



Dispute between TalkTalk and Openreach relating to single jumpered MPF

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Statement and
Determination
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Contents

Section		Page
1	Summary	5
2	Introduction and background	8
3	Analysis and Provisional Conclusions	18
4	Summary of submissions on Provisional Conclusions and Ofcom's response	36
5	Final Conclusions	81
Annex		Page
1	Determination	83
2	Technical background on single and double jumpering services	86
3	Cost benefit analysis of SJ-MPF and DJ-MPF	97
4	SMP Conditions	139

Glossary of terms

2003 Act: The Communications Act 2003.

2010 WLA Statement: *Review of the wholesale local access market*, 7 October 2010.

Available at:

http://stakeholders.ofcom.org.uk/binaries/consultations/wla/statement/WLA_statement.pdf

2012 Charge Control Statement: *Charge control review for LLU and WLR services*, 7 March 2012. Available at: <http://stakeholders.ofcom.org.uk/binaries/consultations/wlr-cc-2011/statement/statementMarch12.pdf>

2013 Charge Control Consultation: *Fixed access market reviews: Approach to setting LLU and WLR Charge Controls*, 11 July 2013. Available at:

<http://stakeholders.ofcom.org.uk/consultations/llu-wlr-cc-13/>

BT: 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 by section 1159 of the Companies Act 2006.

CBA: Cost benefit analysis.

CP: Communications provider.

CPCG: Copper Products Commercial Group.

DCF: Discounted cash flow.

DJ-MPF: Double Jumpered MPF, the provision of MPF using two jumpers in the MDF to connect the end user to the LLU CP's equipment and to the LLU standard TAM.

DSLAM: Digital Subscriber Line Access Multiplexer, a network device, typically deployed by network operators in the local exchange, connecting multiple premises to a high-speed digital communications channel using digital subscriber line interfaces and multiplexing techniques.

EMP: Equivalence Management Platform, a BT system providing CPs with access to BT's ordering, procurement, fault reporting and other operations support systems.

EvoTAM: Next generation TAM, the evolved version of the LLU standard TAM.

EvoTASM: Next generation TASM, in accordance with the requirements of an evoTAM.

E-Side: Exchange-Side of the BT network, from the local exchange's MDF towards network operators' equipment.

FAC: Fully Allocated Cost.

L-Side: Line-Side of the BT network, from the local exchange's MDF towards end-users' premises.

LIJs: Left in jumpers, these are jumper cables left in the MDF unused.

Statement and Determination concerning a dispute between TalkTalk and Openreach relating to single jumpered MPF

LLU: Local Loop Unbundling, which allows CPs physically to control (or share control of) BT's existing copper lines between local telephone exchanges and end-users' premises.

LLU CP: A CP that uses LLU products to provide voice, data or voice and data services to end-users.

Master Controller: A subsystem of a TAM that is responsible for the control of the TAM's other subsystems, namely the TASM's and the test heads.

MDF: Main distribution frame.

MPF: Metallic Path Facility, the provision of access to the copper wires from end-users' 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 end user with both voice and/or data services over such copper wires.

MSAN: Multi Service Access Node, a network device typically deployed by network operators in the local exchange, connecting multiple premises to high-speed digital communications channels, for the provision of multiple analogue and/or digital services such as voice telephony services, digital subscriber line and integrated services digital network access services, using multiplexing techniques.

Openreach: A BT group business offering CPs products and services that are linked to BT's nationwide local access network.

Provisional Conclusions: The provisional conclusions document in this dispute, published on Ofcom's website on 1 October 2013.

RFS: Regulatory financial statements.

SJ-MPF: Single Jumpered MPF, the provision of MPF using one jumper in the MDF to connect the end user to the LLU CP's equipment and to an in-line standard TAM.

Sky: British Sky Broadcasting Limited.

SMP: Significant Market Power.

SMP conditions: Regulatory conditions imposed on a specific CP that has been found to have SMP in a market review conducted by Ofcom.

SMPF: Shared Metallic Path Facility, the provision of access to the copper wires from the end user's premises to a BT MDF that allows the provision of broadband (but not narrowband) services, allowing a competing provider to provide the end user with data but not voice services over such copper wires.

SOR: Statement of Requirements, the form in which CPs make a request to BT for the provision of a service, pursuant to guidelines required to be published under SMP Condition FAA2 (request for new network access condition).

Standard TAM: The standard TAM used by Openreach to test lines on DJ-MPF products. This comprises test heads, tie cable C, master controller and tie cables A and B.¹

Standard TASM: A TASM that meets the requirements of a standard TAM.

¹ The tie cables are illustrated in Annex 2, page 5

Statement and Determination concerning a dispute between TalkTalk and Openreach relating to single jumpered MPF

Statement and Determination: this document.

TalkTalk: TalkTalk Telecom Group PLC whose registered company number is 7105891, and any of its subsidiaries or holding companies, or any subsidiary of such holding companies, all as defined by section 1159 of the Companies Act 2006.

TAM: Test Access Matrix, a system dedicated to testing the performance of telephone/broadband lines.

TASM: Test Access Switch Matrix, a special type of switch that facilitates testing of telephone lines. A TASM is controlled by a master controller and provides multiple line ports, each port serving a single line. When a line needs to be tested, the TASM connects (switches) this line to the appropriate test head.

Test Head: A subsystem of a TAM that is responsible for testing telephone/broadband lines. A test head may provide one or more channels, each channel for testing one line at a time.

The Parties: TalkTalk and BT.

WLA: Wholesale Local Access, the physical connection between end-users' premises and local exchange.

WLR: Wholesale Line Rental, used by CPs (including BT Retail) to provide narrowband telephony (but not broadband) using BT's network.

Section 1

Summary

- 1.1 This Statement and Determination sets out our resolution of a dispute brought by TalkTalk Telecom Group PLC (“TalkTalk”) against British Telecommunications PLC (“BT”).
- 1.2 The dispute, brought by TalkTalk against BT (collectively the “Parties”), relates to the decision by Openreach, the BT group business which offers CPs products and services that are linked to BT’s nationwide local access network, not to offer MPF on a single jumpered basis² having been requested to do so by TalkTalk.
- 1.3 On 25 June 2013 TalkTalk submitted a dispute to Ofcom, which was accepted for resolution on 18 July 2013.³ The dispute concerns the way in which MPF services are provided by Openreach in local exchanges. TalkTalk considers that a new single jumpering technique (as opposed to the existing double jumpering practice) would deliver significant cost savings and that BT, through Openreach, should develop the product and that Openreach’s failure to provide SJ-MPF constitutes a breach of BT’s obligations to provide Network Access and Local Loop Unbundling (“LLU”).
- 1.4 In December 2012, Openreach rejected an SOR⁴ from TalkTalk requesting the provision of MPF on a single jumpered basis. Openreach considered that the case was highly sensitive to MPF volumes and that significant systems development would be required. In assessing the request, both TalkTalk and Openreach built models to ascertain the net present value (“NPV”) of single jumpered MPF (“SJ-MPF”). As part of the dispute submission, TalkTalk updated some of the figures in its model, which produced a more strongly positive NPV than the figures it had provided in the model accompanying its SOR.
- 1.5 TalkTalk contends that SJ-MPF can deliver significant cost savings that will in turn be passed on to consumers. Calculations from the TalkTalk model have indicated that the majority of the savings come from reduced costs associated with activities on the frames used to connect customer access lines to test equipment and LLU operator equipment. In particular, TalkTalk asserts that there are savings because single jumpering uses less space on the main distribution frame (“MDF”) in the local exchange.
- 1.6 Openreach has stated that it does not consider a dispute exists but, even to the extent it does, the relevant SMP condition is FAA2, which concerns requests for network access. Openreach states that it adhered to the SOR process set out under condition FAA2 in letter and spirit in assessing the SOR, and was justified in rejecting the request.
- 1.7 On 27 June 2013 TalkTalk referred a dispute to us, asking that:

² Please see ‘SJ-MPF’ in the glossary for an explanation of single jumpering

³ Details of the dispute were published on the Ofcom website:

http://stakeholders.ofcom.org.uk/enforcement/competition-bulletins/open-cases/all-open-cases/cw_01109/

⁴ Statement of requirements - a process by which CPs make a request to BT for the provision of a service, as required by SMP condition FAA2 (request for new network access condition)

*“Ofcom resolves this dispute and, by exercising its powers under Section 190 of the Communications Act 2003, directs BT to develop and offer within 4 months a single jumpering product on appropriate terms in accordance with the statement of requirements submitted by TalkTalk. This requirement should be combined with a monthly reporting requirement on Openreach to update TalkTalk on developments against clear product development milestones”.*⁵

Ofcom’s Provisional Conclusions on the matters in dispute.

- 1.8 On 1 October 2013 we published our Provisional Conclusions on the matters in dispute. This considered whether in providing metallic path facilities (“MPF”) only on the basis of double jumpering in local exchanges, without developing and offering a single jumpering alternative, BT is compliant with its obligations under SMP Conditions and whether Ofcom should exercise its powers to make a declaration and/or give a direction.
- 1.9 In order to assess whether Openreach has breached its regulatory obligations by providing MPF through the double jumpering technique alone, we considered the following questions:
- i) Would the introduction of an in-line SJ-MPF product increase economic efficiency (in particular, by reducing forward looking economic costs)?
 - ii) In light of our duties, are there any other relevant factors that we should take into account in deciding whether or not to direct Openreach to provide SJ-MPF?
 - iii) In the light of our answers to questions i) and ii), should Ofcom make any declaration under s190(2)(a) or a direction fixing the terms and conditions of the provision of SJ-MPF under s190(2)(b) or (c) of the Act?
 - iv) Was there any breach of FAA2 regarding Openreach’s process in handling the original request and, in light of our provisional conclusion on this question, should Ofcom make any declaration setting out the rights and obligations of the Parties in relation to FAA2 under s190 (2)(a) of the Act?
- 1.10 We noted that we had undertaken a cost-benefit analysis to assist in resolving this dispute. The provisional results of that analysis suggested that SJ-MPF would increase the forward looking industry-wide incremental costs of MPF provision, rather than reduce them. There are several reasons why our model produced different results to those obtained by TalkTalk. These included that our model included lower frame costs savings, and higher equipment unit costs than TalkTalk’s, and that we considered any benefits from single jumpering would occur later than TalkTalk modelled due to development lead times. In addition there were other factors, which could not readily be quantified, such as asymmetric risk, the retraining of engineers and the added complexity of two MPF processes that lent further support to the quantified analysis in suggesting that a positive net benefit was less likely than a net cost.
- 1.11 Accordingly, having regard to our statutory duties, our provisional conclusion was that SJ-MPF would not be a more efficient way of delivering MPF than the status quo (DJ-MPF), and the other relevant factors we had taken into consideration did not alter this conclusion. We therefore considered that we should not require BT to develop

⁵ TalkTalk’s dispute submission, 23 June 2013, page 21, paragraph 7.2

and offer SJ-MPF to comply with SMP conditions FAA1 or FAA9, or otherwise. We therefore provisionally concluded that it was not necessary to consider a direction under section 190(2)(b) or (c) to fix the terms and conditions of the provision of SJ-MPF.

- 1.12 Instead, we provisionally concluded that by providing DJ-MPF only (and not offering an SJ-MPF alternative) BT is compliant with its regulatory obligations.
- 1.13 We also provisionally concluded that Openreach did not breach FAA2 in the handling of the SOR.

Ofcom's Determination of the matters in dispute

- 1.14 We received two responses to our consultation on the Provisional Conclusions, from TalkTalk⁶ and Openreach.⁷ We also sought supplementary information from Openreach by way of follow up questions on its response.⁸ Following careful consideration of these responses we revised our modelling in certain respects, as described in section 4 below. For the reasons set out in this document, those revisions have not caused us to change our overall conclusions as set out in our Provisional Conclusions.
- 1.15 We therefore determine that:
 - 1.15.1 we should make a declaration under section 190(2)(a) that BT is not required to develop and offer SJ-MPF at this time; and
 - 1.15.2 Openreach did not breach FAA2 in its handling of the SOR.

Structure of the remainder of this document

- 1.16 The introduction and background to this dispute are set out in **section 2** and the analysis underpinning our provisional reasoning and assessment is set out in **section 3**. In **section 4** we set out the submissions we received on the Provisional Conclusions and our responses to these. In **section 5** we set out our final conclusions. **Annex 1** is our Determination. **Annex 2** covers the technical and jumpering arrangements for both DJ-MPF and SJ-MPF. **Annex 3** reproduces our description of the quantified cost-based analysis that we included at Annex 2 to our Provisional Conclusions.⁹ **Annex 4** sets out, for ease of reference, the most relevant SMP Conditions.

⁶ TalkTalk response to the Provisional Conclusions, 16 October 2013

⁷ Openreach response to the Provisional Conclusions, 15 October 2013

⁸ Openreach response to follow up questions, 28 October 2013

⁹ It must now be read subject to the analysis and changes described in relation to Step 1 in **section 4**

Section 2

Introduction and background

Issues in dispute

- 2.1 This dispute was referred to Ofcom by TalkTalk against BT. It concerns an alternative wiring arrangement for connecting LLU MPF in the local exchange using one jumper at the main distribution frame (“MDF”) rather than two, as is the practice at present. TalkTalk refers specifically to Openreach as the BT business which offers CPs products and services that are linked to BT’s nationwide local access network. This Statement and Determination also refers to Openreach, although we note that Openreach is part of the wider BT group of companies to which the relevant regulatory obligations apply.
- 2.2 TalkTalk asserts that Openreach’s failure to provide MPF on a single jumpered basis constitutes a breach of two SMP conditions, namely FAA1 (requirement to provide network access on reasonable request), and FAA9 (requirement to provide LLU services).
- 2.3 Openreach argues that neither FAA1 nor FAA9 are relevant and that the relevant obligation is FAA2 (requests for new network access), which, in summary, requires requests for new network access to be handled in accordance with reasonable published guidelines. Openreach asserts that it has complied with FAA2. TalkTalk considers that, while FAA1 and FAA9 are the most relevant SMP conditions, Openreach has also not complied with FAA2.

Relevant regulatory requirements

- 2.4 Ofcom’s 2010 WLA Statement set out Ofcom’s finding, following its market review, that BT has SMP in the market for wholesale local access services in the UK excluding the Hull area.¹⁰
- 2.5 A number of SMP Conditions were imposed to address concerns arising from that finding. These included FAA1, FAA2 and FAA9, which the Parties refer to in this dispute:¹¹
 - 2.5.1 FAA1 requires BT to provide network access on reasonable request from a third party, and also to provide such network access as Ofcom may from time to time direct.
 - 2.5.2 FAA2 is an accompaniment to the requirement to meet all reasonable requests for network access, providing as it does for the publication by BT of guidelines for handling requests for new network access, thus providing transparency.
 - 2.5.3 FAA9 requires BT to provide LLU services, including such ancillary services as may be reasonably necessary to use those services, on reasonable request from a third party. It also requires BT to provide such LLU services,

¹⁰ ‘Review of the wholesale local access market’, 7 October 2010. Available at: http://stakeholders.ofcom.org.uk/binaries/consultations/wla/statement/WLA_statement.pdf

¹¹ The SMP Conditions are set out in full at Annex 3

including ancillary services and other network access, as Ofcom may from time to time direct.

Dispute referred to Ofcom by TalkTalk

History to the case

- 2.6 TalkTalk first submitted a statement of requirements (“SOR”) requesting that Openreach develop SJ-MPF in October 2010, but the request was rejected following assessment by Openreach. Ofcom considered the potential for SJ-MPF in its 2012 Charge Control Statement but deemed it unclear whether the product would deliver cost savings and recommended that if requested by industry, the product would need to go through the SOR process *“We have also concluded that it would be unreasonable to have expected Openreach to introduce a new single jumpering product without industry support for the development of such a product, after having considered all aspects of the product and its costs and benefits (and we consider this process has not yet been completed)”*.¹²
- 2.7 In May 2012, TalkTalk submitted a second SOR for SJ-MPF (“May 2012 SOR”), this time specifying it should be deployed using the ‘in-line’ solution.¹³ In December 2012 Openreach made a presentation to the CPCG¹⁴ where it stated that it was rejecting the SOR. Openreach said *“the case is highly sensitive to future volumes and TAM utilisation”* and that *“considerable systems development would be required to create a new product – the earliest release anticipated 13/14”*.¹⁵
- 2.8 On 25 June 2013, TalkTalk submitted its dispute submission in relation to the rejected SOR and accompanied it with a version of its model used to make the assessment, with updated figures.
- 2.9 Openreach considered that no dispute existed between the Parties because the model submitted by TalkTalk as part of the dispute submission contained new data that Openreach had not previously seen: *“given that TalkTalk referred a dispute on 25 June 2013 containing materially changed data that it had not previously shared with Openreach, Openreach does not believe that it would be appropriate for Ofcom to accept the dispute under the circumstances”*.¹⁶ Openreach was of the view that *“the appropriate course of action would have been for TalkTalk to re-engage in commercial discussions with Openreach, including potentially re-submitting the SOR on the grounds of this updated information”*.¹⁷
- 2.10 TalkTalk considered that the new data provided in the model was not relevant to the question of whether there was a dispute or not. TalkTalk was not obliged to provide a model as part of its May 2012 SOR. It was obliged only to make a reasonable request. Its position in December was that it had made a reasonable request, and Openreach had refused to provide network access on the basis of that request. Its position was thus that *“the dispute between the parties regards whether TalkTalk’s request is a fair and reasonable one not whether the spreadsheet that TalkTalk has*

¹² Ofcom, ‘Charge control review for LLU and WLR services’, 7 March 2012. Single jumpering is discussed in Annex 9

¹³ The in-line solution is explained more fully in Annex 1

¹⁴ Copper Products Commercial Group

¹⁵ SOR 8333 Evaluation for Single Jumper MPF (CPCG presentation), December 2012 (Annex 3 to Openreach comments on TalkTalk’s dispute submission, 26 July 2013)

¹⁶ Openreach’s response to the pre-EPM questionnaire, 9 July 2013, page 4

¹⁷ Openreach’s response to TalkTalk’s dispute submission, 3 July 2013, page 4

developed contains exactly the same figures as Openreach saw it [sic] in October 2012".¹⁸

- 2.11 Openreach considered that, even if there was a dispute, it was a dispute under SMP condition FAA2 on requests for new Network Access "*SJ-MPF would be a new arrangement for providing jumpering and as such SMP condition FAA2 (requests for new Network Access) is the relevant condition in this particular case*".¹⁹ FAA2 concerns the process followed in the assessment of the SOR. Openreach also states that it has "*complied with FAA2 at all times, both in terms of how the SJ-MPF SOR was handled between May 2012 and December 2012, and in terms of the approach taken in reaching the decision to reject the SOR*".²⁰
- 2.12 TalkTalk did not request that a dispute be opened based on a breach of SMP condition FAA2, but says that it has some concerns which may touch on FAA2 about the handling of the SOR. TalkTalk notes, however, that FAA2 does not address the substance of TalkTalk's complaint "*TalkTalk has not requested that Ofcom directly consider Openreach's compliance with FAA2*".²¹
- 2.13 On 18 July 2013, Ofcom accepted the dispute for resolution.

Single jumpered MPF

- 2.14 Single jumpered MPF involves the use of one jumper, rather than two (as is currently the practice) in the wiring of the end user's line to the LLU operator's equipment over the MDF.²² This jumpering arrangement involves the use of an 'in-line' standard TAM, as opposed to the existing DJ-MPF standard TAM which is used by multiple CPs and managed by Openreach. The in-line standard TAM solution has implications for utilisation rates, as these are now dependent on one CP, rather than multiple CPs. The particular technicalities of SJ-MPF and DJ-MPF are explained in full at **Annex 2**.

