part 1 of the Annex to this Condition;

(gg) **"SMPF Bulk Migration"** shall be construed as having the same meaning as 'SMPF Bulk Migrations charge Normal Delivered during a 24 hour period' as as provided by the Dominant Provider on its website for definitions and explanations of its products;

(hh) "**SMPF Cease**" shall be construed as having the same meaning as 'SMPF Cease charge' as provided by the Dominant Provider on its website for definitions and explanations of its products;

(ii) "**SMPF Expedite**" shall be construed as having the same meaning as 'SMPF Expedite' as provided by the Dominant Provider on its website for definitions and explanations of its products;

(jj) "**SMPF New Provide**" means the provision of Shared Access on a line that previously did not have Shared Access, including when the line was previously provided with Metallic Path Facilities;

(kk) "**SMPF Rental**" shall be construed as rental of access to the non-voice band frequency of Metallic Path Facilities; and

(ll) "**SMPF Service Maintenance Level 3**" shall be construed as having the same meaning as 'Service Maintenance Level 3 (Annual Rental)' in respect of the feature 'LLU Shared MPF', as provided by the Dominant Provider on its website for definitions and explanations of its products;

(mm) "**SMPF Service Maintenance Level 4**" shall be construed as having the same meaning as 'Service Maintenance Level 4 (Annual Rental)' in respect of the feature 'LLU Shared MPF', as provided by the Dominant Provider on its website for definitions and explanations of its products;

(nn) "**SMPF Single Migration**" means the transfer of control of a Shared Access service for a single line from one Communications Provider to another;

(oo) "**SMPF Special Fault Investigation 2 (SFI2) - Base module**" shall be construed as having the same meaning as 'SMPF Special Fault Investigation 2 (SFI2) - Base module' as provided by the Dominant Provider on its website for definitions and explanations of its products;

(pp) "**SMPF Special Fault Investigation 2 (SFI2) - Coop module**" shall be construed as having the same meaning as 'SMPF Special Fault Investigation 2 (SFI2) - Coop module' as provided by the Dominant Provider on its website for definitions and explanations of its products;

(qq) "**SMPF Special Fault Investigation 2 (SFI2) - Frame direct module**" shall be construed as having the same meaning as 'SMPF Special Fault Investigation 2 (SFI2) - Frame direct module' as provided by the Dominant Provider on its website for definitions and explanations of its products;

(rr) "**SMPF Special Fault Investigation 2 (SFI2) - Frame module**" shall be construed as having the same meaning as 'SMPF Special Fault Investigation 2 (SFI2) - Frame module' as provided by the Dominant Provider on its website for definitions and explanations of its products;

(ss) "**SMPF Special Fault Investigation 2 (SFI2) - Internal equip module**" shall be construed as having the same meaning as 'SMPF Special Fault Investigation 2 (SFI2) - Internal equip module' as provided by the Dominant Provider on its website for definitions and explanations of its products;

(tt) "**SMPF Special Fault Investigation 2 (SFI2) - Internal Wiring module**" shall be construed as having the same meaning as 'SMPF Special Fault Investigation 2 (SFI2) - Internal Wiring module' as provided by the Dominant Provider on its website for definitions and explanations of its products;

(uu) "**SMPF Special Fault Investigation 2 (SFI2) - Network module**" shall be construed as having the same meaning as 'MPF Special Fault Investigation 2 (SFI2) - Network module' as provided by the Dominant Provider on its website for definitions and explanations of its products;

(vv) "**Prior Year Weighted Average Charge**" is to be determined in accordance with the formula in condition 7A.3;

(ww) "**Relevant Year Weighted Average Charge**" is to be determined in accordance with the relevant formula in condition 7A.3;

(xx) "**WLR Service Maintenance Level 3**" shall be construed as having the same meaning as 'Service Maintenance Level 3 (Annual Rental)' in respect of the feature 'WLR – Wholesale Premium - per line', as provided by the Dominant Provider on its website for definitions and explanations of its products; and

(yy) "**WLR Service Maintenance Level 4**" shall be construed as having the same meaning as 'Service Maintenance Level 4 (Annual Rental)' in respect of the feature 'WLR – Wholesale Premium - per line', as provided by the Dominant Provider on its website for definitions and explanations of its products.

Annex to Condition 7A

Products and/or services subject to charge control pursuant to conditions

7A.1(a), 7A.1(b) and 7A.1(c)

Part 1

Meaning of SMPF Ancillary Services

For the purposes of Condition 7A, the expression "**SMPF Ancillary Services**" shall be construed as including only the following eight products and/or services, subject to such changes as OFCOM may direct from time to time following any proposal by the Dominant Provider to introduce a new product and/or service or to substitute one or more of these eight products and/or services for another (in which case this list shall be construed accordingly):

Item
1. SMPF Tie Pair Modification (3 working day lead time Re-termination)
2. SMPF Tie Pair Modification (Multiple Re-termination)
3. SMPF MDF Remove Jumper Order Singleton Charge
4. SMPF MDF Remove Jumper Order Bulk Charge
5. Cancellation of SMPF orders for Provide, Simultaneous provide, Migration, Modification or Amend
6. Amend orders. Allowable change to SMPF Order
7. SMPF Standard line test
8. SMPF Flexi Cease Fault Investigation Charges

Except in so far as the context otherwise requires, the terms or descriptions of products and/or services used in this Part 1 shall be construed as having the same meaning as those provided by the Dominant Provider on its website for definitions and explanations of its products in addition to future product updates. These are as at *[date]* found as follows:

- For SMPF product information, please refer to: http://www.openreach.co.uk/orpg/home/products/llu/mpf/mpf.do
- For assurance information including care levels, please refer to the Service Products section of the Openreach website: http://www.openreach.co.uk/orpg/home/products/serviceproducts/service_products.do
- For 21C related products, please refer to LLU secure portal, of the Openreach website for which CPs need to request access. This is done by choosing “LLU secure” from the Local Loop Unbundling menu available at: http://www.openreach.co.uk/orpg/home/products/llu/llu.do
- For information held in the price list, please refer to the “LLU Pricing” section of the price list available at: http://www.openreach.co.uk/orpg/home/products/pricing/loadPricing.do

Part 2

Meaning of MPF Ancillary Services

For the purposes of Condition 7A, the expression "**MPF Ancillary Services**" shall be construed as including only the following nine products and/or services, subject to any such changes as OFCOM may direct from time to time following any proposal by the Dominant Provider to introduce a new product and/or service or to substitute one or more of these nine products and/or services for another (in which case this list shall be construed accordingly):