2012 LLU/WLR statement

- 2.15 Ofcom considered single jumpering in its 2012 Charge Control Statement²³ However, the question addressed was how (double jumpered) MPF should be priced, not whether Openreach should provide a single jumpered MPF product. This was because TalkTalk had argued that the MPF price should be set on the assumption that single jumpering was used, whether or not this was actually the case. This reflected TalkTalk's view that single jumpering was the most efficient way of providing MPF and would lead to lower costs and prices than if double jumpering were assumed.
- 2.16 Ofcom concluded that:

"we do not consider the price for the current MPF product should be set on the basis of the costs of the single jumpering approach, because these would be two different products. The incentives for efficiently managing the

¹⁸ TalkTalk's response to the pre-EPM questionnaire, 9 July 2013, page 4

¹⁹ Openreach's response to TalkTalk dispute submission, 26 July 2013, page 2

²⁰ Openreach's response to the pre-EPM questionnaire, 9 July 2013, page 2

²¹ TalkTalk's response to the pre-EPM questionnaire, 9 July 2013, page 5

²² Main distribution frame

²³ Ofcom, 'Charge control review for LLU and WLR services', 7 March 2012. Available at:

<http://stakeholders.ofcom.org.uk/binaries/consultations/wlr-cc-2011/statement/annexesMarch12.pdf>

Single jumpering is discussed in Annex 9

*utilisation of assets are different in the current jumpering approach compared to the single jumpering approach, such that they should be considered separate products”.*²⁴

However, Ofcom considered that there could be value in developing a single-jumpered product:

*“because it may be possible that, under certain circumstances, in particular in order to support the expansion-only approach an alternative single jumpering product could be a lower cost approach to deployment of MPF”.*²⁵

SOR process

- 2.17 A Statement of Requirements (SOR) is the process through which CPs can ask Openreach for the introduction of a new product, or change to an existing Openreach product. The SOR process is described in an Openreach guideline document. Openreach is bound by condition FAA2 to publish this guideline, which must meet principles set out in the condition, and then to follow the published process. Under the guideline, SORs must be submitted with appropriate industry forum visibility. SJ-MPF concerns LLU, so the relevant forum is the Copper Products Commercial Group (“CPCG”).
- 2.18 The CPCG’s task is to review the proposed SOR and *“prioritise and agree the CP requirement that will be submitted into Openreach as an SOR”.*²⁶ The submission is then assessed by Openreach and if suitable is progressed by the Openreach product manager. Depending on whether the request is commercial or regulatory in nature, there are differing timescales for delivery of an initial offer, or rejection by Openreach. For regulatory requests, there is a 60 working day time limit.
- 2.19 In October 2010, TalkTalk made the first of two commercial requests for SJ-MPF via the SOR process. The request was refused by Openreach, and subsequently TalkTalk submitted a further commercial SOR in May 2012 which was also rejected by Openreach. TalkTalk stated that *“Following lengthy commercial negotiations during June 2012 to December 2012, the parties have failed to come to an agreement”.*²⁷
- 2.20 In refusing the request in the May 2012 SOR, Openreach cited a number of reasons as to why it was not taking the product forward to development, in particular that *“the case is highly sensitive to future volumes and TAM utilisation”.*²⁸ Openreach considers that it *“complied with SMP condition FAA2 at all times, both in terms of how the SJ-MPF SOR was handled between May 2012 and December 2012, and in terms of the approach taken in reaching the decision to reject the SOR”.*²⁹

TalkTalk’s view that SJ-MPF could deliver significant cost savings

- 2.21 TalkTalk submits that SJ-MPF would produce *“significant consumer benefits”.* Based on its cost analysis, TalkTalk believes that SJ-MPF would be a *“significantly lower*

²⁴ Ofcom, ‘Charge control review for LLU and WLR services’, 7 March 2012, paragraph A9.96

²⁵ Ofcom, ‘Charge control review for LLU and WLR services’, 7 March 2012, paragraph A9.98

²⁶ Openreach Product SOR Process document, 18 April 2013, submitted as an annex to Openreach’s comments on the dispute, 26 July 2013

²⁷ TalkTalk’s dispute submission, 25 June 2013, page 3, paragraph 2.4

²⁸ SOR 8333 Evaluation for Single Jumper MPF (CPCG presentation), December 2012 (Annex 3 to Openreach comments on TalkTalk’s dispute submission, 26 July 2013)

²⁹ Openreach’s response to TalkTalk dispute submission, 26 July 2013, page 2

*cost way for Openreach to offer MPF services by about £60m (on an NPV basis). It submits that “this will reduce the marginal cost of TalkTalk (and Sky and other MPF operators) which, in a competitive retail market, will feed through to cheaper consumer broadband and telephony services by some or all of the £60m”.*³⁰

TalkTalk’s request for Ofcom to make a determination

- 2.22 TalkTalk claims that Openreach’s failure to provide SJ-MPF constitutes a breach of FAA1 and FAA9 and requests that:

*“Ofcom resolves this dispute and, by exercising its powers under Section 190 of the Communications Act 2003, directs BT to develop and offer within 4 months a single jumpering product on appropriate terms in accordance with the statement of requirements submitted by TalkTalk. This requirement should be combined with a monthly reporting requirement on Openreach to update TalkTalk on developments against clear product development milestones”.*³¹

Comments from Openreach on TalkTalk’s submission

- 2.23 We provided a copy of TalkTalk’s submission to Openreach on 27 June 2013. In response, Openreach stated that it was, and continues to be, fair and reasonable for it to offer MPF solely on a double jumpered basis, and that Openreach had complied with all relevant SMP conditions. In stating its view, it made the following comments:

2.23.1 Openreach considers that the “industry view” business case approach that it took in evaluating TalkTalk’s request for SJ-MPF was “reasonable in that it was based on sound assumptions and a thorough evaluation of likely costs and benefits”.³² The business case that it developed showed that “MPF connections using a SJ-MPF configuration would attract a connection charge of [redacted]£ higher than the standard MPF connection charge, and a per annum rental charge [redacted]£ lower than the standard MPF rental”.³³

2.23.2 Openreach contends that the methodology that supported the assumptions it used to reject the May 2012 SOR “was valid and remains valid now... and by comparison the assumptions used by TalkTalk to seek to substantiate its case for SJ-MPF are in our view less robust”.³⁴ It supports this view by asserting that its assumptions were “based on observed actual performance”, “optimistic”, and were “validated by recently available data”. Openreach asserts that TalkTalk’s assumptions, by comparison, were “based on aspiration”, lacking in coherence, and required further examination.³⁵

2.23.3 Openreach believes that “the process that Openreach followed in managing the SOR between May 2012 and December 2012 was professional, comprehensive and compliant with both the letter and spirit of relevant SMP regulation”.³⁶

³⁰ TalkTalk’s dispute submission, 23 June 2013, page 3, paragraph 2.5

³¹ TalkTalk’s dispute submission, 23 June 2013, page 21, paragraph 7.2

³² Openreach’s response to TalkTalk dispute submission, 26 July 2013, page 1

³³ Openreach’s response to TalkTalk dispute submission, 26 July 2013, page 5

³⁴ Openreach’s response to TalkTalk dispute submission, 26 July 2013, page 1

³⁵ Openreach’s response to TalkTalk dispute submission, 26 July 2013, page 6

³⁶ Openreach’s response to TalkTalk dispute submission, 26 July 2013, page 1

Enquiry Phase Meeting

- 2.24 Before holding an Enquiry Phase Meeting (“EPM”), Ofcom issued a pre-EPM questionnaire, to which both parties responded with views on the potential scope of the Dispute.
- 2.25 On 11 July 2013, Ofcom held an EPM with representatives of TalkTalk and Openreach in order to clarify the principal arguments and facts raised by the Parties and to discuss views on the potential scope of the Dispute.

TalkTalk’s views on scope

- 2.26 TalkTalk stated that it believed that Ofcom’s proposed scope of the Dispute appeared reasonable but added that it did “*not believe Ofcom would necessarily need to find that Openreach had acted in breach of its relevant regulatory obligations in order to direct Openreach to develop the single jumpered MPF product*”.³⁷

Openreach’s views on scope

- 2.27 Openreach reiterated its position regarding the SMP conditions in response to the scope, stating that it “*does not agree that SMP conditions FAA1 and FAA9 are relevant in the context of the request for new network access*”.³⁸ Openreach stated that the scope should seek to assess whether “*BT is compliant with its obligations in respect of requests for new network access under SMP Condition FAA2*”. It also suggested “*Ofcom should determine any appropriate exercise by Ofcom of its powers under section 190(2) of the Communications Act 2003 as part of Ofcom’s determination resolving this dispute*”.³⁹ Openreach also said “*this is clearly an issue that should be dealt with under the Fixed Access Market Review rather than as a dispute*”.⁴⁰

Dispute Resolution

Ofcom’s duty to handle disputes

- 2.28 Ofcom has the power to resolve the following types of disputes referred to it by one or more of the parties:
- 2.28.1 a dispute relating to the provision of network access (section 185(1) of the 2003 Act);
 - 2.28.2 a dispute relating to entitlements to network access that a CP is required to provide by or under a condition imposed on him under section 45 of the 2003 Act between that CP and a person who is identified, or is a member of a class identified, in the relevant condition (section 185(1A) of the 2003 Act); and
 - 2.28.3 a dispute between CPs, which is not an ‘excluded dispute’, relating to rights or obligations conferred or imposed by or under a condition set under section 45 of the 2003 Act or any of the enactments relating to the management of the radio spectrum (section 185(2) of the 2003 Act).

³⁷ TalkTalk’s response to the pre-EPM questionnaire, 9 July 2013, page 9

³⁸ Openreach’s response to the pre-EPM questionnaire, 9 July 2013, page 7

³⁹ Openreach’s response to the pre-EPM questionnaire, 9 July 2013, page 7

⁴⁰ Openreach’s comments on the dispute, 26 July 2013, page 2

- 2.29 Sections 186(1) and (2) of the 2003 Act provide that where a dispute is referred to Ofcom in accordance with section 185, Ofcom must decide whether or not it is appropriate to handle the dispute. Section 186(3) provides that Ofcom must decide that it is appropriate for it to handle a dispute falling within section 185(1A) or section 185(2) unless there are alternative means available for resolving the dispute which would be consistent with the requirements of section 4 of the 2003 Act and would be likely to result in prompt and satisfactory resolution.

Ofcom's powers when determining a dispute

- 2.30 Ofcom's powers in relation to making a dispute determination are limited to those set out in section 190 of the 2003 Act. Except in relation to disputes relating to the management of the radio spectrum, Ofcom's main power is to do one or more of the following:
- 2.30.1 make a declaration setting out the rights and obligations of the parties to the dispute (section 190(2)(a));
 - 2.30.2 give a direction fixing the terms or conditions of transactions between the parties to the dispute (section 190(2)(b));
 - 2.30.3 give a direction imposing an obligation on the parties to enter into a transaction between themselves on the terms and conditions fixed by Ofcom (section 190(2)(c)); and
 - 2.30.4 give a direction requiring the payment of sums by way of adjustment of an underpayment or overpayment, in respect of charges for which amounts have been paid by one party to the dispute, to the other (section 190(2)(d)).
- 2.31 A determination made by Ofcom to resolve a dispute binds all the parties to that dispute (section 190(8)).

Ofcom's duties when determining a dispute

- 2.32 When resolving a dispute under the provisions set out in sections 185 to 191 of the 2003 Act, Ofcom is exercising one of its regulatory functions. As a result, when Ofcom resolves disputes it must do so in a manner which is consistent with both Ofcom's general duties in section 3 of the 2003 Act, and (pursuant to section 4(1)(c) of the 2003 Act) the six Community requirements set out in section 4 of the 2003 Act, which give effect, amongst other things, to the requirements of Article 8 of the Framework Directive.⁴¹

Accepting the Dispute for resolution

- 2.33 Having considered Openreach's submission and subsequent comments made by both Parties, Ofcom were satisfied that the Dispute is a dispute between CPs within the meaning of s185(1A) of the 2003 Act and that, under section 186 of the 2003 Act, it was appropriate for us to handle the Dispute.
- 2.34 In reaching the above conclusions, we noted that both Parties are CPs and that BT is subject to relevant SMP conditions, imposed in relation to the market for wholesale local access services in the UK (excluding Hull). We also noted that the Dispute

⁴¹ Directive 2002/21/EC of 7 March 2002 (as amended)

relates to entitlements to network access which BT is required to provide under those conditions.

- 2.35 Ofcom carefully considered the delay that had occurred between the refusal to provide network access by Openreach following the SOR process in December 2012, and the receipt of TalkTalk's submission in June 2013, and the fact that TalkTalk's submission included new data which had not been considered by Openreach as part of the earlier SOR process. We considered whether, as Openreach had argued, this meant either that there was no dispute, or that there existed alternative means to resolve the Dispute (through a fresh SOR process) that would be likely to lead to a prompt and satisfactory resolution to the Dispute.
- 2.36 Ofcom seeks to determine disputes on the basis of up to date material, so it was appropriate to refresh the data from that in the original SOR process. But we also noted that the length of the delay meant some data had changed substantially, and recognised Openreach had not been able to consider the update.
- 2.37 We did not consider, however, that the delay affected the analysis of whether a dispute existed; the situation remained that TalkTalk were requesting a product (SJ-MPF) that Openreach was not willing to provide. We noted that the SOR process provided a possible alternative means of resolution. On balance, however, we did not consider it likely that this would lead to a prompt and satisfactory resolution of the Dispute, given the apparent lack of common ground on the accuracy of the figures themselves and the model used to analyse them.
- 2.38 On 17 July 2013 we informed the Parties of our decision that it was appropriate for us to handle the Dispute for resolution in accordance with section 186(3) of the 2003 Act.

The scope of the Dispute

- 2.39 On 18 July 2013 we published details of the Dispute, including the scope, on the Competition and Consumer Enforcement Bulletin part of our website:

The scope of the Dispute is:

- i) Whether, in providing metallic path facilities ("MPF") only on the basis of double jumpering in local exchanges and without developing and offering a single jumpering alternative on receipt of a request to do so, BT is compliant with its obligations under SMP Conditions set by Ofcom as a result of its review of the Wholesale Local Access market.*
- ii) Whether Ofcom should exercise its powers to make a declaration under section 190(2)(a) of the Communications Act 2003, and/or give a direction under section 190(2)(b) and/or section 190(2)(c) of the Communications Act 2003.*

Interested parties

- 2.40 Sky, Virgin Media, and Vodafone have expressed an interest in the outcome of this dispute.

Information relied upon in resolving the Dispute

- 2.41 This Statement and Determination document draws on the key information provided by the Parties and stakeholders including:

Statement and Determination concerning a dispute between TalkTalk and Openreach relating to single jumpered MPF

TalkTalk submissions:

- TalkTalk's dispute submission of 25 June 2013.
- TalkTalk's pre-EPM questionnaire response, dated 3 July 2013.
- TalkTalk's response of 14 August 2013 to Ofcom's s191 Notice of 7 August 2013.
- TalkTalk's response of 27 August 2013 to Ofcom's follow up questions to the s191 Notice of 7 August 2013.
- TalkTalk's response of 28 August to Ofcom's follow up questions to the s191 Notice of 7 August 2013.
- TalkTalk's response of 16 and 17 October to Ofcom's Provisional Conclusions published 1 October 2013.

Openreach submissions:

- Openreach's response to TalkTalk's dispute submission, dated 3 July 2013.
- Openreach's pre-EPM questionnaire response, dated 3 July 2013.
- Openreach's comments on the dispute, dated 26 July 2013.
- Openreach's response to confirmation questions, dated 2 August 2013.
- Openreach's response dated 16 August 2013 to annex 1 of Ofcom's s191 Notice of 8 August.
- Openreach's response dated 22 August 2013 to annex 2 of Ofcom's s191 Notice of 8 August.
- Openreach's response of 28 August 2013 to Ofcom's follow up questions to the s191 Notice of 8 August 2013.
- Openreach's response of 30 August 2013 to Ofcom's follow up questions to the s191 Notice of 8 August 2013.
- Openreach's response of 4 September 2013 to Ofcom's follow up questions to the s191 Notice of 8 August 2013.
- Openreach's response of 5 September 2013 to Ofcom's follow up questions to the s191 Notice of 8 August 2013.
- Openreach's response of 15 October 2013 to Ofcom's Provisional Conclusions published 1 October 2013.
- Openreach's response of 28 October 2013 to Ofcom's follow up questions to its response to the Provisional Conclusions.

Sky Submissions:

- Sky's response of 14 August 2013 to Ofcom's s191 Notice of 5 August 2013.

Statement and Determination concerning a dispute between TalkTalk and Openreach relating to single jumpered MPF

- Sky's voluntary submission of 14 August 2013.
- Sky's response of 27 August 2013 to Ofcom's follow up questions to the s191 Notice of 5 August 2013.
- Sky's response of 29 August 2013 to Ofcom's follow up questions to the s191 Notice of 5 August 2013.

Section 3

Analysis and Provisional Conclusions

Questions to be answered

- 3.1 This section sets out our assessment of the questions to be answered in determining this Dispute, and our Provisional Conclusions on the issues in dispute.
- 3.2 In order to determine whether Openreach complied with its obligations to provide network access (under FAA1) and LLU Services (under FAA9) on fair and reasonable terms, conditions and charges, we addressed the following questions:
 - 3.2.1 In **Step 1** below, would the introduction of an in-line SJ-MPF product be likely to increase economic efficiency (in particular, by reducing forward looking economic costs)?
 - 3.2.2 In **Step 2** below, in light of our duties, are there any other relevant factors that we should take into account in deciding whether or not to direct Openreach to provide SJ-MPF?
 - 3.2.3 In the light of our provisional conclusions in Steps 1 and 2, we considered in **Step 3** below whether Ofcom should make any declaration under s190(2)(a) or direction fixing the terms and conditions of the provision of SJ-MPF under s190(2)(b) or (c) of the Act.
 - 3.2.4 In **Step 4** below we considered whether there was any breach of FAA2 regarding Openreach's process in handling the original request and, in light of our provisional conclusion on this question, whether Ofcom should make any declaration setting out the rights and obligations of the Parties in relation to FAA2 under s190 (2)(a) of the Act.
- 3.3 In each of Steps 3 and 4 we additionally took into account the need to act consistently with our statutory duties and Community obligations.
- 3.4 Prior to reaching a provisional assessment of the impact on forward looking costs of introducing an in-line TAM SJ-MPF product under Step 1 we first set out our provisional approach to considering economic efficiency.

Analytical approach to measuring economic efficiency

- 3.5 We cover here our provisional view on why an analysis of the relative costs of SJ-MPF and DJ-MPF configurations, on a forward-looking basis, is the most appropriate approach in this case, and what we consider to be the best methodology for modelling costs. We also consider what the implications for competition could be if the cost-based analysis suggested that the forward looking costs of SJ-MPF were lower than those for DJ-MPF.

Types of efficiency

- 3.6 Our approach is to consider the effect which single jumpering could have on economic efficiency. We identify three types of economic efficiency. These are referred to as allocative efficiency, productive efficiency (which are together known as static efficiency) and dynamic efficiency.

- 3.7 Allocative efficiency involves allocating resources to produce the goods and services that consumers value most. For allocative efficiency, the price of a service should reflect its forward-looking costs. Productive efficiency involves minimising the cost of production, for example by giving CPs an incentive to use the wholesale service which minimises the total costs of providing downstream voice and broadband services. Dynamic efficiency refers to the improvements in efficiency that occur over time as innovation results in the development of new goods and services, and as technological advances and investment allow the production of current and future goods and services at lower resource cost. Dynamic efficiency can be enhanced by promoting competition and by regulating in a way which is stable over time, in order to encourage investment.
- 3.8 In resolving this dispute, we have primarily focussed on productive efficiency. This is because we consider that the main potential benefit of single jumpering is that it could enable MPF to be provided at the least cost, in other words, to enhance productive efficiency. Our understanding is that TalkTalk's case is also primarily that SJ-MPF would enhance productive efficiency. However, we have also considered whether the introduction of SJ-MPF could, in principle, have effects on allocative and dynamic efficiency which could add to or offset any increase in productive efficiency.
- 3.9 If SJ-MPF were introduced, allocative efficiency could be enhanced by setting charges appropriately reflecting any resulting reductions in forward-looking costs. If lower prices led to higher volumes of MPF and downstream services, there might be an additional benefit to be taken into account. However, in our Provisional Conclusions on this Dispute we did not propose to set prices and we considered that it is reasonable to assume that, as a first approximation, total volumes of MPF are unlikely to be affected to any significant degree by the introduction of SJ-MPF. We considered that this is a reasonable assumption since, even in the high scenarios in our Provisional Conclusions,⁴² the reductions in forward-looking costs would not be likely to be sufficient in the context of overall MPF prices to have an appreciable impact on total volumes.
- 3.10 Effects on dynamic efficiency are also likely to depend on how SJ-MPF is priced. Prices affect both BT, as seller, and CPs as buyers of MPF. If BT were required to provide SJ-MPF, incentives for BT to invest could be maintained by setting charges which allowed it the opportunity to recover its efficiently incurred costs, including necessary product development costs and a reasonable return on investment. Incentives for both BT and other CPs to invest will also depend on the perceived stability of the regulatory regime. Our approach to resolving this Dispute in our Provisional Conclusions is consistent with the way we have resolved other disputes in the past, and so is consistent with stable regulation.⁴³ Consistency does not mean that precisely the same approach, in all details, must be adopted in all cases. There will be judgments which need to be made on a case-by-case basis, and necessary adjustments for differences in circumstances.

⁴² Our 'high scenarios' correspond to what we see as more favourable sets of assumptions for SJ-MPF, resulting in a more positive/less negative NPV than our medium scenario. Similarly, our 'low scenarios' correspond to what we see as less favourable set of assumptions for SJ-MPF, resulting in a more negative/less positive NPV.

⁴³ See for example, *'Determination to resolve dispute between Opal Telecom and BT about BT's average porting conveyance charge'*, 26 March 2010. The dispute concerned the point on BT's network at which calls to ported numbers would be handed over to Opal. Ofcom compared the efficiency of the alternatives by means of an analysis of their relative costs in net present value (NPV) terms. Available at: http://stakeholders.ofcom.org.uk/binaries/consultations/draft_deter_bt_opal_charge2/statement/APCC_determination.pdf

DCF and cost-benefit analysis

- 3.11 Even if SJ-MPF were expected to result in cost reductions, investment would be needed to develop the new product and make any necessary changes to existing systems before these savings could be realised. The standard method of assessing whether future cost reductions are sufficient to outweigh an initial investment is a discounted cash-flow (“DCF”) analysis. In a DCF analysis, future cash flows are discounted at a rate which reflects the opportunity cost of the funds initially invested.
- 3.12 In order to decide whether provision of SJ-MPF is likely to be efficient, we assessed whether it would be likely to deliver a net benefit, taking into account the aggregate of costs and benefits to all parties. This could include wider benefits and costs which accrue to firms which are not party to the Dispute and their customers. A framework which allows aggregate benefits and costs to be assessed in order to determine whether an investment is efficient is cost-benefit analysis (“CBA”).
- 3.13 As part of our analysis, we considered the appropriate rate at which to discount future costs and benefits. If the potential benefits of SJ-MPF are to be realised, then we consider that Openreach must be able to earn the required return on its investment and at the same time allow prices to be set at levels which pass sufficient of the cost savings to users of SJ-MPF to allow them to recover their own development costs, and give them an incentive to use it. The relevant discount rate will therefore need to reflect the firms’ cost of capital.⁴⁴ In our central case, we used Openreach’s cost of capital for copper access services, but we also carried out a sensitivity analysis using higher rates to proxy the costs of capital of access seekers such as TalkTalk and Sky.
- 3.14 Because we captured the potential benefits of SJ-MPF in the form of cost savings and as we also considered that the volume of MPF usage, in total, is unlikely to be affected by the introduction of single jumpering, effects on CPs’ revenues were not directly relevant to our analysis. For example, taking account of reductions in Openreach revenue derived on the assumption that regulated prices for SJ-MPF will reflect cost savings would introduce a circularity into the calculation. Openreach’s loss of revenue would be exactly offset by a benefit to users of SJ-MPF, so in CBA terms, these revenue effects would represent a transfer, not a resource cost, and so should not be taken into account. Prices (which determine revenues) are the way in which the benefits of resource cost savings (if any) are passed to users and ultimately consumers.
- 3.15 Similarly, we did not consider that cost reallocation was relevant to the assessment of overall economic efficiency because, when costs are reallocated; cost increases in one place are exactly offset by reductions elsewhere, leaving no net gain or loss in total. However, changes in the pattern of cost recovery between services, that is, changes in relative prices, can affect economic efficiency. If SJ-MPF were to be introduced, it would be necessary to consider how, in principle, the relative prices of SJ-MPF and DJ-MPF should be set for economic efficiency.

⁴⁴ Note that, where private investment is made for public benefit, other approaches, including use of the social time preference rate may be justified. See ‘*Discounting for CBAs involving private investment, but public benefit*’, Joint Regulators Group, 4 October 2011 at <http://stakeholders.ofcom.org.uk/binaries/consultations/cba/summary/JRG-condoc.pdf>. However, in the case of SJ-MPF, the immediate potential beneficiaries are LLU CPs, not end consumers, and the LLU CPs are themselves also contributing to (i.e. having to finance) the upfront investment (not just Openreach). Therefore, a discount rate based on the cost of capital (rather than the social time preference rate) is more appropriate in the present context.

- 3.16 In assessing the economic efficiency of SJ-MPF, we only considered changes in costs which are causally related to the introduction of SJ-MPF, that is the additional costs incurred or saved as a result. In other words, we only took ‘forward-looking’ costs into account. Costs incurred in the past cannot be influenced by current or future consumption and production and so we excluded sunk costs (e.g. costs of fixed assets which will not be replaced).
- 3.17 Investments to enable the use of SJ-MPF might, once made, be considered as costs which are fixed in the short run and would be excluded from our analysis if only short-run variable costs were taken into account. But MPF lines are frequently used over a long period of time and we considered that we needed to take account of all forward-looking costs which are caused by the introduction of SJ-MPF, including additional investments in fixed assets. This means that the most relevant cost concept should be based on a long-run forward-looking view of the relevant incremental costs. The use of forward-looking incremental costs is an important difference between our assessment and that of TalkTalk which, in several cases in its model, used estimates of costs calculated on a fully-allocated (“FAC”) basis. FAC figures may include overheads and other costs which are not relevant to the choice between SJ-MPF and DJ-MPF.
- 3.18 If SJ-MPF were introduced, all CPs would have the option of using it, but not all might be able to do so economically. Some CPs, including BT, might therefore find that they faced tougher competition as a result of SJ-MPF, if it reduced the costs of some of their competitors. Competition on the merits such as this is likely to benefit customers for downstream voice and broadband services.
- 3.19 Thus, if SJ-MPF were more efficient than DJ-MPF and TalkTalk and Sky (for example) were able to reduce their prices as a result of using it, there could be some downward pressure on downstream prices generally. This could spread benefits to customers of CPs that do not use SJ-MPF, including potentially customers of BT’s downstream arm, and incentivise other CPs, notably BT, to make further efficiency gains. We address the potential wider effects of introducing SJ-MPF, including competition and consumer effects and regulatory implications in Step 2 below. Taking account of competition and consumer effects is consistent with our statutory duties.

Step 1. Would the introduction of an in-line SJ-MPF product be likely to increase economic efficiency (in particular, by reducing forward looking economic costs)?

Introduction

- 3.20 Our provisional conclusions in this matter were informed by the cost-benefit analysis we carried out, which is set out in Annex 3. We considered it appropriate, in this case, to make a more detailed assessment than might be considered usual in resolving a dispute. This is because both the Parties submitted their own detailed models to us, but there were key differences between the models and it was important in this case to take a view on the reasonableness of particular features or assumptions within the submitted models. We explain more fully in Annex 3 (see paragraphs A3.19 – A3.20) why we preferred not to rely on one or other of the parties’ models and, instead, to produce our own.
- 3.21 Using our model, we estimated the quantifiable benefits and costs of introducing SJ-MPF under a range of different (yet in our view reasonable) assumptions to reflect the inevitable uncertainty about projections into the future. Whilst we put significant weight on the result using the set of assumptions which we refer to as the ‘base

case', we also took into account estimates of the quantifiable costs and benefits of SJ-MPF under four other sets of assumptions (we detail these in Annex 3). Table 1 below shows the summary output from the Ofcom model for each of the five scenarios upon which we based our provisional assessment of the quantifiable costs and benefits in this dispute. The outputs show that the net present value ("NPV") was positive in only one of the five scenarios we ran.

Table 1 – Ofcom model NPV output for each scenario

Scenario:	High	High-Medium	Medium ⁴⁵	Medium-Low	Low
NPV:	+£5.6m	-£1.8m	-£4.7m	-£7.5m	-£9.2m

Source: Ofcom model

3.22 In light of the above, our judgment based on this quantified assessment was that a positive NPV outcome was less likely than a negative outcome. Even in the scenario where a positive NPV outcome was found it was modest if expressed in annual terms or on a per line basis.⁴⁶

Other considerations

3.23 We also identified a number of other factors we considered likely to be relevant but that we were not able to quantify in our assessment. These were:

- 3.23.1 *Training and availability of engineers:* Engineers would need to be trained to correctly carry out the provisioning and maintenance instructions they receive for SJ-MPF tasks. Whilst these changes may be minimal so that costs may be small, they would be a relevant addition to the costs of SJ-MPF. However, we did not undertake an analysis of these costs. In addition, the model implicitly assumes that there is sufficient engineering capacity to carry out all necessary works. However, if there were any resource constraints, these would act to delay the use of SJ-MPF, resulting in lower SJ-MPF volumes.
- 3.23.2 *Existence of two MPF engineering processes:* Whilst TalkTalk and Sky argued that there is likely to be a lower fault rate on SJ-MPF due to fewer jumpers (and our model has provided for this), we consider that the additional engineering complexity as a result of having two processes to provide MPF products could also potentially increase fault rates. This factor was not accounted for in our model.
- 3.23.3 *EMP work stack:* The development period included in our assessment assumes there is no *delay* in Openreach development and that this development can be included in the next available EMP release (i.e. the next release where developments already underway would not need to be stopped to accommodate SJ-MPF). However, SJ-MPF could be deferred if the EMP work stack is full of developments with a higher priority (based on the relative cost benefit analysis of the different developments). Any such delay would impact the earliest date at which SJ-MPF would be available.

⁴⁵ This is our base case.

⁴⁶ Converting the +£5.6m to a 7 year annuity (at 8.8%) and dividing by 2013/14 MPF volumes equates to about +15p per MPF line, however this per line value will fall over time due to the growing number of MPF lines.

3.24 It was our view that each of these would be likely to reduce the benefit of SJ-MPF in a way not fully captured by the NPV calculation. However, given our assessment of the NPV of SJ-MPF as being negative in four of the five scenarios, we did not carry out more detailed analysis as these factors would not change our provisional conclusions.

Provisional view on Step 1: whether the introduction of an in-line SJ-MPF product would be likely to increase economic efficiency (in particular by reducing forward looking economic costs)

3.25 Whilst we foresaw ongoing operational cost savings from SJ-MPF, we did not believe the quantifiable benefits would outweigh the quantifiable costs over a reasonable time horizon. This was due to the significant upfront capital costs, development costs, and falling volumes of annual net adds, that could make use of SJ-MPF. This can be seen in table 1 which shows that in only one of our five scenarios is there a positive NPV for the incremental cost saving from SJ-MPF over DJ-MPF.

3.26 In considering the outputs of our model, which informed our provisional conclusion, it is worth noting how our model quantified the cost savings from SJ-MPF over DJ-MPF, compared to TalkTalk’s model. Table 2 below breaks down the NPV for each capital and operating cost, for the Ofcom and TalkTalk models.

Table 2 – Industry wide SJ-MPF cost difference NPV breakdown by line item for Ofcom and TalkTalk assessments

		NPV (£m)	
		Ofcom	TTG
TAM Costs⁴⁷	TASMs	-£5.5	[X]
	Tie cables	£1.6	[X]
	Master controller	-£1.9	[X]
	Test head	-£3.0	-
	Racks	-£0.8	-
	TAM costs sub-total	-£9.5	[X]
Frame Costs	Blocks	£0.4	-
	Jumpers installed	£2.6	[X]
	Jumpers removed	£0.3	[X]
	Frame repair	£3.6	[X]
	Frame costs sub-total	£6.8	[X]
Development costs	Development sub-total	-£2.0	[X]
	Total:	-£4.7	£60.1

Source: Ofcom model and TalkTalk model

3.27 As the table illustrates, there are significant differences in the magnitude of the costs between the Ofcom and TalkTalk models. There are a number of factors driving these differences but the key ones are:

⁴⁷ TalkTalk’s model combines a number of TAM components, and as such we are not able to break out all of them as we have done in our model. It is also possible that TalkTalk has not included some of the TAM cost items that we have included in our model.

Statement and Determination concerning a dispute between TalkTalk and Openreach relating to single jumpered MPF

- 3.27.1 different assumptions about the magnitude of frame costs savings;
- 3.27.2 different assumptions about volumes driven partly by different views about when SJ-MPF services might be launched; and
- 3.27.3 different assumptions about capital costs.

We discuss each of these in turn.

- 3.28 The largest of the savings from TalkTalk's model, by some margin, come from frame costs; mainly from frame repair costs but also from the reduced number of jumpers that need to be installed and disconnected under SJ-MPF. We reviewed these potential savings and considered that they would be substantially less than TalkTalk estimated, both in terms of relevant volumes and unit cost savings. Our assessment of frame repair and capital costs is discussed in Annex 3 from paragraphs A3.186 to A3.197. Our assessment of installation and disconnection volumes is discussed at paragraphs A3.160 – A3.171.
- 3.29 Our model was also based on lower volumes that make use of SJ-MPF than are included in TalkTalk's model. There are three main reasons for this:
- *Start date:* TalkTalk assumed a start date of beginning 2013/14.⁴⁸ In our base case we assumed a start date of Q2 2015/16.⁴⁹ Given that net adds are falling significantly each year, these two years have a material impact on volumes. The rationale for our choice of start date is given in Annex 3 paragraphs A3.131 to A3.135.
 - *Volume forecasts:* The volume forecasts we used, indicate net adds will be significantly lower than TalkTalk used in its model, most especially in terms of the forecast volumes for Sky. See Table 3 below for comparison of TalkTalk and Ofcom's forecast net adds.
 - *Utilisation of SJ-MPF assets:* We assumed that if SJ-MPF services were launched, any spare capacity of DJ-MPF assets would be used first to meet MPF demand before switching over to SJ-MPF. We refer to this as 'topping up' of DJ-MPF assets. This reduces the net add volumes for SJ-MPF. We discuss our approach to the use of DJ-MPF assets in Annex 3, paragraphs A3.139 – A3.140.

⁴⁸ TalkTalk dispute submission, 25 June 2013, page 9, paragraph 6.9

⁴⁹ See Annex 3, paragraphs A3.131-A3.135 for justification of the start date for our assessment

Table 3 – Forecast net adds in TalkTalk and Ofcom models

TalkTalk forecast net adds for each year in their model (in millions)⁵⁰

	Year 1 ⁵¹	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Yearly							
TalkTalk	[X]	[X]	[X]	[X]	[X]	[X]	[X]
Sky	[X]	[X]	[X]	[X]	[X]	[X]	[X]
Total	[X]	[X]	[X]	[X]	[X]	[X]	[X]
Cumulative							
TalkTalk	[X]	[X]	[X]	[X]	[X]	[X]	[X]
Sky	[X]	[X]	[X]	[X]	[X]	[X]	[X]
Total	[X]	[X]	[X]	[X]	[X]	[X]	[X]

Ofcom forecast net adds in each year of our model (in millions)⁵²

	Year 1 ⁵³	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Yearly							
TalkTalk	[X]	[X]	[X]	[X]	[X]	[X]	[X]
Sky	[X]	[X]	[X]	[X]	[X]	[X]	[X]
Total	0.8-0.9	0.7-0.8	0.4-0.5	0.213	0.179	0.151	0.137
Cumulative							
TalkTalk	[X]	[X]	[X]	[X]	[X]	[X]	[X]
Sky	[X]	[X]	[X]	[X]	[X]	[X]	[X]
Total	0.8-0.9	1.5-1.7	1.9-2.2	2.1-2.4	2.3-2.6	2.4-2.7	2.6-2.9

Source: Ofcom model

- 3.30 These three factors mean that MPF volumes that make use of SJ-MPF in our model across the assessment period are substantially less than those estimated by TalkTalk. Since SJ-MPF provides incremental operational cost savings, larger net-add volumes will act to increase those incremental savings (compared to DJ-MPF), and therefore make the case for SJ-MPF stronger. Conversely, lower volumes will make the case for SJ-MPF weaker.
- 3.31 Finally, we considered equipment capital costs to be higher than those assumed by TalkTalk. That applies in particular to TAMs. Under SJ-MPF each CP needs its own TAM and so all TAM related equipment volumes are higher under SJ-MPF compared to DJ-MPF.
- 3.32 All of the above factors act to reduce the benefits of SJ-MPF over DJ-MPF in comparison with TalkTalk's modelling and as such drive a lower, and ultimately negative, NPV for the incremental cost savings from SJ-MPF over DJ-MPF in all but our high scenario.

⁵⁰ Source: TalkTalk model

⁵¹ Year 1 refers to financial year 2013/14 in TalkTalk model

⁵² Source: Ofcom model

⁵³ Year 1 refers to calendar year 2015 in Ofcom model

Step 2: In light of our duties, are there any other relevant factors that we should take into account in deciding whether or not to direct Openreach to provide SJ-MPF?

Introduction

3.33 In Step 1 above we considered effects on forward-looking costs. In this section we consider whether there are any other relevant factors that we should take into account in deciding whether it would be reasonable and proportionate for Ofcom to direct Openreach to provide SJ-MPF.

What additional considerations, if any, should we take into account?

TalkTalk's arguments

3.34 TalkTalk submits that *"whether SJ-MPF should be developed is a straightforward question of whether it is a lower cost or not. This question can only be answered through a NPV model that includes all the relevant costs of providing lines on DJ-MPF and on SJ-MPF"*.⁵⁴ When we asked whether a materiality threshold should apply, TalkTalk responded that it considers *"that the issue of materiality does not arise in this case. This is because:*

- *all costs have been included;*
- *some benefits have been excluded (e.g. reducing cost and consumer benefit resulting from fewer jumper/frame faults); and*
- *the model shows a significant positive NPV (in tens of millions of pounds)"*.⁵⁵

Openreach's arguments

3.35 Openreach submits that *"it would be very peculiar indeed for any commercial organisation to make decisions solely on the basis of a forecast NPV without testing the assumptions used in the assessment or without carrying out sensitivity analysis"*.⁵⁶

3.36 Openreach also listed the following factors which it argued should be taken into account:

- *"Payback period*
- *Commitment from CPs to buy the product once it becomes available*
- *Capital required and investment risk*
- *What Openreach believes are achievable volume and utilisation factor assumptions so that Openreach can be confident the volumes would materialise*
- *Whether the proposal raises any issues or concerns in relation to the Undertakings*
- *Whether there is sufficient business benefit in terms of increased revenue, reduced costs or improvements in customer satisfaction*
- *Whether there are regulatory implications*

⁵⁴ TalkTalk's response to the pre-EPM questionnaire, 9 July 2013, page 5

⁵⁵ TalkTalk's response to the pre-EPM questionnaire, 9 July 2013, page 8

⁵⁶ Openreach's response to the pre-EPM questionnaire, 9 July 2013, page 5

- *Whether there are cross portfolio implications*.⁵⁷

Ofcom's provisional views on additional considerations

- 3.37 It appears to be common ground between the Parties, and we agreed, that NPV is an important consideration. However, we did not agree with TalkTalk when it implies that only NPV is relevant or with Openreach in relation to the nature of each of the additional considerations which ought to be taken into account. We have considered the relevance of the additional factors mentioned by Openreach below. The first four factors identified by Openreach relate to risk, which is discussed in paragraphs 3.39 – 3.42. The sixth is the subject of the quantified analysis of costs and benefits which is set out in Annex 3. Implications for other regulated products are discussed in paragraphs 3.48 – 3.51.
- 3.38 In our view, the key considerations identified by Openreach which go beyond the quantified CBA could be grouped under four headings, namely, treatment of risk, competition effects, other effects on consumers, and regulatory considerations. These are discussed below.

How should any additional considerations be applied?

Treatment of risk

- 3.39 The wider effects referred to by Openreach are generally effects which relate to the impact of SJ-MPF on its own costs and revenues. Openreach's concerns are inevitably somewhat different to Ofcom's, since Ofcom is guided by its statutory duties, including to promote efficient competition. However, a number of Openreach's concerns relate to the risk that it may not make an adequate return on any investment it makes in developing SJ-MPF. If SJ-MPF were introduced, Openreach would then bear the risk that costs or demand for SJ-MPF might not develop as expected. This risk was also relevant to our provisional assessment, and is reflected in the quantified analysis of costs and benefits set out in Annex 3. We explain how we addressed Openreach's concerns about risk below.
- 3.40 We refer to the approach we generally take to incentivising risky investments as the 'fair bet' approach.⁵⁸ The key point is that regulation should not be applied asymmetrically; if the regulated firm is required to bear downside risk, then it should also be able to benefit from upside risk. The prospect of it failing to recover its investments in some states of the world is balanced by the prospect of returns above the required minimum rate of return in others, and undiversifiable risk is compensated through the cost of capital. In our quantified analysis for this dispute, we took account of the unavoidable uncertainty about projections of future volumes, costs and benefits by modelling a number of scenarios under a range of different possible assumptions, and by discounting future costs and benefits at the cost of capital.
- 3.41 We sought to ensure that our forecasts were, as far as is practical, objective including insofar as they allow the possibility of both upside and downside risk. The key risk relates to the volume of SJ-MPF usage. This depends primarily on the amount of overall growth in the number of MPF lines. We consider that our MPF volume forecasts were reasonable. Our approach was based on the internal volume

⁵⁷ Openreach's response to the pre-EPM questionnaire, 9 July 2013, page 5

⁵⁸ The 'fair bet' principle is usually applied in the context of setting charge controls. See, for example, Ofcom 'Proposals for WBA charge control', 20 January 2011, Annex 8 at <http://stakeholders.ofcom.org.uk/consultations/wba-charge-control/>

forecasts provided to us by TalkTalk and Sky in response to formal information requests. We also reconciled our forecast to the central case volume assumptions underpinning our proposals in the 2013 Charge Control Consultation to apply from 2014.⁵⁹

- 3.42 We also took account of the possibility that some risks relating to the extent of SJ-MPF usage are asymmetric. For example, there may be some risk that there will be no take-up of SJ-MPF *at all*. In particular, Sky has not indicated a firm intention to use SJ-MPF⁶⁰ and, whilst this is understandable at this stage, it does leave open some risk that take-up will be substantially lower than our base case. By contrast, the probability that demand will be very much higher than in our base case scenario appears to be much less as although net adds could be slightly higher than forecast, there is not a realistic scenario where this is similar in scale to the reverse situation whereby Sky does not take up SJ-MPF. We took this into account when we came to interpret the results of our quantified analysis.