	Item
1.	MPF Connection Charge Stopped Line Provide
2.	MPF Tie Pair Modification (3 working day lead time Re-termination)
3.	MPF Tie Pair Modification (Multiple Re-termination)
4.	MPF MDF Remove Jumper Order Singleton Charge
5.	MPF MDF Remove Jumper Order Bulk Charge
6.	Cancellation of MPF orders for Provide, Migration, Modification or Amend
7.	Amend orders. Allowable change to MPF Order
8.	MPF Standard line test
9.	MPF Working Line Takeover (WLTO)

Except in so far as the context otherwise requires, the terms or descriptions of products and/or services used in this Part 2 shall be construed as having the same meaning as those provided by the Dominant Provider on its website for definitions and explanations of its products in addition to future product updates. These are as at *[date]* found as follows:

- For MPF product information, please refer to http://www.openreach.co.uk/orpg/home/products/llu/mpf/mpf.do
- For assurance information including care levels, please refer to the Service Products section of the Openreach website: http://www.openreach.co.uk/orpg/home/products/serviceproducts/service_products.do
- For 21C related products including Test Access Product, please refer to LLU secure portal, of the Openreach website for which CPs need to request access. This is done by choosing "LLU secure" from the Local Loop Unbundling menu available at: http://www.openreach.co.uk/orpg/home/products/llu/llu.do

- For information held in the price list, please refer to the “LLU Pricing” section of the price list available at: http://www.openreach.co.uk/orpg/home/products/pricing/loadPricing.do

Part 3

Meaning of Co-Mingling Services

For the purposes of Condition 7A, the expression "**Co-Mingling Services**" shall be construed as including only the following eighty one products and/or services, subject to any such changes as OFCOM may direct from time to time following any proposal by the Dominant Provider to introduce a new product and/or service or to substitute one or more of these eighty one products and/or services for another (in which case this list shall be construed accordingly):

	Item
1.	Internal Tie Cable (2)
2.	Internal Tie Cable (2)
3.	Internal Tie Cable (2) Jointing Fixed Charge per External Tie Cable
4.	Handover Distribution Frame Extension to provide additional 1500 tie pair capacity for MCU1
5.	Additional Handover Distribution Frame to provide additional 4800 tie pair capacity for B-BUSS7
6.	Standalone Handover Distribution Frame (HDF) 9
7.	Standalone Handover Distribution Frame (HDF) 18
8.	MDF Licence Fee per Internal Tie Cable per annum
9.	20 CN Enhanced Specification LLU Internal Tie Cable (1) for Co-location and Co-mingling
10.	20 CN Enhanced Specification LLU Internal Tie Cable (1) for Co-location and Co-mingling
11.	21CN-32 pair standard Internal Tie Cable-HDF connected
12.	21CN-32 pair standard Internal Tie Cable-HDF connected
13.	21CN-64 pair standard Internal Tie Cable-HDF connected
14.	21CN-64 pair standard Internal Tie Cable-HDF connected
15.	21CN-32 pair enhanced Internal Tie Cable-HDF connected
16.	21CN-32 pair enhanced Internal Tie Cable-HDF connected

17. 21CN-64 pair enhanced Internal Tie Cable-HDF connected
18. 21CN-64 pair enhanced Internal Tie Cable-HDF connected
19. 21CN-100 pair enhanced Internal Tie Cable-HDF connected
20. 21CN-100 pair enhanced Internal Tie Cable-HDF connected
21. LLU Internal Tie Cable Cease of 1-10 Cables (per Point of Presence)
22. LLU Internal Tie Cable Cease of 11-20 Cables (per Point of Presence)
23. LLU Internal Tie Cable Cease of 21-30 Cables (per Point of Presence)
24. LLU Internal Tie Cable Cease of 31-40 Cables (per Point of Presence)
25. LLU Internal Tie Cable Cease of 41-50 Cables (per Point of Presence)
26. BT Provided External 100 Pair cable @ 100 metres - Rental per annum fixed charge per cable
27. BT Provided External 100 Pair cable @ 100 metres - Connection fixed charge per cable
28. BT Provided External 100 Pair cable @ 100 metres - Rental per annum Per extra 100 pairs
29. BT Provided External 100 Pair cable @ 100 metres - Connection Per extra 100m
30. BT Provided External -500 Pair cable @ 100 metres - Rental per annum fixed charge per cable
31. BT Provided External -500 Pair cable @ 100 metres - Connection fixed charge per cable
32. BT Provided External -500 Pair cable @ 100 metres - Rental per annum Per extra 100m
33. BT Provided External -500 Pair cable @ 100 metres - Connection Per extra 100m
34. BT Provided External 500 Pair cable @ 100 metres - Rental per annum Per extra 100 pairs
35. BT Provided External 500 Pair cable @ 100 metres - Connection fixed charge Per extra 100 pairs
36. BT Provided External 100 Pair cable @ 100 metres - Rental per annum Per

extra 100m

37. BT Provided External 100 Pair cable @ 100 metres - Connection Per extra 100 pairs

38. Operator provided External 100 Pair cable pull through @ 100 metres - Rental fixed per annum (fixed charge per cable)

39. Operator provided External 100 Pair cable pull through @ 100 metres - Connection (fixed charge per cable)

40. Operator Provided External 500 Pair cable pull through @ 100 metres - Rental fixed per annum (fixed charge per cable)