Competition effects

- 3.43 As noted above, introducing SJ-MPF may have some wider effects on competition. Competition benefits could arise if SJ-MPF enables costs and prices to be reduced. Here we considered benefits to customers of operators which do not themselves use SJ-MPF, resulting from downward pressure on prices through competition.
- 3.44 In some circumstances, introducing a new product can lead to significant gains from increased competition, through the introduction of innovative new services or by increasing pressure on firms to operate efficiently. Competition benefits are most likely to be significant where the new product has no close substitutes among existing products or where it facilitates new entry into markets which are not yet effectively competitive. However, these circumstances do not in our view apply to SJ-MPF and this means that, even if it did reduce costs, any additional competition benefits from the introduction of SJ-MPF would be likely to be relatively small. In particular, most downstream markets where SJ-MPF could be used are already competitive, and a close substitute product (DJ-MPF) is already available.⁶¹ In addition, our modelling suggested that, even in those scenarios in which SJ-MPF could produce net cost savings, those savings are likely to be relatively small. Nonetheless, if cost savings by CPs using SJ-MPF were passed on in lower prices to their retail customers, they may, as a result of competitive pressure, also be spread to customers of other CPs. Lower costs could also mean that the number of exchanges where it is economic to roll out LLU are increased, and this could have additional competition benefits, although the number of such exchanges is likely to be small in any case as many of

⁵⁹ See Ofcom 'Fixed access market reviews: Approach to setting LLU and WLR charge controls', 11 July 2013, Annex 8 at <http://stakeholders.ofcom.org.uk/binaries/consultations/llu-wlr-cc-13/annexes/annexes.pdf>

⁶⁰ In its voluntary response to Annex C of our s191 Notice, Sky says it "would be likely to buy and use a SJ-MPF solution, depending on the terms on which such a solution is provided".

⁶¹ CPs use MPF to provide retail voice and broadband services and these retail markets have been found to be effectively competitive (see Ofcom, 'Review of the fixed narrowband services market', 26 September 2013, the '2010 WLA Statement' and 'Fixed Access Market reviews: approach to setting LLU and WLR charge controls' 11 July 2013). Markets for wholesale broadband access (WBA) services are also downstream of the wholesale access market in which MPF services are sold and the majority of these markets by population coverage have also been found effectively competitive (see Ofcom, 'Review of the wholesale broadband access markets', Consultation, 11 July 2013 and 'Review of the wholesale broadband access markets', Statement, 3 December 2010). In respect of wholesale voice services only wholesale call origination (and wholesale call termination) remain SMP markets – see September 2013 Narrowband Market Review.

the remaining non-unbundled exchanges are very small (in terms of premises served) and therefore are unlikely to be economical to unbundle.

Other effects on consumers

- 3.45 As noted above, if SJ-MPF is introduced, all CPs will have the option of using it, but not all may be able to do so economically. Some CPs, including BT, may therefore find that they face tougher competition as a result of SJ-MPF, if it reduces the costs of some of their competitors. In these circumstances, competition on the merits may drive down prices and force those CPs to make further efficiency gains. This would benefit consumers of downstream voice and broadband services, including customers of CPs that do not use SJ-MPF e.g. customers of BT Retail.
- 3.46 Sky has argued that the introduction of SJ-MPF might enable its customers to receive a better service in some respects. Sky told us that “*shorter tie cables and use of newer TAMs in a SJ-MPF [sic] may deliver a faster service than a SJ-MPF. Additionally it may result in simpler migration processes and a lower number of faults due to fewer potential points of failure in the wiring arrangements for MPF*”.⁶² TalkTalk said the fact that there is one less jumper in SJ-MPF means that the overall line length is shorter and that this could lead to “*marginally higher speeds (fn 3 - the length of the copper path from the MSAN to the customer is marginally shorter under single jumpering and therefore the line can support a higher speed)*”.⁶³ We considered the impact of this effect, to the extent it exists, is likely to be extremely small: the proportion of line length saving would normally be very small as compared with the overall length of the line from the exchange to the customer termination point.
- 3.47 TalkTalk said the introduction of SJ-MPF would “*deliver other benefits to consumers from fewer faults (fn 2 – there would be reduced faults since fewer jumpers and tie cables mean lower fault levels)*”⁶⁴ since engineers would only have to install one jumper correctly rather than two. We thought this point was double-edged. We noted that if SJ-MPF is introduced there will be two MPF processes running in tandem i.e. DJ-MPF and SJ-MPF. Having two processes could complicate rather than simplify engineering instructions, and could potentially increase fault rates. In its evaluation of the SOR, Openreach said “*introducing a new MPF variant would create dual processes and the potential increase in order provisioning fault rates*”.⁶⁵

Regulatory considerations

- 3.48 We considered what the implications for other regulated products would be if we were to direct Openreach to supply SJ-MPF.
- 3.49 As we provisionally did not propose to require BT to provide SJ-MPF, we did not consider in detail what implications its introduction would have for other regulated products. However, we noted that if SJ-MPF were to be made available, it would be necessary to consider how this should be reflected in the regulation of MPF provision, which currently includes controls on MPF connection and rental charges based on double jumpering.

⁶² Sky's voluntary submission, 14 August 2013, page 1

⁶³ TalkTalk's dispute submission, 25 June 2013, page 3, paragraph 2.6

⁶⁴ TalkTalk's dispute submission, 25 June 2013, page 3, paragraph 2.6

⁶⁵ SOR 8333 Evaluation for Single Jumper MPF (CPCG presentation), December 2012 (Annex 3 to Openreach comments on TalkTalk's dispute submission, 26 July 2013)

Statement and Determination concerning a dispute between TalkTalk and Openreach relating to single jumpered MPF

- 3.50 The current charge controls expire on 31 March 2014 and Ofcom has recently consulted on its proposals for new charge controls for Local Loop Unbundling (“LLU”) and Wholesale Line Rental (“WLR”) services.⁶⁶ Ofcom has proposed that new charge controls will enter into force on 1 April 2014 and cover the period to 31 March 2017 (“the Market Review Period”). The proposed charge control for MPF has also been based on a model of the costs of providing the service using double jumpering.
- 3.51 If SJ-MPF were introduced, any implications for DJ-MPF costs and charges would be a matter to be considered in the charge control review statement to be published early in 2014.

Provisional view on Step 2: In light of our duties, were there any other relevant factors that we should take into account in deciding whether or not to direct Openreach to provide SJ-MPF?

- 3.52 We considered the treatment of risk, competition effects, other consumer effects and regulatory considerations in our assessment of Step 2.
- 3.53 A number of points in respect of risk identified by Openreach were captured in our quantified CBA. Nevertheless, we considered that the risk which Openreach would bear if SJ-MPF were provided may be asymmetric, and that it was more likely that usage of SJ-MPF would be lower than we calculated in our base case than higher. We took this into account in reaching an overall view on the likely implications of introducing SJ-MPF.
- 3.54 Our analysis also considered the effects on competition of introducing SJ-MPF. We thought this would be limited, given that most competition benefits arise where there is no similar or substitute product. However DJ-MPF enables the provision of the same services as SJ-MPF and at the same level of the supply chain.
- 3.55 In consideration of consumer effects, beyond those addressed in relation to competition effects, we considered TalkTalk’s view that SJ-MPF will result in fewer faults due to fewer jumpers. However, we thought this needed to be balanced against the additional engineering complexity and the possibility of a worse customer experience for end users due to the potential additional complexity of having two parallel ways of providing MPF.
- 3.56 Lastly, we concluded, in relation to regulatory considerations, that were SJ-MPF to be introduced, implications for DJ-MPF costs and charges would be a matter for consideration in the current charge control review statement to be published in early 2014.

Step 3. Should Ofcom make any declaration setting out the rights and obligations of the Parties under s190(2)(a) of the Act or give any direction fixing the terms and conditions of the provision of SJ-MPF under s190(2)(b) and/or (c) of the Act?

Introduction

- 3.57 This section considers whether, in light of our provisional conclusions in steps 1 and 2, we should make any declaration setting out the rights and obligations of the

⁶⁶ Available at: http://stakeholders.ofcom.org.uk/binaries/consultations/llu-wlr-cc-13/summary/LLU_WLR_CC_2014.pdf

Statement and Determination concerning a dispute between TalkTalk and Openreach relating to single jumpered MPF

Parties under s190(2)(a) of the Act or give any direction fixing the terms and conditions of the provision of SJ-MPF under s190(2)(b) and/or (c) of the Act.

Ofcom's provisional views

- 3.58 In Step 1, we provisionally concluded that we did not believe the quantifiable benefits of introducing SJ-MPF would outweigh the quantifiable costs over a reasonable time horizon, as in only one of the five scenarios we considered was there a positive NPV for the incremental cost saving from SJ-MPF over DJ-MPF. We also considered a number of further, unquantified, factors, and provisionally concluded that each of them would act to reduce the benefits of SJ-MPF over DJ-MPF in comparison with TalkTalk's modelling and as such drive a lower, and ultimately negative, NPV for the incremental cost savings from SJ-MPF over DJ-MPF.
- 3.59 In Step 2, we considered the likely effect of a number of further factors, namely treatment of risk, competition effects, other effects on consumers, and regulatory considerations.
- 3.60 We considered whether the likely effect of the factors in Step 2 should lead us to conclude that Openreach should be required to provide SJ-MPF. Our provisional conclusion was that these factors taken together were not likely to have a sufficiently significant positive effect to outweigh the provisional findings in Step 1 that providing SJ-MPF would be NPV negative on most reasonable assumptions. As a result, we provisionally concluded that SJ-MPF would not reduce forward looking economic costs.
- 3.61 Accordingly, our provisional view was that we should not direct Openreach to offer SJ-MPF, and that there was no need either to direct Openreach as to the terms and conditions of the provision of SJ-MPF, or to offer guidance on the principles that might apply to the pricing of SJ-MPF were it provided. However, we did provisionally consider it would be appropriate to make a declaration that in not providing SJ-MPF, Openreach is not in breach of SMP conditions FAA1 and FAA9.

Step 4. Was there any breach of FAA2 regarding Openreach's process in handling the original request and if there was should Ofcom make any declaration setting out the rights and obligations of the Parties in relation to FAA2 under s190 (2)(a) of the Act?

Introduction

- 3.62 FAA2 concerns requests for new network access and the provision of clear guidance for handling such requests by BT. In summary, FAA2:
- 3.62.1 requires Openreach to publish guidelines in relation to requests for new network access
 - 3.62.2 describes the required content of the guidelines
 - 3.62.3 requires Openreach to provide information on reasonable request from a third party that is considering making a request for new network access
 - 3.62.4 requires Openreach to follow its published guidelines in considering requests for new network access

Statement and Determination concerning a dispute between TalkTalk and Openreach relating to single jumpered MPF

3.62.5 requires Openreach to inform Ofcom of the processes it has put in place to ensure compliance with FAA2.

3.63 In this section we consider the relevance of FAA2 and whether Openreach complied with FAA2.

Relevance of FAA2

Openreach's arguments

3.64 In its response to TalkTalk's dispute submission, Openreach states that the relevant SMP condition (if any) is FAA2: "*SJ-MPF would be a new arrangement for providing jumpering and as such SMP condition FAA2 (requests for new Network Access) is the relevant condition in this particular case*".⁶⁷ It goes on to state that it has "*complied with SMP condition FAA2 at all times, both in terms of how the SJ-MPF SOR was handled between May 2012 and December 2012, and in terms of the approach taken in reaching the decision to reject the SOR*".⁶⁸

TalkTalk's arguments

3.65 TalkTalk argues that Openreach has misinterpreted FAA2 in linking it to the SJ-MPF dispute, stating "*it would seem that they have either misunderstood or are deliberately mischaracterising the nature and meaning of these three SMP conditions*".⁶⁹ ...It says "*TalkTalk maintains that SMP conditions FAA1 and FAA9 are clearly the relevant obligations for Ofcom to consider in this dispute because they impose on Openreach the obligation to provide network access on fair and reasonable terms, as indeed set out in TalkTalk's dispute submission*".⁷⁰

Ofcom's provisional views on whether FAA2 is relevant

3.66 Ofcom understands that it is Openreach's position that FAA2 applies instead of, rather than in addition to, FAA1. Ofcom provisionally did not consider that this is a correct interpretation, either on the face of the SMP conditions as drafted, or in the explanation provided in the 2010 WLA Statement which describes the FAA2 requirement as, "*an accompaniment to the obligation on BT to meet all reasonable requests for new network access*" (paragraph 5.28 – emphasis added).

3.67 FAA2 addresses a particular issue about the handling of requests for new network access, in terms of the level of clarity and certainty for CPs over the handling of requests for new network access, and the standard of information required by BT to assess requests. It supports rather than replaces FAA1 in the case of requests for new network access.

Did Openreach comply with FAA2?

Openreach's arguments

3.68 Openreach states that it complied with all aspects of FAA2 in its handling of the request by TalkTalk "*the process that Openreach followed, and our actions in*

⁶⁷ Openreach's response to TalkTalk's dispute submission, 26 July 2013, page 2

⁶⁸ Openreach's response to TalkTalk's dispute submission, 26 July 2013, page 2

⁶⁹ TalkTalk's response to the pre-EPM questionnaire, 9 July 2013, page 4

⁷⁰ TalkTalk's response to the pre-EPM questionnaire, 9 July 2013, page 4

*considering the request were fully compliant with the letter (and spirit) of the relevant SMP obligations”.*⁷¹

TalkTalk’s arguments

- 3.69 TalkTalk considers *“that Openreach’s approach has not been constructive and Openreach’s intent was never to accept the SOR whatever the evidence that was presented”*.⁷² TalkTalk argues that *“Openreach did not engage in a transparent or constructive manner (not only in respect of the SOR but also in respect of previous requests to develop SJ-MPF)”*.⁷³
- 3.70 Concerning the Openreach models, TalkTalk states that Openreach has *“consistently refused to share any of their models (or details of their model) that would have allowed us to comment on their assumptions. They have refused even to provide the logic of the model absent assumptions (or with dummy assumptions)”*.⁷⁴ In relation to the model that it built, TalkTalk states that *“on occasions, Openreach have pointed out relevant and valid mistakes in our modeling... In the main, however, Openreach have avoided engaging in a meaningful way with the substance of the model, they have never produced cogent reasons or evidence to rebut the fundamental components, assumptions and, most importantly the end-result of the model showing a significant positive NPV of £60 million”*.⁷⁵

Ofcom’s provisional views on whether Openreach has breached FAA2

- 3.71 We considered the correspondence exchanged between Openreach and TalkTalk during the period from May to December 2012 during the period when Openreach was considering the SOR, as supplied to us by the Parties during the Enquiry Phase to this dispute. We also considered Openreach’s guidance ‘*How to raise a Statement of Requirement for Openreach Products*’. This is the guidance that Openreach has published in compliance with condition FAA2.1, and which it is bound to follow under condition FAA2.4.
- 3.72 We also took into account TalkTalk’s comments on Openreach’s approach to the SOR process in relation to the matters which are in dispute.
- 3.73 Our provisional view was that we had not received specific or sufficient evidence to conclude that BT breached any of the specific obligations under FAA2, including the requirement at FAA2.4 for Openreach to follow its own guidance, in this matter.
- 3.74 Consequently we provisionally concluded that it would not be appropriate for Ofcom to make a declaration in relation to this condition under section 190(2)(a).

Summary of Provisional Conclusions

- 3.75 As explained above at paragraph 2.30, Ofcom’s powers in resolving a dispute are set out in section 190 of the 2003 Act. TalkTalk requested that Ofcom determine the dispute by:

⁷¹ Openreach’s comments on the dispute, 26 July 2013, page 9

⁷² TalkTalk’s response to the pre-EPM questionnaire, 9 July 2013, page 4

⁷³ TalkTalk’s response to the pre-EPM questionnaire, 9 July 2013, page 5

⁷⁴ TalkTalk’s dispute submission, 25 June 2013, page 18, paragraph 6.47

⁷⁵ TalkTalk’s dispute submission, 25 June 2013, page 18, paragraph 6.48

*“exercising its powers under Section 190 of the Communications Act 2003, directs BT to develop and offer within 4 months a single jumpering product on appropriate terms in accordance with the statement of requirements submitted by TalkTalk. This requirement should be combined with a monthly reporting requirement on Openreach to update TalkTalk on developments against clear product development milestones”.*⁷⁶

- 3.76 As noted above, on balance the quantified cost-benefit analysis that we undertook indicated to us that moving to SJ-MPF would be more likely to increase the forward looking industry-wide incremental costs of MPF provision than to reduce them. There were several reasons why our model produced different results to those obtained by TalkTalk. These included that our model included lower frame costs savings, and higher equipment unit costs than TalkTalk’s, and that we considered any benefits from single jumpering would occur later than TalkTalk modelled due to development lead times. In addition there were other factors, which could not readily be quantified, such as asymmetric risk, the retraining of engineers and the added complexity of two MPF processes that lent further support to the quantified analysis in suggesting that a positive net benefit was less likely than a net cost.
- 3.77 Accordingly, having regard to our statutory duties, our provisional conclusion was that SJ-MPF would not be a more efficient way of delivering MPF than the status quo (DJ-MPF), and the other relevant factors we had taken into consideration did not alter this conclusion. We therefore considered that we should not require BT to develop and offer SJ-MPF to comply with SMP conditions FAA1 or FAA9, or otherwise. We therefore provisionally concluded in relation to Step 3 above that it was not necessary to consider a direction under section 190(2)(b) or (c) to fix the terms and conditions of the provision of SJ-MPF.
- 3.78 Instead, based on the analysis set out in this section, we provisionally concluded that by providing DJ-MPF only (and not offering an SJ-MPF alternative); BT was compliant with its regulatory obligations. Our provisional assessment was therefore that we should make a declaration under section 190(2)(a) that BT is not required to develop and offer SJ-MPF.
- 3.79 We also provisionally concluded, in relation to Step 4, that Openreach did not breach FAA2 in the handling of the SOR and it would not be appropriate for Ofcom to make a declaration in relation to this condition under section 190(2)(a).

Assessment of consistency of Ofcom’s provisional conclusion with our statutory duties and Community obligations

- 3.80 As noted above, in conducting our analysis, we considered our general duties in section 3 of the Act and also the six “Community requirements” set out in section 4 of the 2003 Act, which give effect, among other things, to the requirements of Article 8 of the Framework Directive.
- 3.81 In particular, we had regard to:
- 3.81.1 our duty to further the interests of citizens (i.e. all members of the public in the United Kingdom) in relation to communications matters and to further the interests of consumers in relevant markets, where appropriate by promoting competition (section 3(1));

⁷⁶ TalkTalk’s dispute submission, 25 June 2013, page 21, paragraph 7.2

Statement and Determination concerning a dispute between TalkTalk and Openreach relating to single jumpered MPF

- 3.81.2 our duty to have regard to the principles under which regulatory activities should be transparent, accountable, proportionate, consistent and targeted only at cases in which action is needed; as well as any other principles appearing to Ofcom to represent best regulatory practice (section 3(3)); and
- 3.81.3 our duty to promote competition (section 4(3)) and to encourage, to the extent Ofcom considers it appropriate, the provision of network access and service interoperability for the purposes of securing efficiency and sustainable competition in communications markets, efficient investment and innovation and the maximum benefit for the customers of communications network and services providers (sections 4(7) and 4(8)).
- 3.82 We also considered our duties under section 190(2A) of the 2003 Act which provides that Ofcom must exercise its powers in the way that seems to it most appropriate for the purpose of securing: efficiency, sustainable competition, efficient investment and innovation and the greatest possible benefit for the end-users of public electronic communications services.
- 3.83 We considered that our provisional conclusions were consistent with these duties, for the reasons explained throughout this document.
- 3.84 In setting out our provisional assessment, we kept in mind our duty under subsection 3(3)(a) of the 2003 Act to ensure that our regulatory activities are, among other things, transparent, accountable, proportionate and targeted only at cases where action is needed. In particular, this document sets out the Parties' arguments and the reasoning that underpins our provisional assessment, and the Parties had an opportunity to comment on this in advance of our final determination of the Dispute.