41. Operator Provided External 500 Pair cable pull through @ 100 metres - Connection (fixed charge per cable)

42. Operator provided External 100 Pair cable pull through @ 100 metres - rental fixed per annum Per extra 100 pairs

43. Operator provided External 100 Pair cable pull through @ 100 metres - Connection Per extra 100 pairs

44. Operator provided External 500 Pair cable pull through @ 100 metres - rental fixed per annum Per extra 100 pairs

45. Operator provided External 500 Pair cable pull through @ 100 metres - Connection Per extra 100 pairs

46. Hand-over Distribution Frame charge per 100 pair tie cable

47. Distant location full survey

48. Missed joint survey or testing appointment

49. Co-location order rejection - no space available

50. Co-location full survey

51. Site visit charge to be allocated to all orders not in conjunction with the installation of a base product.

52. Co-Mingling order rejection - no space or insufficient space available

53. Co-Mingling set up fee (per sq metre)

54. Comingling Shared Point of Presence Administration Fee

55. Ancillary Service Structure upgrade from 1-3 Rack Space Units to 4-6 Rack

Space Units

56. Ancillary Service Structure downgrade from 4-6 Rack Space Units to 1-3 Rack Space Units
57. AC Final Distribution Rental per 10kw increment per annum (Charges will appear in billed units of decawatts (100W)
58. Cooling per kw
59. Upgrade of existing MCU1 product to MCU2
60. Upgrade of existing BBUSS3 Point Of Presence to BBUSS7 (power and space)
61. Upgrade of existing BBUSS 3 Point Of Presence to B-BUSS 7 (space only)
62. Downgrade of existing BBUSS 7 Point Of Presence to B-BUSS 3 (space only)
63. Upgrade of existing MCU1 / MCU2 to MCU1Max / MCU2Max
64. Out of Hours Connection Fee for upgrade of existing MCU1 / MCU2 to MCU1Max / MCU2Max
65. Upgrade of existing MCU1 / MCU2 to MCU1MaxAux / MCU2MaxAux
66. Out of Hours Connection Fee for upgrade of existing MCU1 / MCU2 to MCU1MaxAux / MCU2MaxAux
67. Security rental per sq. Metre
68. Service Charge per square metre per annum
69. BT’s Normal Working Hours, planned
70. BT’s Normal Working Hours, unplanned
71. BASIS (BT Assisted Site Delivery Service) fixed charge
72. Site Access
73. Handover
74. Security partitioning per site charge
75. ESS Survey for capacity upgrade
76. ESS Rental of existing capacity per kW per annum (Charges will appear in billed units of decawatts (10W))
77. Provision of sub meter
78. APO Cancellation Charge

79. Internal 100 pair Tie Cable - HDF connected (1) for Co-Location and Co-Mingling - Connection

80. Internal 100 pair Tie Cable - HDF connected (1) for Co-Location and Co-Mingling - Rental

81. Duct Charge - Hand-over Distribution Frame option per 100 pair Frame capacity

Except in so far as the context otherwise requires, the terms or descriptions of products and/or services used in this Part 3 shall be construed as having the same meaning as those provided by the Dominant Provider on its website for definitions and explanations of its products in addition to future product updates. These are as at *[date]* found as follows:

- For SMPF and MPF product information, please refer to http://www.openreach.co.uk/orpg/home/products/llu/llu.do
- For assurance information including care levels, please refer to the Service Products section of the Openreach website: http://www.openreach.co.uk/orpg/home/products/serviceproducts/service_products.do
- For 21C related products, please refer to LLU secure portal, of the Openreach website for which CPs need to request access. This is done by choosing “LLU secure” from the Local Loop Unbundling menu available at: http://www.openreach.co.uk/orpg/home/products/llu/llu.do

For information held in the price list, please refer to the Plan and Build area within the “Local Loop Unbundling Pricing” section of the price list available at: http://www.openreach.co.uk/orpg/home/products/pricing/loadPricing.do

PART II: PROPOSALS ON SETTING OF SMP CONDITIONS FOR WLR

NOTIFICATION OF PROPOSALS UNDER SECTIONS 48A OF THE COMMUNICATIONS ACT 2003

Proposals for the setting of SMP services conditions to be imposed on BT under section 45 of the Communications Act 2003

Background

1. On 3 July 2013, OFCOM published a document entitled "*Fixed access market reviews: wholesale local access, wholesale fixed analogue exchange lines, ISDN2 and ISDN30 Consultation on the proposed markets, market power determinations and remedies*" (the "**FAMR Consultation**").[272]

2. Annex 11 to the FAMR Consultation, sets out the notification under sections 48A and 80A of the Communications Act 2003 (**"the Act"**), in accordance with sections 48(1) and 80(1) of the Act, in which OFCOM proposes to:
   - identify certain markets;
   - make market power determinations; and
   - set SMP services conditions.

   (the **"FAMR Notification"**)

3. In the FAMR Notification, OFCOM proposes to identify, among others, the market for wholesale fixed analogue exchange line services in the United Kingdom excluding the Hull Area for the purpose of making proposed market power determinations. The FAMR Notification also proposes to make a determination that BT has significant market power on that market over the period of the review undertaken in the FAMR Consultation.

4. In the FAMR Notification, OFCOM proposes to set SMP services conditions on BT, Conditions 1 and 2.1B, which together impose a requirement on BT to provide network access in the form of a wholesale analogue line rental service. The FAMR Consultation, which accompanied the FAMR Notification, proposed that, in principle,

[272] http://stakeholders.ofcom.org.uk/consultations/fixed-access-market-reviews/

a charge control on the wholesale analogue line rental service is necessary. However, it explained that OFCOM would set out its full cost analysis and specific pricing proposals in a separate consultation.

5. Accordingly, in this notification, OFCOM specifies its proposed SMP price control conditions in that regard for the reasons set out in the consultation document attached to this notification. These proposals are made by reference to the proposed market power determinations in the FAMR Notification and, as such, are to be treated as supplementary to the FAMR Notification.

Proposals

6. OFCOM hereby gives notice of its proposals, in accordance with section 48A of the Act in relation to the market for wholesale fixed analogue exchange line access in the United Kingdom excluding the Hull Area to set the SMP price control conditions on BT as set out in Schedule 1 to this notification, pursuant to their powers under section 87(9) of the Act. It is proposed that these conditions shall have effect from 1 April 2014.

7. The proposed SMP price control conditions in paragraph 6, above, are set out in the Schedule to this notification. The effect of, and OFCOM's reasons for making, the proposal set out in the Schedule to this notification are contained in the consultation document accompanying this notification.

8. For the reasons set out in the consultation document accompanying this notification, OFCOM is satisfied that all applicable legal tests would be met if the proposed SMP price control conditions were to be imposed on BT, including the requirements of sections 45 to 47, 87 and 88 of the Act as appropriate.

9. For the reasons set out in the consultation document accompanying this notification, in proposing to set the SMP price control conditions in Schedule 1, OFCOM has:
   - considered and acted in accordance with their general duties set out in section 3, and the six Community requirements in section 4, of the Act; and
   - taken due account of all applicable recommendations in accordance with section 4A of the Act.