Section 4

Summary of submissions on Provisional Conclusions and Ofcom's response

Introduction

- 4.1 On 1 October 2013 we published the Provisional Conclusions on our website. We received two non-confidential responses to the Provisional Conclusions, from TalkTalk and Openreach. TalkTalk broadly agrees with our analytical approach, but does not agree with all of the assumptions we had made in arriving at our Provisional Conclusions. Openreach generally agrees with our Provisional Conclusions but makes a number of observations on our proposed approach. Sky said it did not propose to provide detailed comments on the Provisional Conclusions but that it was disappointed with our Provisional Conclusions *“as we consider that SJ will provide the opportunity to deliver greater efficiencies and possible cost savings”*.⁷⁷
- 4.2 In this section, we summarise the key issues raised in the responses to the Provisional Conclusions, and set out our response to these.
- 4.3 Openreach's responses relate primarily to our acceptance of the dispute for resolution and Step 2 of our analysis in the Provisional Conclusions. TalkTalk's responses relate primarily to Steps 1 and 2 of our analysis in the Provisional Conclusions and whether Openreach breached FAA1. We have structured our consideration of the responses as follows:
- Accepting the Dispute for resolution (paragraphs 4.6 - 4.12).
 - Step 1. Would the introduction of an in-line SJ-MPF product be likely to increase economic efficiency (in particular, by reducing forward looking economic costs)? (paragraphs 4.13 – 4.173). We structure the responses broadly following the ordering of TalkTalk's submissions.
 - Step 2. In light of our duties, are there any other relevant factors that we should take into account in deciding whether or not to direct Openreach to provide SJ-MPF? (paragraphs 4.174 – 4.213). We structure the responses following the ordering of the analysis in paragraphs 3.37 – 3.56 of the Provisional Conclusions.

In relation to each issue, we consider first any submissions from Openreach, and then any submissions from TalkTalk, then set out our response.

- 4.4 We have also reviewed Steps 3 and 4 taking into account Openreach's and TalkTalk's submissions and our response to these:
- Step 3. Should Ofcom make any declaration setting out the rights and obligations of the Parties under s190(2)(a) of the Act or give any direction fixing the terms and conditions of the provision of SJ-MPF under s190(2)(b) and/or (c) of the Act? (paragraphs 4.214 – 4.217).

⁷⁷ Sky email to Ofcom, 14 October 2013

- Step 4. Was there any breach of FAA2 regarding Openreach's process in handling the original request and if there was should Ofcom make any declaration setting out the rights and obligations of the Parties in relation to FAA2 under s190(2)(a) of the Act? (paragraphs 4.218 – 4.227).

4.5 Our final conclusions are set out **section 5**.

Accepting the Dispute for resolution

Openreach's submissions

- 4.6 Openreach states that it remains "*of the view that Ofcom should not have accepted the SJ-MPF dispute in the specific circumstances of this case*".⁷⁸ It highlights three reasons why it considers Ofcom should not have accepted the Dispute, these are:
- There were extensive discussions with TalkTalk and other stakeholders regarding the SJ-MPF SOR.
 - There was significant delay by TalkTalk prior to its dispute referral.
 - Alternative options were available to Ofcom to address the issue.⁷⁹
- 4.7 Openreach considers that it "*complied with SMP Condition FAA2 and its SOR guidelines in assessing and subsequently rejecting the TalkTalk SJ-MPF SOR*".⁸⁰ It states that its submission to Ofcom of 26 July 2013, provided a "*detailed description of how we evaluated the commercial viability of the SOR*".⁸¹
- 4.8 Openreach states that "*there was a 6 month delay between Openreach rejecting the SOR and TalkTalk referring the dispute to Ofcom*".⁸² It notes that Ofcom did not comment in detail on this fact in the Provisional Conclusions and suggests that "*by accepting the dispute, Ofcom could be seen to implicitly acknowledge that such a delay is acceptable*".⁸³ Openreach goes on to state that "*to provide certainty for industry, there should be a time limit (e.g. 3 months from the date of rejection of any SOR) for CPs to raise a dispute related to the outcome of an SOR assessment beyond which commercial negotiations must resume*".⁸⁴ Openreach believes that Ofcom should consider the question of clear and reasonable time limits to provide certainty for stakeholders and reduce incentives to "game" the dispute process as part of its assessment of Openreach's SOR processes in the Fixed Access Market Review ("FAMR").⁸⁵
- 4.9 Openreach considers that Ofcom could have "*considered whether it was appropriate to develop SJ-MPF as part of its FAMR*".⁸⁶ In addition, it is of the view that "*the need for prompt resolution was not apparent in the circumstances of this case*" because of

⁷⁸ Openreach's response to the Provisional Conclusions, 15 October 2013, page 2

⁷⁹ Openreach's response to the Provisional Conclusions, 15 October 2013, pages 2-3

⁸⁰ Openreach's response to the Provisional Conclusions, 15 October 2013, page 2

⁸¹ Openreach's response to the Provisional Conclusions, 15 October 2013, page 2

⁸² Openreach's response to the Provisional Conclusions, 15 October 2013, page 3

⁸³ Openreach's response to the Provisional Conclusions, 15 October 2013, page 3

⁸⁴ Openreach's response to the Provisional Conclusions, 15 October 2013, page 3

⁸⁵ Openreach's response to the Provisional Conclusions, 15 October 2013, page 3

⁸⁶ Openreach's response to the Provisional Conclusions, 15 October 2013, page 3

*“the 6 month delay on the part of TalkTalk between rejection of the SOR and referral of the dispute”.*⁸⁷

Ofcom’s response

- 4.10 The reasons why Ofcom originally accepted the Dispute for resolution are set out in section 2 above. In summary, we were satisfied that the Dispute was a dispute between CPs within the meaning of s185(1A) of the 2003 Act and that, under section 186 of the 2003 Act, it was appropriate for us to handle the Dispute.
- 4.11 In relation to TalkTalk’s delay in bringing the Dispute, this is discussed at paragraphs 2.35 to 2.37 above. Ofcom carefully considered whether the delay meant that there was no dispute, or that there were alternative means to resolve the Dispute which would be likely to result in a prompt and satisfactory outcome. Our discussion in the Provisional Conclusions was specific to the factual circumstances of the case and did not imply, as Openreach suggests, that the outcome would necessarily be the same in a case with a similar delay but different set of facts. The underlying legislation does not envisage a time limit of the kind Openreach suggests and in any event, while Ofcom encourages prompt referral of genuine disputes, a time limit could risk encouraging premature referral of matters that could be resolved by alternative means. Additionally, there is limited scope for the “*gaming*” Openreach mentioned in its response as, in cases such as this, it is generally in the interests of a party which has been denied access to seek to progress matters expeditiously.
- 4.12 Contrary to Openreach’s view, the course of the dispute resolution process itself has tended to confirm that Ofcom’s decision to accept the Dispute for resolution was well founded. In particular, it was clear that there was a lack of common ground both in relation to input data and the model used to analyse them. Consequently, it appeared unlikely that a new SOR would have led to a prompt and satisfactory outcome, and rather it was likely that it would have resulted in a resubmission of a dispute to Ofcom at a later date. Nor would the timescale or context of the FAMR have been likely to provide a prompt and satisfactory alternative resolution.

Step 1. Would the introduction of an in-line SJ-MPF product be likely to increase economic efficiency (in particular, by reducing forward looking economic costs)?

- 4.13 In this section we review the key assumptions that have been challenged by TalkTalk. We discuss these in the following order:
- 4.13.1 Assumptions on the start date of SJ-MPF launch and development lead-times
 - 4.13.2 Exchanges in which SJ-MPF should be deployed
 - 4.13.3 Top-up strategy
 - 4.13.4 Usable spare capacity on DJ-MPF assets
 - 4.13.5 Survey costs
 - 4.13.6 Test heads

⁸⁷ Openreach’s response to the Provisional Conclusions, 15 October 2013, page 3

- 4.13.7 Master controllers
- 4.13.8 Jumper installation and removal
- 4.13.9 Frame costs
- 4.13.10 Valuation assumptions

We then discuss the other factors that Openreach and TalkTalk say should be considered as relevant to our quantified assessment before coming to our final view on Step 1.

Assumptions on the start date of SJ-MPF launch and development lead-times

- 4.14 At paragraph A2.31 of Annex 2 to the Provisional Conclusions⁸⁸ we stated that our model allowed the user to select two different start dates for when SJ-MPF becomes available: Q4 of 2014/15 (i.e. January 2015, based on a 12 month development time, starting from January 2014); or Q2 2015/16 (i.e. July 2015, based on an 18 month development lead time). Our assumptions about the date at which SJ-MPF could be launched were explained in more detail at paragraphs A2.131 – A2.135 of Annex 2 to the Provisional Conclusions.⁸⁹

TalkTalk's submissions

- 4.15 TalkTalk considers *“that the appropriate start time should be based on when Openreach would have launched SJ-MPF if it had not rejected the SOR... the appropriate start date is therefore August 2013”*.⁹⁰ TalkTalk repeats this point later in its submission, in the following terms: *“the cost analysis must be based on whether the request was reasonable at the point that the request was made/rejected. Accordingly, the cost analysis must be based on the presumption that Openreach started development in July 2012 when it rejected the request.”*⁹¹ It expresses what it describes as *“serious concerns”* about Ofcom’s proposed start date of July 2015.⁹² TalkTalk states that *“[t]he start date is critical since there are declining numbers of MPF net adds (as a result of the market maturing) that could be deployed on a SJ-MPF configuration and therefore a later start results in fewer lines on SJ-MPF and a lower cost saving”*.⁹³ TalkTalk believes that *“the appropriate start time should be based on when Openreach would have launched SJ-MPF if it had not rejected the SOR. We think that the appropriate start date is therefore August 2013”*.⁹⁴
- 4.16 TalkTalk is of the view that 12 months is sufficient time to complete the necessary development and commence deployment. TalkTalk argues that *“Openreach were well aware of the product before May 2012 given that it had been subject to a previous SOR and analysis in the context of the 2012 LLU/WLR Charge Control”*.⁹⁵ It also states that *“EMP development could be completed in 9 months”*⁹⁶ given that

⁸⁸ Paragraph A3.31 of Annex 3 to this Statement and Determination

⁸⁹ Paragraphs A3.131 – A3.135 to this Statement and Determination

⁹⁰ TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 2.7, page 4

⁹¹ TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 3.5, page 13

⁹² TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 3.2, page 12

⁹³ TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 3.2, page 12

⁹⁴ TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 2.7, page 4

⁹⁵ TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 2.7, page 4

⁹⁶ TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 2.7, page 4

Openreach developed PCP-only GEA⁹⁷ in 9 months, which it considers to be more complex than SJ-MPF. TalkTalk considers that *“the deployment of TAM/tie cables for SJ-MPF could be planned and installed in parallel to EMP development”* and that *“the development required by CPs is minimal”*.⁹⁸ TalkTalk argues that amending the start date to August 2013 increases the NPV by approximately £14m, *“since the volumes over the valuation period will be higher”*.⁹⁹

Ofcom’s response

- 4.17 We disagree with TalkTalk’s assertion that the start date should be August 2013. We have considered whether, going forward, Openreach should have to provide SJ-MPF. TalkTalk brought the Dispute with volume forecasts that had been updated since the submission of the original SOR and we accepted the Dispute for resolution with these up to date figures. We consider it would be inconsistent with the basis on which we accepted the dispute to then model based on historic data.
- 4.18 This is also consistent with TalkTalk’s approach when bringing the Dispute to us, when it argued that we should base our assessment on its updated figures rather than those submitted to Openreach in its earlier SOR. As set out in paragraph 2.36, we agreed with this approach, which involves determining disputes based on up to date material.
- 4.19 TalkTalk now suggests that the Dispute is properly resolved on the basis of a cost analysis at the time of Openreach’s rejection of the SOR. That does not appear to be consistent with the submission of revised figures which were not provided to Openreach at the time of the SOR. Nor would it help to resolve the Dispute. In considering whether it would be appropriate to exercise a power under section 190(2), the primary issue is, as we have set out, the forward-looking cost-benefit analysis (both quantified on the basis of the model and taking into account additional factors we have been unable to quantify). In our view, only future costs and benefits are relevant to an assessment of whether to require SJ-MPF.
- 4.20 As TalkTalk recognises, Ofcom’s modelling approach, as set out in Annex 3, differs in several respects from that of Openreach in assessing the original SOR (as well as from TalkTalk’s own approach). But we do not agree with TalkTalk’s suggestion that it would be appropriate to resolve the dispute now by directing provision of SJ-MPF if, at some point in the past, it would have been reasonable for Openreach to have provided SJ-MPF. We note that the case for provision of a form of network access can evolve over time, and consequently there is an onus on both parties to progress requests expeditiously. This is recognised in FAA2.2, which requires Openreach’s process to set out reasonable timescales, and equally there is an onus on parties to bring disputes promptly.¹⁰⁰
- 4.21 In light of TalkTalk’s submissions, we requested further information from Openreach relating to its EMP release schedule and when the earliest launch date could be. Nothing in Openreach’s response prompted us to change our view of our base case SJ-MPF launch date. Indeed, we would attach a low probability to the ‘high scenario’

⁹⁷ PCP-only GEA: Openreach’s Generic Ethernet Access (GEA) service being supplied from the cabinet (Primary Connection Point - PCP), excluding the provision and deployment of a modem at the end-user’s premise, which remains the responsibility of the CP.

⁹⁸ TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 2.7, page 4

⁹⁹ TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 2.7, page 4

¹⁰⁰ In this respect we also note that there was some delay in TalkTalk bringing the dispute to us –see section 2 above.

of a launch date of January 2015 Openreach provided estimates of CP development times, which could delay actual take up of SJ-MPF significantly beyond the EMP release dates. We consider this point further in paragraphs 4.148 – 4.154 below. Even without taking CP development time into account, there appears to be a greater risk that the launch date could slip further from our base case assumption of the start of Q2 2015/16 (for example if other EMP launches were prioritised over SJ-MPF), than there is a prospect of launch being brought forward substantially. This would be most likely to happen where another release was prioritised on the basis it may have greater benefits. Accordingly, we have revised the start date in our low scenario to the start of Q3 2015/16 (i.e. from October 2015).

Exchanges in which SJ-MPF should be deployed

4.22 At paragraph A.2.19.2 of Annex 2 to the Provisional Conclusions¹⁰¹ we introduced the geo-type assumptions that we had made in our model and stated that our model allowed for the possibility that single jumpering might not be used in all unbundled exchanges.

TalkTalk's submissions

4.23 TalkTalk agrees with Ofcom's modelling approach which excludes deploying SJ-MPF in certain smaller exchanges where it is not economically viable due to the lower volume of net adds.¹⁰² However, it does not agree with Ofcom's assumption of deploying SJ-MPF in 'type 3' exchanges (which we referred to as 'Group 2' in Annex 2 to our Provisional Conclusions¹⁰³) as it says that this is "*value destroying*", and that not doing so increases the NPV by approximately £6m.¹⁰⁴

4.24 TalkTalk goes on to say that deploying SJ-MPF in new, smaller exchanges (which Ofcom did not do in its medium scenario base case) further improves the NPV because "*there is no existing estate (TAM, tie cables, master controller, test head, racks etc) that can be leveraged and so net cost savings from SJ-MPF are higher. The cost saving (in NPV terms) per line in new exchanges where there will be 200 or more MPF lines per operator using SJ-MPF (only) rather than DJ-MPF (only) is about £15-20 per line (in NPV terms)*".¹⁰⁵

Ofcom's response

4.25 In light of TalkTalk's submissions, we have considered again where CPs are likely to consider it to be economic to deploy SJ-MPF. Our calculations suggest that exchanges with more than 50 net additions in the first assessment year will make a positive contribution to the NPV.

4.26 However, the definition of the Group 2 exchanges used in our model was based on historic data on the number of net additions. This would be a reasonable basis for identifying exchanges where SJ-MPF would be economic if past rates of net additions were maintained in future. Nevertheless, the future net additions projected for these exchanges by our model were generally significantly less than past levels.

¹⁰¹ Paragraph A3.19.2 of Annex 3 to this Statement and Determination

¹⁰² TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.9, page 4

¹⁰³ Annex 3 to this Statement and Determination. In the Ofcom model that accompanied the Provisional Conclusions document, we incorrectly labelled the geo-type groups as 'types 1, 2, 3, and 4'. These inversely correspond to groups 1, 2, 3, and 4. For example Group 2 is type 3.

¹⁰⁴ TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.10, page 4

¹⁰⁵ TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.11, page 5

In addition, topping up existing spare capacities would be economically efficient and this would further reduce the volumes for the first couple of years of the assessment period. As a result, Group 2 exchanges as defined included a significant number of exchanges where use of SJ-MPF would not be economic on a forward looking basis.

- 4.27 We do not think we should simply remove all the Group 2 exchanges as TalkTalk suggests. Firstly, it is likely to be economic to deploy SJ-MPF in the larger exchanges in this group. Secondly, CPs will not know with certainty whether SJ-MPF will be commercially viable in any particular exchange at the time they decide to deploy it, and the decision to incur development costs will be taken in advance of any actual deployment.
- 4.28 We have considered TalkTalk’s argument that it would be beneficial to employ SJ-MPF in exchanges that will in future be unbundled. We asked TalkTalk for information about future unbundling plans but we were not provided with any information about rollout plans after March 2015. We therefore have no information on which to base any estimates and we would expect that the number of new unbundled exchanges would be low from the date that SJ-MPF services might be launched.
- 4.29 We therefore consider that it is likely to be economic to deploy SJ-MPF in larger exchanges within Group 2 and that CPs do not have perfect advance knowledge of where deployment will and will not be commercially viable. We consider it more likely that the tendency will be to deploy in more rather than fewer exchanges where there is a degree of doubt. Taking these factors into account, we have revised the definition of Group 2 exchanges to include those with between 200 and 400 net additions, raising the upper boundary of our Group 1 exchanges from 50 net adds to 200. This change increases the NPV by around £3 million. Table 4 below updates Table A2.9 in Annex 2 of our Provisional Conclusions¹⁰⁶ and sets out our revised segmentation of exchange groups.

Table 4: Updated Ofcom model geo-type breakdown

Group	Band of Net adds	No of Exchanges	% of Exchanges	Total Net adds	% of net adds
1	0-200	1,116	37%	[X]	10.04%
2	201-400	919	31%	[X]	22.38%
3	401-1000	743	25%	[X]	40.46%
4	1000+	222	7%	[X]	27.12%
	Total	3,000	100%	[X]	100.00%

Top-up strategy

- 4.30 At paragraph A2.38 of Annex 2 to the Provisional Conclusions,¹⁰⁷ we explained that our model made an assumption about how much spare capacity there exists on DJ-MPF TAMs which we said should be fully utilised before considering alternative methods of provision, from the perspective of industry wide efficiency.

¹⁰⁶ Table A3.9 in this Statement and Determination

¹⁰⁷ Paragraph A3.38 of Annex 3 to this Statement and Determination

TalkTalk's submissions

- 4.31 In its response, TalkTalk says that Ofcom's assumption that topping up is the most efficient way of operating "*is not necessarily correct. Even if there is existing unused TAM capacity (which can effectively be used for 'free')* it may still be lower cost overall to deploy the lines on SJ-MPF given the cost savings on the frame (and lower connection / disconnection costs".¹⁰⁸ TalkTalk concludes that "*the impact is either no change or an increase to the NPV of SJ-MPF*".¹⁰⁹

Ofcom's response

- 4.32 We disagree with TalkTalk's proposition that topping up of existing DJ-MPF capacity before deploying SJ-MPF may not be the efficient thing to do. In particular we would note that the efficiency of topping-up is not simply an assumption. The outputs of our model show that if the existing spare capacities on DJ-MPF were not topped-up before deploying SJ-MPF the NPV would be significantly reduced for all scenarios except for the high scenario and then only if TalkTalk's assumptions on cost savings were adopted.
- 4.33 Topping-up is efficient because, as TalkTalk itself correctly stated in its submission, "*existing unused TAM capacity... can effectively be used for 'free'*".¹¹⁰ Failure to use this 'free' capacity before starting to use SJ-MPF would mean that more investment on equipment would have to be incurred at the beginning of the assessment period, earlier than if the existing DJ-MPF capacity were used first. Therefore, not topping up would be inefficient, and would reduce any net benefits from SJ-MPF, as it would result in higher investment costs being incurred earlier which would outweigh any savings in frame costs and jumpering activities. This remains true even under TalkTalk's assumptions of high cost savings from these activities.¹¹¹

Usable spare capacity on DJ-MPF assets

- 4.34 At paragraphs A2.35 to A2.44 of Annex 2 to the Provisional Conclusions¹¹² we explained our approach to the use of existing DJ-MPF assets. We explained at paragraph A2.40¹¹³ that we assumed an operational maximum utilisation of 99% for a TASM. We stated at paragraph A2.42¹¹⁴ that we based our estimate for average DJ-MPF TAM utilisation by SJ-MPF launch on the current 85% utilisation with an adjustment to account for the likely increase in TAM utilisation in the lead up to SJ-MPF launch resulting from operational planning. Accordingly, we explained, our model assumed a 90% DJ-MPF TAM utilisation rate by SJ-MPF launch.

TalkTalk's submissions

- 4.35 TalkTalk does not agree with Ofcom's assumption that when SJ-MPF becomes available, there will be 90% utilisation on DJ-MPF assets such as TAMs and tie

¹⁰⁸ TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.13, page 5

¹⁰⁹ TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.14, page 5

¹¹⁰ TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.13, page 5

¹¹¹ Our calculations show that failure to use the existing spare capacity for SJ-MPF would reduce the NPV by around £13m for the base case. Using cost savings in frame costs and jumpering activities as TalkTalk suggests would increase the NPV by around £7m, but the NPV would still be around £6m lower than our base case. The extent of possible frame and jumpering cost savings are discussed in more detail below.

¹¹² Paragraphs A3.35 to A3.44 of Annex 3 to this Statement and Determination

¹¹³ Paragraph A3.40 of Annex 3 to this Statement and Determination

¹¹⁴ Paragraph A3.42 of Annex 3 to this Statement and Determination

cables and that the unused 10% can be used for new net additions before starting to use SJ-MPF.¹¹⁵ TalkTalk considers that there are two reasons why this is not the case. Firstly, TalkTalk considers that “[t]he equipment (particularly TAM) is bought in modules of 200 lines each so it is impossible in most cases to have 100% utilisation”.¹¹⁶ It calls this ‘modularity’. Secondly, TalkTalk says that “[c]ertain lines on a TAM are unusable since, for instance, there are left in jumpers (due to stopped lines) or certain ports are faulty”.¹¹⁷ In relation to the second reason, it goes on to say that “[g]iven the TAM size is 200 lines one would expect on average that there to be [sic] 100 unused lines in each exchange (i.e. 50% of the total capacity) due to the modularity issue. Yet according to Ofcom’s model the number of spare lines in exchange type 1 is 1,154 lines and in exchange type 2 lines is 514. This implies that the majority of the unused capacity is due to lines being unusable rather than due to modularity”.¹¹⁸

- 4.36 TalkTalk argues that “under-utilisation due to modularity can be fully overcome”¹¹⁹ under a top-up strategy, but that it is not possible to achieve 100% utilisation by topping up the existing DJ-MPF infrastructure because of the left in jumpers and faulty ports “unless the unusable ports were brought back into service”.¹²⁰ TalkTalk considers that this will involve costs such as left in jumper clear up or faulty port repair and these were not taken into consideration in Ofcom’s model. “Therefore, it is not realistic to assume 100% utilisation unless the costs of making the currently unusable ports usable is also included”.¹²¹ TalkTalk said that it had changed Ofcom’s model “to assume that the amount of usable spare capacity is 100 lines per exchange (i.e. 50% of the 200 line module) i.e. that the under utilisation due to modularity is overcome but that unusable ports remain unusable”¹²² and that this had the effect of increasing the NPV from deploying SJ-MPF by £5m.
- 4.37 TalkTalk considers that Ofcom’s assumption of a 99% operational maximum utilisation for a TASM is too high. It states that the maximum utilisation would be more like 90%. TalkTalk says that using this approach “the utilisation will not be unrealistically high.”¹²³ Further, TalkTalk states that “it cannot be assumed that the DJ-MPF TAM/tie cable estate immediately reaches this utilisation level since it will take some time”.¹²⁴

Ofcom’s response

- 4.38 We have gathered further data from Openreach which shows that the average current DJ-MPF TAM utilisation of 85% that Openreach had previously provided includes in-use ports and ports used for testing, but excludes faulty ports and ports connected to stopped lines with left-in jumpers (“LIJs”). Openreach informs us that there are, on average, 1.7 faulty ports per 200-port TASM and 16.6 stopped lines per 200-port TASM. The breakdown of port status is, on average.¹²⁵

- In use (including test ports) – 170 per 200 port TASM (85%)

¹¹⁵ TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 2.16, page 5

¹¹⁶ TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 2.17, page 5

¹¹⁷ TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 2.17, page 5

¹¹⁸ TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 2.19, page 6

¹¹⁹ TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 2.19, page 6

¹²⁰ TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 2.19, page 6

¹²¹ TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 2.19, page 6

¹²² TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 2.20, page 6

¹²³ TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 2.21, page 6

¹²⁴ TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 2.21, page 6

¹²⁵ Openreach’s response to follow-up questions, 31 October 2013

Statement and Determination concerning a dispute between TalkTalk and Openreach relating to single jumpered MPF

- Stopped lines with LIJs – 16.6 per 200 port TASM (8%)
 - Faulty ports - 1.7 per 200 port TASM (1%)
 - Spare ports – 11.7 per 200 port TASM (6%)
- 4.39 The cost data provided by Openreach indicates that the cost of a TAM port is around [redacted]¹²⁶ in the DJ-MPF configuration. The incremental cost of removing a jumper in our model is [redacted] per jumper,¹²⁷ so the cost of removing LIJs would be around [redacted] per line for a double-jumpered line. There may be additional incremental costs that should also be taken into account, but we would expect where these arise they would be small (for example, bulk removal of LIJs could be carried out when engineers were in the exchange so that no incremental travel costs would be incurred, but there may be some limited incremental costs related to order processing, etc.).
- 4.40 Given the time constraints in finalising our Statement and Determination within the statutory four month period we do not consider it would be feasible to gather sufficient data to quantify precisely the additional incremental costs which would be incurred other than the [redacted] for jumper removal (in the case of two jumpers). However, given the available information (which we consider is sufficient for us to reach a view on this issue in this Dispute); we consider that it is highly likely that removal of LIJs would be more efficient than purchasing new TAM ports.¹²⁸
- 4.41 As such, we consider that the existing LIJs would be removed to create spare capacity. Removing the LIJs (8% of TASM ports) would mean 14% of the ports would currently be spare (i.e. 8% from LIJs and 6% already spare) and so could be used before SJ-MPF is deployed (i.e. could be used for ‘topping-up’).
- 4.42 In our Provisional Conclusions we assumed that there would be some increase in utilisation prior to SJ-MPF becoming available. On the basis of the information we had available at the time we considered utilisation would increase from the current 85% to 90% with 10% spare at the time of SJ-MPF launch.
- 4.43 Based on the new data provided by Openreach (i.e. that test ports are included in the utilisation data but that faulty ports and LIJs are not), the maximum utilisation would need to take account of the expected fault rate of TAM ports. Openreach has indicated that 1.7 ports per TASM are faulty and that there is relatively little replacement of TASM s.¹²⁹ As such, we consider that the rate of faults on TAM ports would be low. We have taken a figure of 1% so that the maximum utilisation (following Openreach’s approach of treating the two test lines as ‘in use’) would be 99%.¹³⁰
- 4.44 In assessing how much utilisation would increase prior to SJ-MPF launch, we do not think our original assumption of 10% spare capacity is unreasonable. 10% spare capacity would be consistent with an increase in utilisation between now and SJ-MPF

¹²⁶ This figure includes the blocks and tie cables that would be required to bring the new TAM into service. It does not include the ongoing OPEX associated with TAMs. Based on Openreach s191 response of 8 August 2013.

¹²⁷ See paragraphs 4.101 to 4.105 below.

¹²⁸ Whilst not included in our modelling assessment, another benefit of removing LIJs is that this will free up ports on CPs’ MSANs which could be re-used.

¹²⁹ Openreach’s response to follow-up questions, 28 October 2013 indicated [redacted]. Openreach also said in its response of 8 August 2013 that faulty ports are replaced until the whole TASM is replaced.

¹³⁰ Based on 1.7 faulty ports per 200 port TASM, giving a fault rate of 0.85%

launch from 85% to 89%.¹³¹ We have therefore assumed 10% spare capacity in our base case. We do not discount that the change in utilisation could be different. We have therefore included different assumptions in our high and low cases (that utilisation reaches 90% so that there is 9% spare capacity in the high case and that there is no increase in utilisation prior to launch so spare capacity remains at 14% in the low case).

- 4.45 In relation to TalkTalk's point that it will take some time for the existing TAM/tie cable estate to reach maximum utilisation, we acknowledge this. This is captured in our assumption that utilisation rates would increase prior to SJ-MPF being launched and that CPs would continue to top-up existing DJ-MPF assets prior to deploying SJ-MPF.
- 4.46 We have considered the impact of LIJ removal on our analysis. Prior to the launch of SJ-MPF, the cost of removing LIJs would be the same in both cases (i.e. where SJ-MPF is launched and where it is not). Once SJ-MPF is implemented, there would still be DJ-MPF lines being ceased resulting in LIJs. Again, the cost of removing these would be the same whether SJ-MPF is available or not. It should be noted that we do not consider that it would be more efficient to leave LIJs on double jumpered lines and provide new lines via SJ-MPF instead. This is because the cost of a TAM port in the SJ-MPF configuration is [X]¹³² so it would still be more efficient to remove LIJs on DJ-MPF TAMs and use the available DJ-MPF capacity than purchase new TAMs in an SJ-MPF configuration.
- 4.47 Once SJ-MPF is available, some of the circuits that are ceased will be SJ-MPF circuits. As stated above, the cost of a TAM port in the SJ-MPF configuration is [X] whilst the cost of jumper removal would be [X] because dealing with LIJs will involve removal of one jumper fewer than for DJ-MPF. Therefore, we consider it would be highly likely to be more efficient to remove the LIJs than purchase new TAM ports in the SJ-MPF case. We consider this further in paragraphs 4.86 to 4.100 below.

Survey costs

- 4.48 At paragraph A2.88 of Annex 2 to the Provisional Conclusions¹³³ we noted in relation to TASM CAPEX that we had included the same survey (and installation) costs for DJ-MPF and SJ-MPF in our model although Openreach had indicated that the costs for survey for SJ-MPF may be higher as the survey would seek to locate TAMs conveniently between the MDF and the CP's equipment, whereas TAMs for DJ-MPF would be located close to the MDF. These survey costs covered surveying for the TASM units, their associated tie cables (A, B and D), rack and master controllers.
- 4.49 At paragraph A2.93 of Annex 2 to the Provisional Conclusions¹³⁴ we noted in relation to tie cable CAPEX that tie cables in DJ-MPF connecting to the CPs' equipment (tie cables C) require their own survey (and installation) work. The data Openreach had provided on TAM costs in SJ-MPF had not included the costs of tie cable E.

¹³¹ Utilisation (including test ports) is currently 85% utilisation with 6% spare and 8% LIJs. Removing LIJs would provide 14% spare. If utilisation grows by 4% to 89%, this would leave 10% spare relative to the maximum of 99%.

¹³² As in the DJ-MPF case, this includes the cost of blocks and tie cables required to bring the TAM into service. This includes the tie cable from the TAM to the MDF and the tie cable from the TAM to the CP. The difference between this cost and that for TAMs in the DJ configuration reflects the data provided by Openreach indicating fewer heat sinks would be needed in the SJ-MPF case. Again, it does not include the OPEX related to TAMs. Based on Openreach s191 response, 8 August 2013.

¹³³ Paragraph A3.88 of Annex 3 to this Statement and Determination

¹³⁴ Paragraph A3.93 of Annex 3 to this Statement and Determination

Therefore the installation cost data that we had used for cables C and E had been derived from separate information provided by Openreach on the installation and cable costs of tie cables, and the unit costs we used included the cost of installation.

TalkTalk's submissions

- 4.50 TalkTalk makes two points concerning survey costs.¹³⁵ Firstly, it notes that the survey costs for new SJ-MPF equipment (i.e. TAMs, tie cables, racks) are reflected through a higher cost for 'new build' TAMs. It suggests that this is broken down separately to ensure that the costs are not included elsewhere or 'double counted'.
- 4.51 Secondly, TalkTalk disagrees with Openreach's view that survey costs for SJ-MPF would be higher than for DJ-MPF. TalkTalk states that "*SJ-MPF TAMs could be located near the MDF (they could also, if lower cost, be located elsewhere)*".¹³⁶

Ofcom's response

- 4.52 With respect to TalkTalk's first point, the TAM cost data we received from Openreach identified the separate cost elements that are required for new build as opposed to growth units.¹³⁷ Practically all of the difference between the costs of a new build TASM unit and a growth TASM unit are down to higher installation and commissioning costs. The unit costs we adopted in our model reflect these different installation and commissioning costs. On the basis of the cost data we received from Openreach under our formal powers we do not agree with TalkTalk that there is double counting of these costs.
- 4.53 According to the cost data we received from Openreach, both new build and growth TASM units incur the same survey costs. Again, on the basis of the cost data we received from Openreach under our formal powers we are satisfied that there is not any double counting of these costs.
- 4.54 With respect to TalkTalk's second point, Openreach supported its statement that SJ-MPF survey costs are higher by noting that "*For the current configuration of LLU TAMs, the TAM is placed as close as possible to the MDF in the main exchange area. This reduces the complexity of surveying (for example cable runs) and reduces the TAM installation costs*".¹³⁸
- 4.55 However, Openreach then went on to say that "*[f]or in-line TAM, the TAM would ideally be located in between the MDF and the CP's equipment in the co-mingling space. Finding an appropriate location, assessing the installation requirements (power etc.) and assessing cable runs would therefore be expected to be more complex and so more costly*".¹³⁹ Openreach then says "*We would expect the TAM rack installation surveys to take relevant CP equipment locations into consideration as well as the location of the MDF. However when adding growth ports and associated cabling to an existing rack we would not expect the survey and installation costs to increase*".¹⁴⁰

¹³⁵ TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.22, page 7

¹³⁶ TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.22, page 7

¹³⁷ A new build TASM is the first TASM to be installed in an exchange. Growth TASMs are incremental TASMs that make use of an existing master controller, test head and any spare rack space. See paragraphs A3.58 and A3.59 in Annex A3 for more details.

¹³⁸ Openreach's response to confirmation questions, 2 August 2013

¹³⁹ Openreach's response to confirmation questions, 2 August 2013

¹⁴⁰ Openreach's response to confirmation questions, 2 August 2013

- 4.56 Finally, Openreach also noted that there could be further complications “*where multiple CPs use in-line TAMs because each CP’s equipment may be located in different areas of the co-mingling space*” and that “*CPs [sic] equipment may be on different levels within the exchange building*”.¹⁴¹
- 4.57 Under current DJ-MPF arrangements the TAM is already located close to the MDF. We do not consider that it would be materially closer under SJ-MPF such that survey costs would be likely to be less for SJ-MPF. On the contrary, we tend to agree with Openreach that assessing appropriate locations for the TAM under SJ-MPF is, on balance, likely to be somewhat more complex and therefore more likely to incur higher cost. However, in our modelling we assumed the same survey costs for both DJ-MPF and SJ-MPF as we had insufficient data to quantify any difference in survey costs.
- 4.58 Survey costs are not a large proportion of TASM installation costs. Our conclusion is that there is no need to change the model to reflect TalkTalk’s arguments on survey costs. In any case, our assumptions about survey costs are more likely to have understated than to have overstated the costs of providing SJ-MPF services.

Test heads

- 4.59 At paragraph A2.78 of Annex 2 to the Provisional Conclusions¹⁴² we noted that each site where SJ-MPF will be installed for the first time will require a test head. In addition at paragraph A2.77¹⁴³ we noted that Openreach had told us that a new test head is required for each new build and when the existing test head reaches its full utilisation of 5000 lines.

TalkTalk’s submissions

- 4.60 TalkTalk disagrees with our assumption that a new test head is required in every exchange where SJ-MPF is deployed. It states that it does “*not understand why a new test head is required. A test head is agnostic to the cabling arrangements and the same test head is able to test lines using SJ-MPF TAMs as well as lines using DJ-MPF TAMs*”.¹⁴⁴ TalkTalk also says that “*Ofcom have not presented any evidence or explanation to support its claim (and nor has Openreach who never mentioned this during the discussions)*”.¹⁴⁵
- 4.61 TalkTalk asserts that removing the costs for these additional test heads for SJ-MPF would increase the NPV by approximately £3m.

Ofcom’s response

- 4.62 We were informed by Openreach in response to information requested using our formal powers that it “*would incur additional costs for tests heads if new master controllers needed to be installed for both the EvoTAM-based solution and the TAM-based solution. A new test head would be required for each new master controller that would need to be installed*”.¹⁴⁶

¹⁴¹ Openreach’s response to confirmation questions, 2 August 2013

¹⁴² Paragraph A3.78 of Annex 3 to this Statement and Determination

¹⁴³ Paragraph A3.77 of Annex 3 to this Statement and Determination

¹⁴⁴ TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 2.23, page 7

¹⁴⁵ TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 2.23, page 7

¹⁴⁶ Openreach’s response to s191 notice, 30 August 2013, page 4

- 4.63 Furthermore, Openreach explained that *“in addition to test heads being required with each new master controller that is being installed, an additional test head is also required when the total number of TAM or EvoTAM installed ports exceeds 5000 ports or multiples of”*.¹⁴⁷ The approach we took to modelling test head volumes for SJ-MPF as described in our Provisional Conclusions was based on information provided to us by Openreach, which we believe to be correct.

Master controllers

- 4.64 In line with our explanation at paragraph A1.50 of Annex 1 to the Provisional Conclusions¹⁴⁸ and our conclusion at A3.181 that TASM s would be more cost effective than evoTASM s in SJ-MPF, our model assumed that a new master controller would be needed in every exchange using standard TAM s where SJ-MPF was deployed.

TalkTalk’s submissions

- 4.65 TalkTalk states that it does not understand why a new master controller is required in every exchange where SJ-MPF is deployed,¹⁴⁹ and that neither Ofcom, nor Openreach has *“presented any evidence or explanation to support its support its position”*.¹⁵⁰
- 4.66 TalkTalk estimates that if the costs of a new master controller for each exchange where SJ-MPF is deployed were taken out of the model *“the NPV would increase by about £2m”*.¹⁵¹

Ofcom’s response

- 4.67 Openreach told us in response to a request using our formal powers that if standard TAM s are used *“Master Controllers would need to be deployed to support in-line TAM s as new instances of the TAM would be required to support in-line working (existing “jumpered in” TAM s would not support both in-line working and the current DJ configuration). It should also be noted that whether the TAM operates in-line or is “jumpered-in”, a Master Controller is required”*.¹⁵²
- 4.68 Openreach also told us that *“One new master controller unit would be required at each SJ-MPF site under a TAM solution”*.¹⁵³
- 4.69 More specifically, Openreach clarified that *“TAM master controllers are required for every 9,800 lines”* and *“EvoTAM master controllers are required for every 13,824 lines”*.¹⁵⁴
- 4.70 Accordingly, the approach we took to modelling master controller volumes as described in our Provisional Conclusions was based on information provided to us by Openreach, and we remain of the view that this information is reasonable.

¹⁴⁷ Openreach’s response to Ofcom’s follow up questions to the s191 notice, 4 September 2013

¹⁴⁸ Paragraph A2.50 of Annex 2 to this Statement and Determination

¹⁴⁹ TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 2.25, page 7

¹⁵⁰ TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 2.26, page 7

¹⁵¹ TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 2.27, page 7

¹⁵² Openreach’s response to confirmation questions, 2 August 2013

¹⁵³ Openreach’s response to s191 notice, 16 August 2013, pages 3-4

¹⁵⁴ Openreach’s response to Ofcom’s follow up questions to the s191 notice, 4 September 2013

Jumper installation and removal

- 4.71 At paragraphs A2.81 to 2.84 of Annex 2 to the Provisional Conclusions¹⁵⁵ we explained our approach to net jumpers installed and removed in SJ-MPF by comparison with DJ-MPF. At paragraph A2.84¹⁵⁶ we said our base case assumed that 10% of installation volumes would require one extra jumpering movement under SJ-MPF with the remaining 90% requiring one less. On average, therefore 0.8 fewer jumpers would need to be installed in SJ-MPF. At paragraph A2.165 of Annex 2 to the Provisional Conclusions¹⁵⁷ we noted that we had adopted TalkTalk's approach to estimating installation volumes, forecasting relevant installation volumes as the sum of net adds plus churn, estimated at 15% of the SJ-MPF base at the start of the year.
- 4.72 In terms of savings from reduced disconnection activity in SJ-MPF, we noted at paragraph A2.171 of Annex 2 to the Provisional Conclusions¹⁵⁸ that we had assumed that MPF lines that migrate to WLR or WLR + SMPF would account for 35% of migrations. Savings from lines that migrate to other MPF providers had already been included in our jumpering installation volume assumptions and for stopped lines (in particular, soft ceases) no jumpering is required until there is a periodic 'clean up' of the frames (see paragraph A2.170 of Annex 2 to the Provisional Conclusions).¹⁵⁹ Accordingly we allowed a saving in SJ-MPF of an additional 0.35 jumper removals per disconnection, although we noted that we considered this likely to be too high given that the ratio was likely to decrease over time as the proportion of WLR and WLR+SMPF lines is projected to fall as a proportion of total copper lines.