Representations

10. Representations may be made to OFCOM about the proposals set out in this notification and the accompanying consultation document no later than 25 September 2013.

11. A copy of this notification and the accompanying consultation document have been sent to the Secretary of State, in accordance with section 48C(1) of the Act.

Interpretation

12. For the purpose of interpreting this notification—

(a) except in so far as the context otherwise requires, words or expressions have the meaning assigned to them in paragraph 13 below, and otherwise any word or expression has the same meaning as it has in the Act;

(b) headings and titles shall be disregarded;

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

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

13. In this notification—

(a) "**BT**" means British Telecommunications plc, whose registered company number is 1800000, and any of its subsidiaries or holding companies, or any subsidiary of such holding companies, all as defined in section 1159 of the Companies Act 2006;

(b) "**Hull Area**" means the area defined as the 'Licensed Area' in the licence granted on 30 November 1987 by the Secretary of State under section 7 of the Telecommunications Act 1984 to Kingston upon Hull City Council and Kingston Communications (Hull) plc;

(c) "**OFCOM**" means the Office of Communications as established pursuant to section 1(1) of the Office of Communications Act 2002 (c. 11); and

(d) "**United Kingdom**" has the meaning given to it in the Interpretation Act 1978 (c. 30).

14. Schedule 1 to this notification shall form part of this notification.

Signed by

David Clarkson
Competition Policy Director

A person duly authorised in accordance with paragraph 18 of the Schedule to the Office of Communications Act 2002

11 July 2013

Schedule 1

[DRAFT] SMP services condition 7C imposed on BT under the Communications Act 2003 as a result of the market power determination made by OFCOM in which it has been determined that BT has significant market power

Condition 7C – WLR charge control

7C.1 The Dominant Provider shall take all reasonable steps to secure that, at the end of each Relevant Year, the Percentage Change (determined in accordance with condition 7C.3) in:

(a) the charge for Wholesale Analogue Line Rental, except for the First Relevant Year in relation to which the charge ceiling specified in condition 7C.2(a) applies;

(b) the charge for WLR Transfer, except for the First Relevant Year in relation to which the charge ceiling specified in condition 7C.2(b) applies;

(c) the charge for WLR New Connection, except for the First Relevant Year in relation to which the charge ceiling specified in condition 7C.2(c) applies; and

(d) the charge for WLR Conversion, except for:

(i) the First Relevant Year; and/or

(ii) when that service is Simultaneously Provided with SMPF New Provide,

in relation to which the charge ceilings specified in condition 7C.2(d) apply;

is not more than the Controlling Percentage (as determined in accordance with condition 7C.4).

7C.2 The Dominant Provider shall not charge more than:

(a) for Wholesale Analogue Line Rental, the amount of £[88.14 to 93.55] in the First Relevant Year;

(b) for WLR Transfer, the amount of £[4.69 to 4.99] in the First Relevant Year;

(c) for WLR New Connection, the amount of £[41.12 to 44.41] in the First Relevant Year;

(d) for WLR Conversion:

(i) when not Simultaneously Provided with SMPF New Provide, the amount of £[28.90 to 31.04] in the First Relevant Year; or

(ii) when Simultaneously Provided with SMPF New Provide, the Charge for WLR Conversion determined in accordance with condition 7C.1(d) less the Charge for SMPF New Provide determined in accordance with condition 7A.1(f) for each Relevant Year.

7C.3 The Percentage Change for the purposes of each of the products and/or services specified (each of which is referred to in this condition as a "single charge category") in condition 7C.1(a) to 7C.1(d) shall be calculated for the purposes of complying with condition 7C.1 by employing the following formula:

$$C_t = \frac{(\overline{p}_t - \overline{p}_{t-1})}{\overline{p}_{t-1}}$$

Where:

$C_{t,}$ is the Percentage Change in charges for the specific product and/or service in the single charge category in question for the Relevant Year *t*;

t refers to the Relevant Year;

t-1 refers to the Prior Year;

$\bar{p}_t$ is the weighted average charge made by the Dominant Provider for the specific product and/or service in the single charge category in question during the Relevant Year excluding any discounts offered by the Dominant Provider:

Where such Relevant Year Weighted Average Charge shall be calculated by employing the following formula:

$$\bar{p}_t = \sum_{j=1}^{m} \left(w_{j,t}\, p_{j,t} \right)$$

Where:

m is the number of periods for which there are distinct charges during the Relevant Year;

j is a number from 1 to *m* for each of the *m* periods during which a distinct charge is in effect;

$w_{j,t}$ is the proportion of the Relevant Year in which each charge, $p_{j,t}$, is in effect, calculated by the number of days during which the charge is in effect and dividing

1) for the First Relevant Year, by 365;
2) for the Second Relevant Year, by 366; and
3) for the Third Relevant Year, by 365.

$p_{j,t}$ is the charge for the specified period, *j*, during the Relevant Year *t* for the specific product and/or service in the single charge category in question;

$\bar{p}_{t-1}$ is the weighted average charge made by the Dominant Provider for the specific product and/or service in the single charge category in question during the Prior Year excluding any discounts offered by the Dominant Provider;

Where such Prior Year Weighted Average Charge shall be calculated by employing the following formula:

$$\bar{p}_{t-1} = \sum_{j=1}^{m} \left(w_{j,t-1}\, p_{j,t-1} \right)$$

Where:

m is the number of periods for which there are distinct charges during the Prior Year;

j is a number from 1 to *m* for each of the *m* periods during which a distinct charge is in effect;

$w_{j,t-1}$ is the proportion of the Prior Year in which each charge, $p_{j,t-1}$, is in effect, calculated by the number of days during which the charge is in effect and dividing

1) for the Prior Year when considering the First Relevant Year, by 365;
2) for the Prior Year when considering the Second Relevant Year, by 365;
3) for the Prior Year when considering the Third Relevant Year, by 366;

$p_{j,t-1}$ is the charge for the individual period, *j*, during the Prior Year, for the specific product and/or service in the single charge category in question.

7C.4 The Controlling Percentage in relation to any Relevant Year for each of the categories of products and/or services specified in Condition 7C.1 shall be calculated by employing the following formula:

$$CP_t = \{(100\% + CPI_t + X) \times \ Prior\ Year\ Adjustment\ Ratio_t\} - \ 100\%_{\ t}$$

Where:

CP_t means the Controlling Percentage for Relevant Year *t*;
CPI_t is *CPI for the Relevant Year t*

$Prior\ Year\ Adjustment\ Ratio_t$ is the Prior Year Adjustment Ratio for Relevant Year *t* as determined in condition 7C.5 below

X means:

(a) for the category of products and/or services specified in condition 7C.1(a) [0% to -6%] percentage points;

(b) for the category of products and/or services specified in condition 7C.1(b) [+36% to +45%] percentage points;

(c) for the category of products and/or services specified in condition 7C.1(c) [-8% to -15%] percentage points;

(d) for the category of products and/or services specified in condition 7C.1(d) [-1% to -8%] percentage points;

For the avoidance of doubt, the charges for each of these products and/or services are constrained by 7C.2 in the First Relevant Year.

7C.5 The Prior Year Adjustment Ratio in relation to any Relevant Year for each of the categories of products and/or services specified in Condition 7C.1 shall be:

(a) one for the First Relevant Year; and

(b) calculated by employing the following formula for the Second Relevant Year and Third Relevant Year:

$$\text{Prior Year Adjustment Ratio}_t = (100\% + CP_{t-1}) \,/\, (100\% + C_{t-1})$$

Where:

CP_{t-1} means the Controlling Percentage for the relevant categories of products and/or services specified in Condition 7C.1 for the Prior Year, which shall be equal to:

1) the Controlling Percentage for the First Relevant Year when considering the Second Relevant Year;
2) the Controlling Percentage for the Second Relevant Year when considering the Third Relevant year;

C_{t-1} means the Percentage Change for the relevant categories of products and/or services specified in Condition 7C.1 for the Prior Year, which shall be equal to:

1) the Percentage Change for the First Relevant Year when considering the Second Relevant Year;
2) the Percentage Change for the Second Relevant Year when considering the Third Relevant year.

7C.6 Where

(a) the Dominant Provider makes a material change (other than to a Charge) to any Charge Controlled Service for which a Charge is charged;

(b) the Dominant Provider makes a change to the date on which its financial year ends; or

(c) there is a material change in the basis of the Consumer Prices Index;

conditions 7C.1 to 7C.5 shall have effect subject to such reasonable adjustment to take account of the change as OFCOM may direct to be appropriate in the circumstances. For the purposes of this condition 7C.6, a material change to the Charge Controlled Service includes (but is not limited to) the introduction of a new product and/or service wholly or substantially in substitution for that existing Charge Controlled Service.

7C.7 The Dominant Provider must record, maintain and supply to OFCOM in an electronic format, no later than three months after the end of each Relevant Year, the data necessary for OFCOM to monitor compliance of the Dominant Provider with the price control. The data must include:

(a) pursuant to Condition 7C.3, the calculated Percentage Change relating to each category of products and services listed in conditions 7C.1(a) through to 7C.1(d);

(b) all relevant data the Dominant Provider used in the calculation of the Percentage Change as set out in Condition 7C.3;

(c) all charges, excluding any discounts, published by the Dominant Provider from time to time during the Relevant Year and the Prior Year, including the periods such charges were in force;

(d) the Relevant Year Weighted Average Charges and the Prior Year Weighted Average Charges for all of the services for which Condition 7C.3 apply and calculations thereof; and

(e) other data necessary for monitoring compliance with the charge control,

whereby all relevant revenues in respect of a specific service in the Basket are provided to at least the nearest £1,000.

7C.8 If it appears to OFCOM that the Dominant Provider is likely to fail to secure that the Percentage Change does not exceed the Controlling Percentage for the Third Relevant Year, the Dominant Provider shall make such adjustment to any of its charges for the provision of Charge Controlled Service and by such day in the Third Relevant Year (or if appropriate in OFCOM's opinion, by such day that falls after the end of the Third Relevant Year) as OFCOM may direct for the purpose of avoiding such a failure.

7C.9 Conditions 7C.1 to 7C.8 shall not apply to such extent as OFCOM may direct.

7C.10 The Dominant Provider shall comply with any direction OFCOM may make from time to time under this Condition.

7C.11 In this condition:

(a) "**Charge**" means for the purposes of condition 7C.6, the charge (being in all cases the amounts offered or charged by the Dominant Provider) to a communications provider for the Charge Controlled Service;

(b) "**Charge Controlled Service**" means a product and/or service listed in 7C.1(a), 7C.1(b), 7C.1(c) and 7C.1(d);

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

(d) "**Controlling Percentage**" is to be determined in accordance with condition 7C.4;

(e) "**CPI**" means the amount of the change in the Consumer Prices Index in the period of twelve months ending on 31 October immediately before the beginning of a Relevant Year, expressed as a percentage (rounded to two decimal places) of that Consumer Prices Index as at the beginning of that first mentioned period;

(f) "**Dominant Provider**" means British Telecommunications plc, whose registered company number is 1800000, and any of its subsidiaries or holding companies,

or any subsidiary of such holding companies, all as defined in section 1159 of the Companies Act 2006;

(g) "**Exchange Line**" means apparatus comprised in the Dominant Provider's electronic communications network and installed for the purpose of connecting a telephone exchange run by the Dominant Provider to a Network Termination Point comprised in Network Termination and Testing Apparatus installed by the Dominant Provider for the purpose of providing electronic communications services at the premises at which the Network Termination and Testing Apparatus is located;

(h) "**Network Termination and Testing Apparatus**" means an item of apparatus comprised in an electronic communications network installed in a fixed position on served premises which enables:

i. approved apparatus to be readily connected to, and disconnected from, the network;

ii. the conveyance of signals between such approved apparatus and the network;

iii. the due functioning of the network to be tested, but the only other functions of which, if any, are:

A. to supply energy between such approved apparatus and the network;

B. to protect safety or security of the operation of the network; or

C. to enable other operations exclusively related to the running of the network to be performed or the due functioning of any system to which the network is or is to be connected to be tested (separately or together with the network);

(i) "**OFCOM**" means the Office of Communications as established pursuant to section 1(1) of the Office of Communications Act 2002 (c. 11);

(j) "**Ordinary Maintenance**" means maintenance which is part of the service provided by the Dominant Provider in consideration of the charge for an Exchange Line and includes normal fault repair, as defined in the Dominant Provider's standard terms and conditions;

(k) "**Percentage Change**" has the meaning given to it in condition 7C.3;

(l) "**Prior Year**" means the period of 12 months ending on 31 March immediately preceding the Relevant Year;

(m) "**Prior Year Weighted Average Charge**" is to be determined in accordance with the formula in condition 7C.3;

(n) **"Prior Year Adjustment Ratio"** shall be construed in accordance with condition 7C.3;

(o) "**Network Termination Point**" means the physical point at which a Relevant Subscriber is provided with access to a public electronic communications network;

(p) "**Relevant Subscriber**" means any person who is party to a contract with a provider of public electronic communications services for the supply of such services

(q) "**Relevant Year**" means each of the following three periods:

i. the period beginning on 1 April 2014 and ending on 31 March 2015 (the "First Relevant Year");

ii. the period beginning on 1 April 2015 and ending on 31 March 2016 (the "Second Relevant Year");

iii. the period beginning on 1 April 2016 and ending on 31 March 2017 (the "Third Relevant Year").