TalkTalk's submissions

- 4.73 TalkTalk identifies three assumptions that relate to the savings for installation and removal of jumpers using the SJ-MPF technique.¹⁶⁰ These are:
- 4.73.1 the level of churn that affects connections and disconnections
 - 4.73.2 the number of jumpering activities per connection/disconnection – 0.80 per connection and 0.35 per disconnection in Ofcom's Provisional Conclusions
 - 4.73.3 the saving per jumpering activity, TalkTalk has inferred that "*Ofcom has used a incremental cost figure of about £2.00 to £2.50*".¹⁶¹
- 4.74 TalkTalk agrees with Ofcom's churn figure of 15%.
- 4.75 TalkTalk disagrees with Ofcom's figures for jumpering activities per connection and disconnection. For connections, TalkTalk considers that "*connections from other MPF CPs will in time increasingly not be from DJ-MPF but rather from SJ-MPF (as the prevalence of SJ-MPF increases)*".¹⁶² It notes that there will be one less jumper activity required for migrations from SJ-MPF and "*thus the ratio will increase towards*

¹⁵⁵ Paragraphs A3.81 to A3.84 of Annex 3 to this Statement and Determination

¹⁵⁶ Paragraph A3.84 in Annex 3 to this Statement and Determination

¹⁵⁷ Paragraph A3.165 of Annex 3 to this Statement and Determination

¹⁵⁸ Paragraph A3.171 of Annex 3 to this Statement and Determination

¹⁵⁹ Paragraph A3.170 of Annex 3 to this Statement and Determination

¹⁶⁰ TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.28, page 8

¹⁶¹ TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.28, page 8

¹⁶² TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.30, page 8

1.0 over time particularly since SJ-MPF lines will tend to be recycled to SJ-MPF (and DJ-MPF recycled to DJ-MPF).¹⁶³

- 4.76 TalkTalk considers that Ofcom's figure of 0.35 jumper removals per disconnections underestimates the true number. TalkTalk states "*Ofcom assumes that in the case of a stopped line no jumpering work is carried out and that in the case of lines that migrate to MPF the reduction in jumpering activity has already been captured in the connections*".¹⁶⁴ It considers that this doesn't take into account 'clean-ups' that involve jumper removal and that "*the reduction in jumpering activity will only be captured in the connections if it is assumed that not all migrations from MPF to SJ-MPF are from DJ-MPF*".¹⁶⁵
- 4.77 In its assessment of cost per jumper installation/removal activity, TalkTalk claims that the incremental cost figure it derives from Ofcom's model (£2.00 to £2.50) is too low, and that a mid-point LRIC per jumper of approximately £3.20 (calculated by reference to the range of £3.16 to £3.80 published in Ofcom's WLR+SMPF simultaneous migration offer dispute determination¹⁶⁶) should be used. It asserts that using this figure would increase the NPV by about £1m.

Ofcom's response

- 4.78 We agree with TalkTalk that a proportion of connections from other MPF CPs will originate from the base of SJ-MPF connections over time. However we do not agree that that there will be one less jumper movement if the migration is from SJ-MPF or that the ratio will increase to anywhere near 1.0 over time. Further, we believe the impact of changing our analysis to reflect this shift in patterns of demand would be minimal but add substantial complexity to the model.
- 4.79 The relevant connections to consider are:
- 4.79.1 a migration from an MPF line to another MPF line;
 - 4.79.2 a working line takeover of what was an MPF line to an MPF connection; or
 - 4.79.3 the provision of an MPF line to a previously stopped MPF line.
- 4.80 The jumpering movements are the same for each of these three types of connection, so for the purposes of illustration we will consider just the migration case.
- 4.81 The relevant comparison is for an MPF migration from a connection that was on DJ-MPF to DJ-MPF (the DJ-MPF case) against either a migration from a DJ-MPF line to an SJ-MPF line (which is what we originally modelled) or an SJ-MPF line to a SJ-MPF line (the new case TalkTalk has noted we should consider). There may also be some migration from an SJ-MPF line back to a DJ-MPF line. The relevant jumpering movements are shown in the table 5 below

¹⁶³ TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.30, page 8

¹⁶⁴ TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.30, page 8

¹⁶⁵ TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.30, page 8

¹⁶⁶ 'Dispute between BT and TalkTalk relating to MPF to WLR + SMPF simultaneous migration offer' http://stakeholders.ofcom.org.uk/binaries/enforcement/competition-bulletins/closed-cases/all-closed-cases/cw_01097/Final_Determination_Non_Con1.pdf

Table 5: Comparison of MPF to MPF migration jumpering movements

Description	From	To	Jumpers Added	Jumpers Removed	Difference SJ-MPF v DJ-MPF jumper movements
MPF migration under DJ-MPF	DJ-MPF	DJ-MPF	1	1	No difference
MPF Migration under SJ-MPF	DJ-MPF	SJ-MPF	1	2	+1
	SJ-MPF	SJ-MPF	1	1	No difference
	SJ-MPF	DJ-MPF	2	1	+1

4.82 The above shows that, whereas we originally assumed all these connections would have one extra jumpering movement when both SJ-MPF and DJ-MPF are available, in fact there would be some, the SJ-MPF to SJ-MPF case, that would have the same number.

4.83 Our base case assumed that 90% of connections required one jumper fewer. The above analysis does not change that assumption. However, we originally assumed that the remaining 10%, relating to the three types of MPF to MPF migrations¹⁶⁷ analysed above (pure migrations, stopped line provide, and working line take-over) required one more jumper. To reflect TalkTalk's point and the jumpering movements given in Table 5 we could subdivide this 10% of SJ-MPF into the three categories given in the table above. We consider it reasonable to assume that the last category, SJ-MPF to DJ-MPF, will be small and that the two remaining categories would be roughly in proportion to the total number of DJ-MPF as opposed to SJ-MPF connections in each year.

4.84 Adopting the calculations outlined above suggests that the average number of jumpering movements saved under SJ-MPF would increase only fractionally over time. Our previously assumed average of 0.8 less jumpering movements under SJ-MPF would increase to less than [x] for Sky by year 7 and even less than that for TalkTalk. Volumes of net additions are higher at the start of the period when the difference will be closer to 0.8. Weighting by the number of net additions in each year suggests the average impact across even a 7 year period would be around 0.804 across TalkTalk and Sky's volumes. The impact of changing our 0.8 assumption to 0.804 is negligible: the base case NPV increases only by about £12,000.

4.85 We have not reflected these calculations in the model because our estimate of the change in value is minimal and to do so would make the model significantly more complex. We also note that the £12,000 estimate above will be an upper bound. There are several reasons for this:

4.85.1 Firstly we have not included any SJ-MPF to DJ-MPF migrations.

¹⁶⁷ In our subsequent calculation in response to TalkTalk's comments on disconnection volumes (see paragraphs 4.93 to 4.97 below); we have undertaken more detailed calculations on migrations. We have estimated that these three migrations might account for around 12% of demand in 2012/13 and that this might be expected to rise further over the assessment period. Increasing our base case assumption from 10% to 12% would reduce the 0.8 jumper savings down to 0.76. We have not changed this assumption with our base case but if we had done so it would have reduced NPVs by about £120,000.

- 4.85.2 Secondly, cost savings in earlier years, when the average savings will be based on 0.8 jumper movements, will be discounted less than those costs savings in later years when savings will be based on 0.82 jumper movements.
- 4.85.3 Finally, as explained above in footnote 167, if we were to update our assumptions we would also need to consider taking account of our updated calculations on the volume of MPF to MPF migrations, which would reduce the NPV.
- 4.86 Turning to TalkTalk's arguments about disconnection volumes, we noted in paragraph 4.47 that, to be consistent with our arguments about usable spare capacity, we need to consider the impact of removing left in jumpers (LIJs) when SJ-MPF has been implemented. Once SJ-MPF is available, some of the circuits that are ceased would be SJ-MPF circuits. Removing LIJs from SJ-MPF would involve one less jumper removal and so would be cheaper than removing LIJs from DJ-MPF.
- 4.87 In our Provisional Conclusions in Annex 2, paragraph A2.171¹⁶⁸ we assumed that each disconnection would lead to 0.35 jumper removals. TalkTalk argued that this would be higher due to the eventual 'clean-up' of frames.
- 4.88 The figure of 0.35 reflected lines migrating to WLR or WLR + SMPF. However, based on the discussion above in paragraph 4.86, we consider we should also include those stopped lines that would be cleaned-up to remove LIJs in order to free up TAM ports. To do so, we only need to reflect those lines that are permanently stopped. So, for example, lines that are initially stopped but then migrate to other MPF providers before being 'cleaned-up' will be part of MPF migration volumes. Permanently stopped lines are principally those where the end user migrates to another access network (e.g. Virgin Media), becomes a mobile-only household, or where no new service is taken up.
- 4.89 We have identified three components of MPF cessations:
- Stopped lines. These are flexi-ceased, which means that jumpers are not physically removed though there will be periodic clean-ups of frames.
 - Lines that migrate to WLR or WLR + SMPF. This would result in one less jumpering movement under SJ-MPF compared to DJ-MPF.
 - Lines that migrate to other MPF providers. The jumpering activity associated with these migrations has already been included in the jumpering installation volumes discussed above.
- 4.90 In the first two of these cases there would be circuit disconnections and SJ-MPF would provide a saving in jumpering activity. In the third case, as we have already noted, we have already taken account of jumpering savings in the provisioning activity.
- 4.91 We do not have data to divide MPF cessations into these three components. However, we can calculate the volume of MPF provisions that are MPF to MPF migrations (i.e. the third scenario), so the remainder must account for the other two categories.
- 4.92 Openreach told us that of total MPF provisions in the year to July 2013:

¹⁶⁸ Paragraph A3.171 of Annex 3 to this Statement and Determination

Statement and Determination concerning a dispute between TalkTalk and Openreach relating to single jumpered MPF

- 1% were MPF to MPF single migrations;
- 4% were MPF Working Line Takeover (“WLTO”); and
- 29% were stopped line re-provides but Openreach could not say what the stopped line was (i.e. was it WLR, WLR+SMPF or MPF before it was stopped).

4.93 In order to assess the proportion of stopped line provides where the line was previously MPF, we have assumed that ratio would be similar to the ratio of MPF lines in the installed base. To calculate this we have used data from 2012/2013 from the 2013 Charge Control Consultation. Our approach is shown in the Figure 1 below.

Figure 1: Calculation of the ratio of cessations that are MPF to MPF migrations

4.94 This shows that 21% of cessations would result in an MPF to MPF migration in our 2015 forecast. This in turn suggests that the other options (stopped lines and migration to WLR/WLR+SMPF) would equate to 79%.

4.95 But this is based on 2012/13 data, i.e. before our assessment period. If we update the calculations above with figures from our assessment period we would get a higher figure for MPF – MPF migrations. For example, if we look at the last year of the forecast in our recent 2013 Charge Control Consultation (i.e. 2016/17), 36% of all

lines are MPF, compared to 24% in 2012/13.¹⁶⁹ Applying this to the approach shown in Figure 1 increases the proportion of cessations that are MPF to MPF migrations to 27% so that stopped lines and migrations to WLR/WLR + SMPF together would reduce to 73%. This figure would, over the period of our model, decrease further as MPF grows.

- 4.96 If the MPF base grows as expected there is also likely to be an increase in MPF WLTO and single migrations which would reduce the 73% even further. Relevant to this would be:
- growth in the MPF forecast (5.9m in 2012/13, 9m in 2016/17 from our recent 2013 Charge Control Consultation, increasing to around 11m during our assessment period based on our extended forecast); and
 - the shift in migrations – the historic data includes, for example, mass migrations from WLR+SMPF to MPF which won't be repeated because once Sky and TalkTalk have shifted their user base to MPF they will not need to do it again.
- 4.97 We do not have data to quantify what this increase may be but we think the points above suggest that increasing the migrations and WLTO from 5% to 10% of all MPF provisions could be reasonable over the period of our assessment. This would reduce the figure of 73% to 64%. However, given the uncertainty of forecasting this change we have taken a more conservative forecast from around the middle of this possible range and this gives a figure of around 67%.
- 4.98 Therefore, we have taken a figure of 67% (0.67) as our base case for the lines where there will be jumper removal. Changing the base case from 0.35 to 0.67 increases the base case NPV by around £0.2m.
- 4.99 Indeed, increasing the 0.67 figure further would not materially impact our assessment.¹⁷⁰ Because increasing the 0.67 figure further would not materially impact our assessment, we have not sought data to refine our assumption further.
- 4.100 Additionally, the model assumes jumpers are removed as circuits are ceased. This is favourable to the SJ-MPF case as, in practice, the LIJs would be unlikely to be removed immediately. The model is therefore likely slightly to overstate the saving (of 1 jumper per SJ-MPF line) by taking the benefit early: i.e. the saving is not as fully discounted as it should be. However, on grounds of lack of materiality, we have concluded it would be disproportionate to attempt to model in more detail the effect of delaying LIJ removal.
- 4.101 Lastly, on the costs of removing and installing a jumper in paragraph A3.101 we noted that we had assumed the cost of installing and removing a jumper was [X] per jumper. This was based on the direct labour costs of an engineer. We also noted that Openreach had not identified any non-pay costs. The costs of *MDF Hardware jumpering*, the key cost component that covers the relevant engineering activity, fell significantly in 2012/13.¹⁷¹

¹⁶⁹ Ofcom, *Fixed access market reviews: Approach to setting LLU and WLR Charge Controls*, 11 July 2013. <http://stakeholders.ofcom.org.uk/consultations/llu-wlr-cc-13/>

¹⁷⁰ Increasing the figure from 0.67 to 0.75 would have a small impact of increasing the base case NPV by £68k. Increasing this figure to 100% (i.e. assuming no MPF to MPF migration) would increase the base case NPV by approximately £300k.

¹⁷¹ See for example page 140 of BT's 2013 RFS and page 96 of BT's 2013 RFS. This shows that unit costs of *MDF Hardware jumpering* fell from £21.28 in 2011/12 to £17.13 in 2012/13.

- 4.102 TalkTalk argues we should have assumed a cost that was more consistent with that used in the WLR/SMPF simultaneous migration offer dispute. However as noted in paragraph A2.102 of Annex 2 to the Provisional Conclusions¹⁷² we re-ran the calculations that we undertook for that dispute on updated 2012/13 RFS data (the previous dispute had used 2011/12 RFS data) and concluded that the Openreach input was not an unreasonable number to use.
- 4.103 We have reviewed our 2012/13 RFS cost calculations and again concluded that those estimate jumpering connection costs of around [X] per jumper.¹⁷³ This is only slightly higher than the Openreach direct labour cost element and will include contributions from non-cash costs, such as depreciation, as well as contributions from cost sectors that we would not expect to vary with the number of jumpers such as marketing and sales and finance and billing.
- 4.104 We have also considered whether the Openreach number should include any other non-pay costs by analysing a cost sector breakdown of LRIC costs for the *MDF Hardware jumpering* cost component. The only incremental cash costs apart from labour that we have identified are supplies costs. Our analysis suggests supplies costs of *MDF hardware jumpering* are small: they might increase the direct pay cost element by around [X] per jumper.¹⁷⁴ These extra supplies costs would not be relevant for the cost of removing jumpers, though as a modelling simplification we have assumed the cost of adding or removing a jumper is the same (which will tend to overstate the relevant incremental costs of removals).
- 4.105 We have therefore revised our assumption of the cost of installing and removing a jumper up from [X] per jumper to [X] per jumper. This very slightly increases our base case NPV by around £0.1m.

Frame costs

- 4.106 At paragraphs A2.186 to A2.197 of Annex 2 to the Provisional Conclusions¹⁷⁵ we explained our assumption on frame costs.
- 4.107 We explained that we believed we had captured CAPEX savings from moving to SJ-MPF through savings in the costs of frame blocks. We had not been able to identify any other incremental capital cost savings.
- 4.108 We also noted that we had found it difficult to identify and collect data on any incremental savings in operating costs associated with frames. In the absence of other data we had used LRIC data for the component *LE general frames current*¹⁷⁶ to estimate the likely scale of operating cost savings on frame repair and maintenance

¹⁷² Paragraph A3.102 of Annex 3 to this Statement and Determination

¹⁷³ This calculation compares the *MDF Hardware jumpering* costs required to provide an MPF single migration against those for a WLR service connection. We have used the CCA FAC component costs as reported on pages 36 and 80 of BT's 2013 RFS. These have been converted to LRIC costs by using the LRIC/FAC ratios for *MDF Hardware jumpering* as given in BT's Additional Financial Information Schedules AFI1, AFI2, AFI3 and AFI4 submitted to Ofcom by BT to support its 2012/13 RFS. These LRIC estimates reflect the costs saved on the basis that *MDF Hardware jumpering* is no longer provided for all access line services.

¹⁷⁴ LRIC data by component obtained from BT's Additional Financial Information schedules AFI1 and 2 submitted to Ofcom to support its 2012/13 RFS.

¹⁷⁵ Paragraphs A3.186 to A3.197 of Annex 3 to this Statement and Determination

¹⁷⁶ LRIC data for the *LE general frames current* component obtained from BT's Additional Financial Information Schedules AFI1 and AFI2 submitted by BT to Ofcom to support its RFS. These schedules show CCA FAC and LRIC data by cost component by the cost sectors outlined in this paragraph.

costs from moving to SJ-MPF. This led to estimates of [£] and [£] per jumper in 2011/12 and 2012/13. We included cost contributions from the following sectors: provision, maintenance, general support, plant support, customer support, planning and development, and supplies and transport. We excluded costs from the sectors: POLOs, marketing and sales, finance and billing, computing, personnel, accommodation, general management and other, on the grounds that these are unlikely to vary with the number of jumpers that are installed. We also excluded depreciation and capital costs as we considered these would be small and would not reflect the direct costs of frame maintenance and repair. In any case, we considered that capital costs captured within the *LE general frames capital* component were not relevant as the only incremental capital costs we had been able to identify were the costs of frame blocks (which were separately modelled).

- 4.109 We compared the resulting incremental cost estimate per jumper in 2011/12 and 2012/13 respectively to the FAC differences between MPF and WLR of between £1.17 and £1.35. As a further cross check we compared our result with the outputs from our recent 2013 Charge Control Consultation model which reported the FAC difference between MPF and WLR as [£] in 2012/13 and [£] in 2016/17, noting that we expected the LRIC to be around 90% of the FAC.
- 4.110 Reflecting the uncertainty in these estimates, we rounded our base case to £1 per line per annum for incremental frame operating cost savings under SJ-MPF, with an upper bound of £1.35 which is the fully allocated operating cost estimate from the RFS in 2012/13 (and so will include a contribution to capital costs as well as common costs).

TalkTalk's submissions

- 4.111 TalkTalk disagrees with Ofcom's assumption that the only incremental CAPEX costs that are incremental to frame savings under SJ-MPF are the costs of the blocks. TalkTalk estimates Ofcom's incremental cost for blocks to be around £0.10 per line. TalkTalk also disagrees that £1 per line is an appropriate estimate of incremental OPEX frame cost savings under SJ-MPF.¹⁷⁷ It considers there are two reasons why Ofcom's assumption is incorrect: "*first it is inconsistent with the assumption used for incremental frame cost in the LLU/WLR charge control and second it is inconsistent with other evidence*".¹⁷⁸
- 4.112 TalkTalk states that "*in the LLU/WLR Charge Control the incremental costs is about £2.90 yet here it is £1.10. There is no justification for this difference*".¹⁷⁹ It also considers that the £1.10 figure is contrary to the CVE evidence from the 2012 Charge Control. "*The CVE for Local exchanges general frames capital is 0.93 and Local exchanges general frames current is 0.94. Thus on Ofcom's own analysis the frame saving should be £2.94 (=£1.80 x 93% + £1.35 x 94%)*".¹⁸⁰
- 4.113 TalkTalk says that "*if the same assumption that is used in the LLU/WLR charge control (~£2.94) is used in the case of assessing SJ-MPF then the NPV saving increases by about £7m*".¹⁸¹

¹⁷⁷ TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.35, page 9

¹⁷⁸ TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.36, page 9

¹⁷⁹ TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.37, page 9

¹⁸⁰ TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.38, page 9

¹⁸¹ TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.39, page 9

Ofcom's response

- 4.114 For other assets – like TASMs, tie cables and racks – we have used differences in projected cash flows (operating costs and CAPEX) to inform our DCF analysis. For frames the only incremental CAPEX costs we identified related to frame blocks. We think it unlikely that the cost of the ironwork, ladders or physical infrastructure on which the frame blocks rest would vary materially if the number of jumpers changed.
- 4.115 On operating costs Openreach told us that the introduction of SJ-MPF would not lead to any incremental costs savings on frame maintenance. We did not agree and used regulatory cost data that supports BT's RFS to derive our estimates of operating cost savings on frames.
- 4.116 TalkTalk's arguments concern consistency with cost estimates provided in the LLU/WLR charge control. Its estimate of incremental costs of £2.94 is made up of £1.67 from the *LE general frames capital* component and £1.27 from the *LE general frames current* component. For the reasons set out below we disagree with using RFS LRIC component costs without any adjustments. We have undertaken some further work on the costs of these components to verify our earlier estimate. Before doing so, it is first useful to expand on a more general point about the nature of BT's LRIC costs that we made in A2.93.¹⁸²
- 4.117 For the purposes of resolving this Dispute we have estimated the forward looking incremental costs that would be saved on frames costs in an exchange should jumpering activities be reduced. BT's FAC for components include an allocation of fixed and common costs and will tend to overstate such savings.
- 4.118 BT's LRIC costs for both the *LE general frames capital* and *LE general frame current* components are calculated by estimating the savings in frame costs which could hypothetically be made by no longer undertaking activities on frames for all access services: WLR (both analogue and ISDN) as well as MPF and SMPF lines. These LRIC estimates include non cash flow costs, such as depreciation and a return on capital employed, but also exclude capital expenditure.
- 4.119 Moreover, for the purpose of resolving this Dispute we are interested in the cost savings from reducing activities on frames, not stopping them entirely. The incremental volume change is therefore much smaller than that assumed when BT calculates its LRIC estimates.
- 4.120 We have based our estimate of operating cost savings on *LE general frames current* LRIC costs but consider it appropriate to make some adjustments to reflect other costs that have already been included in the model and the degree to which the remaining costs will vary as the number of jumpers reduces.
- 4.121 Analysis on *LE general frame capital* and *LE general frame current* component costs suggests there has been little capital expenditure on these components over the past three years. Further, [X] %¹⁸³ of the non-current assets on *LE general frame current* were associated with capitalised software costs. We have already included incremental spend on software within development costs. This provides some support for our assumption that the relevant incremental CAPEX may be limited and restricted to frame blocks.