(r) "**Relevant Year Weighted Average Charge**" is to be determined in accordance with the relevant formula in condition 7C.3;

(s) "**Simultaneously Provided**" means in the case of WLR Conversion, when it is ordered and purchased simultaneously with SMPF New Provide;

(t) "**SMPF New Provide**" means the provision of Shared Access on a line that previously did not have Shared Access, including when the line was previously provided with Metallic Path Facilities;

(u) "**Wholesale Analogue Line Rental**" means an electronic communications service provided by the Dominant Provider to a Third Party for the use and Ordinary Maintenance of an analogue Exchange Line;

(v) "**WLR Conversion**" shall be construed as having the same meaning as 'Conversion of Local Loop Unbundling (LLU) Metallic Path Facility (MPF) to a single Wholesale Access line' as provided by the Dominant Provider on its website for definitions and explanations of its products;

(w) "**WLR New Connection**" means a charge for the connection of a new analogue line to a premises; and

(x) "**WLR Transfer**" means a charge for the transfer of control of an analogue access line.

Annex 18

Sources of Evidence

Introduction

A18.1 We have noted throughout this Consultation the evidence we have relied upon in relation to our proposals and how we have relied upon that evidence. This Annex lists the main sources of evidence used. We also list all respondents to our consultations and to our formal information requests.

A18.2 Whilst the Annex lists the main evidence we have relied upon, the list is for convenience only and is not intended to be exhaustive.

List of respondents to the call for inputs

A18.3 We published a Call for Inputs (CFI) on 9 November 2012 setting out our proposed approach to this market review and seeking stakeholder input. This can be found at the following link:

Fixed access market reviews: wholesale local access, wholesale fixed analogue exchange lines, ISDN2 and ISDN30 – Call for Inputs, 9 November 2012.

A18.4 21 stakeholders provided written responses to the CFI:

- Axis Telecommunications Ltd;
- Birmingham City Council;
- British Sky Broadcasting Group plc;
- British Telecommunications plc;
- Cable and Wireless Worldwide plc/Vodafone;
- Colt Technology Services;
- Cumbria County Council;
- Derby City Council;
- The Federation of Communication Services;
- KCOM Group plc;
- Manchester City Council;
- Modern Communications Ltd;
- SSE plc;
- TalkTalk Telecom Group plc;

- Tesco Broadband;
- The Bit Commons Ltd;
- Verizon UK Limited;
- Virgin Media Limited; and
- Two confidential responses

A18.5 We have published the non-confidential versions of the responses from all the stakeholders listed above. These can be found on our website:

www.stakeholders.ofcom.org.uk/consultations/fixed-accessmarkets/?showResponses=true

Information-gathering using statutory powers (s135)

A18.6 During this market review, we have issued a series of notices under section 135 of the Act requiring various CPs to provide specified information as set out in the notice. These information requests are listed below:

- Information request of 8 February 2013 regarding the provision data necessary to inform our cost modelling and analysis of the efficiency of BT's copper access network business. Request addressed to and response received from:
  - British Telecommunications plc.
- Information request of 7 March regarding historic and forecast volume data. Request addressed to and response received from:
  - British Telecommunications plc.
  - Cable and Wireless Worldwide plc;
  - Daisy
  - Everything Everywhere ltd
  - KCOM Group plc
  - O2
  - Plusnet
  - Post Office
  - BSkyB
  - TTG
  - Virgin Media

- Information request of 18 March 2013 regarding information to help inform our cost modelling and the structure of any future such controls. Request addressed to and response received from:

  - British Telecommunications plc.

- Information request of 17 April 2013 regarding information to help inform our cost modelling and the structure of any future such controls and information on the costs incurred in connection with the provision and repair of LLU and WLR lines and how these are accounted for by BT. Request addressed to and response received from:

  - British Telecommunications plc.

- Information request of 23 April 2013 regarding information to help inform our cost modelling and the structure of any future such controls and information on the costs incurred in connection with the provision and repair of LLU and WLR lines and how these are accounted for by BT. Request addressed to and response received from:

  - British Telecommunications plc.

- Information request of 8 May 2013 regarding information to help inform our cost modelling and the structure of any future such controls. Request addressed to and response received from:

  - British Telecommunications plc.

- Information request of 15 May 2013 regarding historic and forecast information on the amount of installed Digital Access Carrier System equipment and its use and confirmation of the allocation of line testing equipment.. Request addressed to and response received from:

  - British Telecommunications plc.

- Information request of 29 May2013 regarding clarification and explanation to better understand how previous information provided by BT in response to section 135 requests reconciles to the RFS and to gather further information on products within the existing charge control baskets. Request addressed to and response received from:

  - British Telecommunications plc.

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21CN: BT's next generation network upgrade.

Access Network: The part of the network that connects directly to customers from the local telephone exchange.

Anchor pricing: An approach that bases charge control modelling on the cost of existing technology rather than that of any new technology that might be adopted during the control period.

Asset Volume Elasticity (AVE): The percentage increase in capital costs required for a 1% increase in volume.

Axis: Axis Telecom Limited.

Birmingham: Birmingham City Council.

Bit Commons: The Bit Commons Limited.

BT: British Telecommunications plc.

BT Retail: The retail division of BT.

BT Wholesale: The wholesale division of BT.

CAT: Competition Appeal Tribunal.

CC: Competition Commission.

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

Colt: Colt Technology Services.

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

Communications Provider (CP): A person who provides an Electronic Communications Network or provides an Electronic Communications Service.

Competition Commission (CC): An independent public body that conducts in depth inquiries into mergers, markets and the major regulated industries.

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

Cost Allocation model (CA model): In this model, costs from the Cost Forecast model were allocated to individual services cost and asset data allocated to services to derive unit cost estimates. The Cost Allocation model also drew on a calculation of the forecast asset values and depreciation, for Copper and Duct, provided by the RAV model.

Cost Forecast model (CF model): This was an activity-based costing model, using data linked to historically observed activity levels and costs together with estimates of future level of demand. In this model, we forecast operating costs and capital expenditure at an Openreach level. The output was fed into the Cost Allocation model.

Cost orientation: The principle that the price charged for the provision of a service should reflect the underlying costs incurred in providing that service.

Costs Volume Elasticity (CVE): The percentage increase in operating costs for a 1% increase in volume.

Cumulo rates: The business rates paid by BT Group on its network business. These relate to the use of public land for assets such as poles, duct, street cabinets and the equipment in exchange buildings.

Current cost accounting (CCA): An accounting convention, where assets are valued and depreciated according to their current replacement cost whilst maintaining the operating or financial capital of the business entity.

Current cost accounting fully allocated cost (CCA FAC): An approach used to measure a company's costs.

Current generation network (CGN): A network that uses existing (copper) technology in the core and backhaul.

Daisy: Daisy Group plc.

Derby: Derby City Council.

Digital subscriber line access multiplexor (DSLAM): A network device, located in the telephone exchanges of the internet service providers, that connects multiple customer Digital Subscriber Lines (DSLs) to a high-speed Internet backbone line using multiplexing techniques.

Distributed long run incremental cost (DLRIC): The LRIC of the individual service with a share of costs which are common to other services over BT's core network.

Distributed stand alone cost (DSAC): An accounting approach estimated by adding to the DLRIC a proportionate share of the inter-increment common costs. Rather than all common costs shared by a service being allocated to the service under consideration, the common costs are instead allocated amongst all the services that share the network increment.

Downstream BT: BT's downstream operations, by which we mean BT Wholesale, BT Retail or any other downstream operation owned or operated by BT.

the Draft EC Recommendation: Commission Recommendation of XX 2012 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment: http://ec.europa.eu/digital-agenda/en/news/draft-commission-recommendation-consistent-non-discrimination-obligations-and-costing

Dropwire: The part of the network that uses a copper line from the distribution point to and including the PSTN Network Terminating Equipment (NTE).

DSLAM: A digital subscriber line access multiplex that terminates copper connections to customer's premises, extracts broadband data from the digital subscriber line (DSL) signals on the copper lines and aggregates in an appropriate format the broadband data from a number of customers onto one or more fibre connections to the operator's network and vice versa.

Duct Access: When service providers other than the owners of telecommunications ducts can access existing pipes to deliver connections to end customers. In practice, communications providers can pull their own cables through the existing pipes without needing to dig new trenches and lay new ducting.

Ducts: Underground pipes which hold copper and fibre lines.

Early termination charge (ETC): The total fee that will be charged for early termination of a contract or agreement.

EC: European Commission.

EE: Everything Everywhere Limited.

Eighth BT Information Request: The eighth formal information request sent to BT on 29 May 2013

Equal proportionate mark-ups (EPMU): Under EPMU, charges are set to recover the sum of incremental costs and a mark-up for common costs which is the same, as a percentage of incremental costs, for all services.

FAMR: Fixed Access Market Reviews.

FCS: Federation of Communication Services.

Fibre to the cabinet (FTTC): An access network structure in which the optical fibre extends from the exchange to a flexibility point in the BT network known as a cabinet. The street cabinet is usually located only a few hundred metres from the subscriber's premises. The remaining part of the access network from the cabinet to the customer is usually copper wire but could use another technology, such as wireless.

Fibre to the premises (FTTP): An access network structure in which the optical fibre network runs from the local exchange to the end user's house or business premise. The optical fibre may be point-to-point – there is one dedicated fibre connection for each home – or may use a shared infrastructure such as a GPON. Sometimes also referred to as Fibre to the home (FTTH).

Fifth BT Information Request: The fifth formal information request sent to BT on 23 April 2013.

First BT Information Request: The first formal information request sent to BT on 8 February 2013.

Fourth BT Information Request: Ofcom's third formal information request sent to BT on 17 April 2013.

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

Gamma: Gamma Communications.

Generic Ethernet Access (GEA): BT's wholesale non-physical product providing CPs with access to higher speed broadband products.

Gigabit Passive Optical Network (GPON): A shared fibre network architecture that can be used for NGA.

Gross replacement cost (GRC): The cost of replacing an existing tangible fixed asset with an identical or substantially similar new asset having a similar production or service capacity.

Historic cost accounting (HCA): A method of accounting under which assets and liabilities are recorded at the values at which they were first acquired.

Hull Area: The area defined as the 'Licensed Area' in the licence granted on 30 November 1987 by the Secretary of State under Section 7 of the Telecommunications Act 1984 to Kingston upon Hull City Council and Kingston Communications (Hull) plc (KCOM).

Incremental costs: Those costs which are directly caused by the provision of that service in addition to the other services which the firm also produces. Another way of expressing this is that the incremental costs of a service are the difference between the total costs in a situation where the service is provided and the costs in another situation where the service is not provided.

ISDN2: A type of digital telephone line service that supports telephony and switched data services. ISDN2 allows a business to handle two phone calls simultaneously. It is primarily used by smaller businesses.

ISDN30: A type of digital telephone line service that provides up to 30 lines over a common digital bearer circuit. These lines provide digital voice telephony, data services and a wide range of ancillary services. It is primarily used by larger businesses.

KCOM: KCOM Group plc, formerly Kingston Communications Limited

Local loop: The access network connection between the customer's premises and the local serving exchange, usually comprised of two copper wires twisted together.

Local loop unbundling (LLU): A process by which a dominant provider's local loops are physically disconnected from its network and connected to competing provider's networks. This enables operators other than the incumbent to use the local loop to provide services directly to customers.

Long run incremental cost (LRIC): The cost caused by the provision of a defined increment of output given that costs can, if necessary, be varied and that some level of output is already produced.

Main distribution frame (MDF)/unbundled local loop: An internal wiring frame where copper access network cables are terminated and cross connected to exchange equipment by flexible wire jumpers.

Manchester: Manchester City Council.

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the Market Review Period: 1 April 2014 and 31 March 2017.

MCL: Modern Communications Ltd.

Metallic path facilities (MPF): The provision of access to the copper wires from the customer premises to a BT MDF that covers the full available frequency range, including both narrowband and broadband channels, allowing a competing provider to provide the customer with both voice and/or data services over such copper wires.

Minimum contract period (MCP): The amount of time a consumer must remain in a contract before being able to cancel it.

Modern equivalent asset (MEA): An approach to setting charges that bases costs on what is believed to be the most efficient available technology that performs the same function as the old technology.

MSAN: A multiple service access node that terminates connections to customer’s premises, copper and fibre, supporting a range of services including broadband data, telephony and TV; extracts the service data from the appropriate customer connection signals and aggregates in an appropriate format the service data from multiple customers onto one or more fibre connections to the operator’s network and vice versa.

Net replacement cost (NRC): Gross replacement cost less accumulated depreciation based on gross replacement cost.

Network terminating equipment (NTE): Transmission equipment located at the customer premises. Performs a similar function to LTE and also provides the customer interface.

Next generation access (NGA) networks: Wired access networks which consist wholly or in part of optical elements and which are capable of delivering broadband access services with enhanced characteristics (such as higher throughput) as compared to those provided over already existing copper networks. In most cases, NGAs are the result of an upgrade of an already existing copper of co-axial access network.

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

Ninth BT Information Request: The ninth formal information request sent to BT on 13 June 2013.

O2: Telefonica UK.

Ofcom: The Office of Communications.

Office of the Telecommunications Adjudicator (OTA): An independent body that facilitates discussion between CPs on operational issues related to new and existing telecoms products and services.

ONS: The Office of National Statistics.

Openreach: The access division of BT established by Undertakings in 2005.

Physical Infrastructure Access (PIA): A proposed obligation under which BT would be required to allow other CPs to deploy NGA networks in the physical infrastructure of its access network.

PSTN switch: A a public switched telephone network switch that terminates a customer's telephone line and connects a customer's telephone call to other PSTN switches so that the telephone call reaches the intended destination.

Rate of return (RoR): The ratio of money gained or lost (whether realised or unrealised) on an investment relative to the amount of money invested.

RAV adjustment: An adjustment to the regulatory asset valuation of the pre-1997 assets to historic cost accounting.

RAV model: This model calculates the forecast asset values and depreciation, for Copper and Duct. The model also applies a regulatory adjustment (the regulatory asset value adjustment, or RAV adjustment) previously applied by Ofcom.

Regulatory asset value (RAV): The value ascribed by Ofcom to the capital employed in the relevant licensed business.

Regulatory financial statements (RFS): The financial statements that BT is required to prepare and publish by Ofcom.

Retail price index (RPI): A measure of inflation published monthly by the Office for National Statistics. It measures the change in the cost of a basket of retail goods and services.

Return on capital employed (ROCE): The ratio of accounting profit to capital employed. The measure of capital employed can be either Historic Cost Accounting (HCA) or Current Cost Accounting (CCA).

RPIJ: RPIJ is a Retail Prices Index (RPI) based measure that will use a geometric (Jevons) formula in place of one type of arithmetic formula (Carli). It was launched in response to the National Statistician's conclusion that the RPI does not meet international standards due to the use of the Carli formula in its calculation.

Second BT Information Request: The second formal information request sent to BT on 7 March 2013.

Service Management Centre (SMC): The contact point in Openreach for CPs requesting LLU, WLR and other services.

Seventh BT Information Request: The seventh formal information request sent to BT on 15 May 2013.

Shared metallic path facility (SMPF)/shared access: The provision of access to the copper wires from the customer's premises to a BT MDF that allows a competing provider to provide the customer with broadband services, while the dominant provider continues to provide the customer with conventional narrowband communications.

Significant market power (SMP): The significant market power test is set out in European Directives. It is used by National Regulatory Authorities (NRAs), such as Ofcom, to identify those CPs who must meet additional obligations under the relevant Directives.

Sixth BT Information Request: The sixth formal information request sent to BT on 8 May 2013.

Sky: British Sky Broadcasting Ltd.

Special Fault Investigations (SFIs): A chargeable investigation product from Openreach.

SSE: SSE plc.

Stand alone costs (SAC): An accounting approach under which the total cost incurred in providing a service is allocated to that service.

Sub-loop unbundling (SLU): Like local loop unbundling (LLU), except that CPs interconnect at a point between the exchange and the end uder, usually at the cabinet.

Superfast broadband: A broadband connection that can support a maximum download speed of 30Mbps or greater.

TalkTalk: TalkTalk Group.

Tesco: Tesco Broadband.

Test Access Matrices (TAMs): A test access matrix connects on demand test signals and measurement equipment to customer lines so that an operator can determine remotely if the connection to the customer is functioning to the required standard. It should be noted that The TAM is owned and operated by Openreach and does not change ownership in relation to the local loop.

Third BT Information Request: Ofcom's third s.135 statutory information request sent to BT on 18 March 2013.

Three: Hutchinson 3G.

Time division multiplex (TDM): a method of putting multiple data streams in a single signal by separating each signal into many segments, each having a very short duration. Each individual data stream is reassembled at the destination based on timing.

Time-related charges (TRCs) : Time Related Charges are raised by Openreach to recover costs incurred when Openreach engineers perform work not covered under the terms of the Openreach service.

UKSA: The UK Statistics Authority.

Vectoring: A performance improvement technique that reduces the effect of crosstalk on copper lines. It is based on the concept of noise cancellation via the co-ordination of line signals.

Verizon: Verizon Enterprise Solutions.

Virgin: Virgin Media.

Virtual Unbundled Local Access (VULA): It provides a connection from the nearest 'local' aggregation point to the customer premises.

Vodafone: Vodafone UK and Cable & Wireless Worldwide Ltd.

Weighted average cost of capital (WACC): The rate that a company is expected to pay on average to all its security holders to finance its assets.

Wholesale Fixed Analogue Exchange Line (WFAEL): The provision of wholesale analogue voice services using BT or KCOM's existing voice infrastructure.

Wholesale Line Rental (WLR): The service offered by BT to other UK communications providers to enable them to offer retail line rental services in competition with BT's own retail services. Line rental is offered along with calls (and other service elements, such as broadband) to retail customers.

Wholesale Local Access (WLA): Covers fixed telecommunications infrastructure, specifically the physical connection between end users' premises and a local exchange.