¹⁸² Paragraph A3.93 in this Statement and Determination

¹⁸³ Analysis of LRIC and FAC data by component contained within BT Additional Financial Schedules AFI 1-4 to support its RFS

- 4.122 It would be reasonable to expect that the bulk of CAPEX on frames would be attributed to the component *LE general frames capital*. However return on mean capital employed forms a relatively small proportion (less than [x]%) of the costs of this component.¹⁸⁴ The highest contribution to *LE general frames capital* costs comes from the accommodation sector: these make up roughly [x]% of operating costs (excluding depreciation) in 2012/13 (it was slightly less than in 2011/12) for this component. These accommodation costs are an allocation of accommodation charges; predominantly rents (or more strictly availability charges) paid to Telereal Trillium and facilities management costs, and will reflect the space occupied by the frame within the exchange. However, reducing the number of jumpers on the frame will not enable BT to remove the exchange building from its portfolio. We consider it unlikely that accommodation costs would change as a result of increasing or reducing the number of jumpers within an exchange.
- 4.123 Our conclusion from the above is that the only significant incremental cost saving in CAPEX is likely to come from expenditure on frame blocks. For the reasons outlined above we disagree with TalkTalk's assertion that there should be a contribution of £1.67 to frame saving costs from the *LE general frames capital* component.
- 4.124 We have used BT's *LE general frames current* component as the basis for our estimate of operating cost savings of £1.00. TalkTalk argues the savings on this component should be *calculated as £1.35 x 94%* which equals £1.27. As noted above this will include capital costs (depreciation and a return on capital employed) which will cover expenditure on software that we have included in development costs.
- 4.125 We described our approach to estimating operating costs savings in A2.193 to A2.197 of Annex 2 of our Provisional Conclusions.¹⁸⁵ We estimated likely cash flow savings by reviewing which elements of this component's LRIC costs might vary as the number of jumpers changed. That led to estimates of [x] and [x] per jumper in 2011/12 and 2012/13 respectively. Maintenance costs are an increasing proportion of *LE general frames current costs* but even now are only just over [x] of the costs. If we had considered only maintenance costs the estimates would have been [x] per jumper in 2011/12 and [x] in 2012/13.
- 4.126 We have carried out a cross-check of the consistency of our estimate against outputs from the 2013 Charge Control Consultation model. The charge control model suggests FAC differences of [x] in 2012/13 decreasing to £1.12¹⁸⁶ in 2016/17. Using the LRIC to FAC ratio of 0.94 that TalkTalk quotes suggests a LRIC differential of just over £1.00 when SJ-MPF might be introduced. As noted above this, however, includes contributions from depreciation and return on mean capital employed and so tend to overstate the forward-looking incremental cost savings from operating costs that we need for the purpose of resolving this Dispute.
- 4.127 Our 2012/13 estimates provide a full range of possible operating cost savings that extends from 70p to £1.35. We remain of the view that our assumption of £1 for operating cost savings for jumpering is reasonable. This lies in the middle of the range we consider plausible and the true cash savings may well be less than £1.

¹⁸⁴ See also Appendix 1.1, page 140 of BT's RFS, which shows the breakdown of costs by component.

¹⁸⁵ Paragraphs A3.193 to A2.197 of Annex 3 to this Statement and Determination

¹⁸⁶ See paragraph 4.68 of 2013 Charge Control Consultation. Available at:

<http://stakeholders.ofcom.org.uk/consultations/llu-wlr-cc-13/>

Having carefully considered the arguments put forward by Talk Talk, we do not consider that we have understated capital cost savings.

Valuation assumptions

4.128 In the Provisional Conclusions, we used a DCF model to calculate the NPV of the quantifiable costs and benefits of SJ-MPF over a seven year period. We explained this approach at paragraphs A2.141 to A2.144 of Annex 2 to the Provisional Conclusions.¹⁸⁷ We considered this a reasonable reflection of the lifetime of the assets used. The model submitted by TalkTalk also evaluated costs and benefits over a 7 year period.

TalkTalk's submissions

4.129 TalkTalk agrees with Ofcom's approach of using an NPV analysis and 8.8% as the discount rate.¹⁸⁸

4.130 TalkTalk comments on the base case valuation period of 7 years that "*the valuation should reflect that there will be a value beyond year 7 (rather than truncating it)*".¹⁸⁹ It states that TAM and tie cable equipment would need to be replaced after 7 years but that the cost of replacement under DJ-MPF and SJ-MPF is analogous.

4.131 TalkTalk considers that "*SJ-MPF will deliver continuing cost savings from lower frame costs and lower connection/disconnection costs (compared to DJ-MPF)*"¹⁹⁰ and that this saving should not be ignored. It then states that "*if cash flows were considered to remain constant after year 7 then the terminal value could be estimated at 11 times the last year cash flow (=1/8.8%). Using a conservative assumption of a terminal value multiplier of 6 times would increase the NPV by £8m*".¹⁹¹

4.132 TalkTalk considers that given Ofcom's assertion that TAMs have an operational life beyond 7 years; the sensitivities should be run above and below this on the base case.¹⁹²

Ofcom's response

4.133 We agree that, in principle, it may be appropriate to take account of costs and benefits which may accrue beyond the seven year assessment period. However, TalkTalk's proposals are likely to significantly overstate any reasonable estimate of the NPV of future cost savings. Firstly, cash flows in year 7 are not likely to be representative of cash flows in later years, because the rate of net MPF additions is expected to decline over time, and because it will become necessary to replace assets as they reach the end of their useful lives (whereas the year 7 cash flows do not reflect any replacement CAPEX). Secondly, the multiplier of eleven is based on an assumption that the projected cash flows are repeated in perpetuity, that is, that the lifetime of SJ-MPF is in effect infinite. We do not regard this as an appropriate assumption. TalkTalk does not explain how it has derived its 'conservative' multiplier of six, and so we do not regard that as appropriate either.

¹⁸⁷ Paragraph A3.141 to A3.144 of Annex 3 to this Statement and Determination

¹⁸⁸ TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.41, page 10

¹⁸⁹ TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.43, page 10

¹⁹⁰ TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.43, page 10

¹⁹¹ TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.43, page 10

¹⁹² TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.44, page 10

- 4.134 We have considered alternative ways of reflecting the value of cost savings from SJ-MPF after year 7. One way of capturing economic value beyond the evaluation period is by including an estimate of the residual value of the fixed assets, the TASMs and so on, remaining at the end of the period. We have also considered whether, in addition, to extend the evaluation period beyond the assumed lifetime of the (first tranche of) new assets.
- 4.135 We consider that the inclusion of residual asset values is appropriate. We note that, given the assumptions of our modelling scenarios, SJ-MPF assets will not be purchased in year 0 or year 1, when development costs are incurred and existing DJ-MPF assets are 'topped-up'. This means that the first tranche of SJ-MPF assets is not purchased until year 2 and, with an asset life of 7 years, does not require replacement until year 8. With different modelling assumptions, investment in SJ-MPF assets could occur in year 1 in some scenarios, but assets purchased later would still not be fully-depreciated after 7 years. Some other assets have a life of 8 years, and so will also not be fully-depreciated after 7 years.
- 4.136 To take account of this, we have now included estimates of residual asset values in all our scenarios. We have done so by including the un-depreciated value of these assets as a positive cash flow in the final year of the evaluation. The impact on the NPV is relatively small (see Table 7).
- 4.137 We have not been persuaded that we should assume asset lifetimes longer than 7 years for TAsMs. In the Provisional Conclusions, we noted that, under Openreach's accounting policies, evoTAsMs have a 7 year life, whereas standard TAsMs have a 5 year life. However, some standard TAsMs which are fully depreciated are still in use, and this suggested that the average economic life of TAsMs could be somewhat longer than 5 years. The evidence suggested that an assumption of 7 years for TAsMs would be reasonable. As this would also be consistent with the accounting life of evoTAsMs, and we do not have evidence to support a longer economic life, we have continued to assume that the economic life of TAsMs is 7 years.
- 4.138 In general, we consider it reasonable to adopt an appraisal period which reflects the lifetime of the relevant assets, also taking account of residual values where appropriate.¹⁹³ This suggests that a seven year appraisal period is reasonable. However, a 7 year period, even allowing for the residual value of fixed assets, might not capture all the value of future cost savings from SJ-MPF, if these would continue beyond the lifetime of the first tranche of assets.¹⁹⁴ We have considered whether, to address this, we should extend the evaluation period beyond seven years. We would also then need to allow for replacement investment in the fixed assets needed to support MPF services.
- 4.139 In reaching a view on the most appropriate evaluation period, we have taken account of the inevitable increase in uncertainty as projections are pushed further into the future. It would not be reasonable to require Openreach to provide SJ-MPF if this could be justified only on the basis of assumptions about costs and benefits far into the future, when the continuing use of the copper network itself may be uncertain. In

¹⁹³ The Green Book says that "costs and benefits considered should normally be extended to cover the period of the useful lifetime of the assets" (paragraph 5.10) and "even where an appraisal covers the full expected period of use of an asset, the asset may still have some residual value, in an alternative use within an organisation, in a second-hand market, or as scrap. These values should be included and tested for sensitivity as it may be difficult to estimate the future residual value at the present time" (paragraph 5.22).

¹⁹⁴ The value of these savings might in effect be regarded as an intangible asset created by the development costs incurred at the start of the period.

the longer term, demand for MPF is subject to significant uncertainty arising, for example, from rollout of fibre to the premises (“FTTP”), improvements to mobile speeds and quality, the predicted shift to voice over internet services, and technical and other developments which simply cannot be foreseen at present.

- 4.140 For example, in its response to the narrowband market review, BT indicated that it and similar operators were now considering when to close their legacy narrowband networks and migrate to a Next Generation Network (“NGN”) architecture.¹⁹⁵ BT also included an annex from Bell Labs setting out possible migration strategies, which included a range of approaches that would remove the requirement for a copper access connection to supply narrowband (and broadband) connections.¹⁹⁶ In summarising these annexes BT stated that “*migration to next generation broadband voice is inevitable*”.¹⁹⁷ BT also said that it did not envisage shutting down its current network before 2020. However, our model’s base case appraisal period for SJ-MPF runs from the start of calendar year 2014 to the end of calendar year 2021. As such, it continues into the period in which shutdown of BT’s current narrowband network becomes increasingly likely. In the light of this, any assumption about MPF costs and usage beyond seven years from the introduction of SJ-MPF would necessarily have to be treated with caution.
- 4.141 In the light of these considerations, we consider that 7 years is a reasonable assessment horizon for the purposes of our medium (‘base case’) scenario. For the low and medium-low scenarios, we also continue to regard a 7 year horizon, consistent with our asset life assumption, as reasonable.
- 4.142 In our medium high scenario, we have allowed for the effect of extending the evaluation period to ten years and also for the replacement investment in the fixed assets needed to support MPF services. In our medium high scenario, we have not allowed explicitly for the effects of the technological or fixed line demand changes described above, and so this scenario is best seen as representing an ‘upside risk’ to which we do not attach a high probability.
- 4.143 For the high scenario, we have assumed a maximum duration of 14 years, equal to two 7 year investment cycles. This allows for a significantly longer period in which to realise any benefits of SJ-MPF. We consider that an appraisal period longer than this would simply require projections which were too speculative to be reliable, but could certainly include scenarios in which use of the copper access network suffered significant declines. It should therefore not be presumed that longer evaluation periods would necessarily imply increased benefits from SJ-MPF.

Other considerations

- 4.144 At paragraphs 3.23 to 3.24 of our Provisional Conclusions we identified a number of other factors that we considered likely to be relevant to our quantified assessment, but which we had been unable to quantify. These were: (i) training and availability of engineers; (ii) existence of two MPF engineering processes; and (iii) the Equivalence Management Platform (EMP) work stack. We set out our view that each of these would be likely to reduce the benefit of SJ-MPF in a way that we had been unable

¹⁹⁵ BT response to the Narrowband Market Review consultation, paragraph 9.18, <http://stakeholders.ofcom.org.uk/binaries/consultations/nmr-2013/responses/BT.pdf>

¹⁹⁶ BT response to the Narrowband Market Review consultation, Annex 4 http://stakeholders.ofcom.org.uk/binaries/consultations/nmr-2013/responses/Bt_annex_4.pdf

¹⁹⁷ BT response to the Narrowband Market Review consultation, paragraph 9.22, <http://stakeholders.ofcom.org.uk/binaries/consultations/nmr-2013/responses/BT.pdf>

fully to capture in our NPV calculation. We noted that given our assessment of the NPV of SJ-MPF as being negative in four out of five of our scenarios we had not carried out more detailed analysis as we considered these factors would not change our preliminary conclusions.

- 4.145 Both Openreach and TalkTalk have made submissions that are relevant to these other considerations. We set out Openreach's submissions first, then TalkTalk's, and then our own assessment.

Openreach submissions – further downside risks

- 4.146 Openreach agrees with Ofcom's view that there is limited merit in trying to quantify the additional considerations we identified as it says they would serve only to further confirm that there is no commercial case for development.¹⁹⁸

- 4.147 Openreach identifies the relevant other considerations – which it describes as “*further downside risks*” – as follows:

- Timescales for deployment of SJ-MPF
- Opportunity costs of changing the existing EMP
- Costs associated with running two processes and risks of increasing fault rates
- Training costs

- 4.148 In its consideration of timescales for deployment of SJ-MPF, Openreach states that the 12-18 month product development timeframes outlined in the Provisional Conclusions document “*assume that there is space available in future EMP release schedules to make the development. In practice, this may not be the case*”.¹⁹⁹ Openreach cites, for example, the consumer switching process that Ofcom has decided should apply to all Openreach copper products as something which may impact the EMP work stack. It notes that Ofcom is currently consulting on a 12 month development and implementation timeframe from publication of the final statement, which is expected in early 2014.²⁰⁰ Openreach states that “*this will impact all CPs ordering services from Openreach including TalkTalk who will also have to make systems changes to ensure compliance. In the circumstances, a 12-18 month Openreach development window for SJ-MPF should therefore be considered at the lower end of what could be reasonably delivered (without moving other planned developments that have much broader based demand)*”.²⁰¹ Openreach goes on to say that the 12-18 month timescale only covers Openreach's development. After this the purchasing CPs would need “*to make the necessary developments to their own processes and systems in order to consume the SJ-MPF service*”²⁰² and that only when this had been completed, would it be possible to deploy SJ-MPF. Openreach

¹⁹⁸ Openreach's response to the Provisional Conclusions, 15 October 2013, page 5

¹⁹⁹ Openreach's response to the Provisional Conclusions, 15 October 2013, page 5

²⁰⁰ Consumer Switching – a statement and consultation on the processes for switching fixed voice and broadband providers on Openreach copper network of 8 August 2013 available at <http://stakeholders.ofcom.org.uk/consultations/consumer-switching-review/>

²⁰¹ Openreach's response to the Provisional Conclusions, 15 October 2013, page 5

²⁰² Openreach's response to the Provisional Conclusions, 15 October 2013, page 5

states that *“the timescale for CP consumption can range from 2 months to 2 years after the release date”*.²⁰³

- 4.149 In response to follow up questions on development timescales, Openreach states that *“three EMP releases are scheduled between November 2013 and March 2014, all of which have a total development cost of [X] each, are fully committed and cannot be changed”*.²⁰⁴ It says that *“the earliest release window for consideration for SJ-MPF would be release 2750 to 2800”*.²⁰⁵ These releases are scheduled to happen between January 2015 and March 2015. Openreach suggests that SJ-MPF could, in any case, require two EMP releases *“due to the complexity of the proposed change”*.²⁰⁶
- 4.150 At paragraph A2.133 of Annex 2 of our Provisional Conclusions²⁰⁷ we noted that *“further requirements and lead times associated with CPs implementing changes on their systems and ordering procedures”* could adversely impact our assumption of a 12 – 18 month development lead time. This comment reflected potentially conflicting information received from Openreach and TalkTalk in the course of the Dispute. Openreach had told us that *“consumption of a particular release by CPs can vary between 2 months and 2 years after the release date”*²⁰⁸ whereas TalkTalk had said that *“[i]f SJ-MPF were available today it would take 2 months for us to complete the limited work required for TalkTalk to consume it (see answer to question 1(e) regarding the work involved). Since Openreach’s development will be longer we will be ready to consume the SJ-MPF product as soon as it is available”*.²⁰⁹
- 4.151 In answer to follow up questions on its response to our Provisional Conclusions, Openreach identifies a range of factors that impact when CPs commence their development work to consume releases, products or functionality. These include: *“Need for a particular product or functionality and how quickly they are required; aspiration to consume the product or functionality by a particular point in time; development costs and budget availability; and Openreach withdrawing an EMP version on a particular date”*.²¹⁰ Openreach notes that in general *“[b]ased on previous developments of a similar scale, the timescale for CP consumption can range from 2 months to 2 years”*.²¹¹
- 4.152 For a CP to move as quickly as possible to consume SJ-MPF it would need to start its development as soon as Openreach published its release development documentation *“which is typically 90 days before the EMP release date”*.²¹² It would be possible for CPs to commence development earlier but this would entail a degree of risk *“as the release scope or the release documentation might not be finalised at the point at which the CP commenced development (i.e. could require re-work further down the line)”*.²¹³
- 4.153 In addition, Openreach notes that it is typical for CP volumes associated with new capability to *“increase over time rather than be delivered at high levels straight*

²⁰³ Openreach’s response to the Provisional Conclusions, 15 October 2013, page 6

²⁰⁴ Openreach’s response to follow-up questions, 28 October 2013, page 2

²⁰⁵ Openreach’s response to follow-up questions, 28 October 2013, page 3

²⁰⁶ Openreach’s response to follow-up questions, 28 October 2013, page 3

²⁰⁷ Paragraph A3.133 of Annex 3 to this Statement and Determination

²⁰⁸ Openreach’s response to s191 follow-up questions, 30 August 2013, page 1

²⁰⁹ TalkTalk’s response to s191 follow-up questions, 14 August 2013, page 8

²¹⁰ Openreach’s response to follow-up questions, 28 October 2013, page 4

²¹¹ Openreach’s response to the Provisional Conclusions, 15 October 2013, pages 5-6

²¹² Openreach’s response to follow-up questions, 28 October 2013, page 4

²¹³ Openreach’s response to follow-up questions, 28 October 2013, page 5

away". Openreach summarises that "Any Ofcom assessment of how quickly SJ-MPF volumes are likely to be delivered therefore needs to account for Openreach delivery timescales, CP delivery timescales (including practical issues such as lead time to order tie cables in the new proposed configuration) **and** typical CP consumption patterns post-delivery of the new functionality" [Openreach's emphasis].²¹⁴

- 4.154 In its consideration of the opportunity costs of changing the existing EMP schedule, Openreach notes that "[o]nce an EMP release is scheduled and its content agreed...there is limited flexibility to re-prioritise its content as this would require removing from the scope of a particular schedule items for which work might have already started. This would have cost implications for Openreach and potentially for any other CP that has started its own development in parallel".²¹⁵ In response to follow-up questions, Openreach says that the EMP releases for 2013/14 are fully committed. Those for 2014/15 are yet to be finalised and prioritised, but there is a significant list of potential candidates, not all of which will be achievable within Openreach's overall development capability.
- 4.155 In relation to costs associated with running two processes and risks of increasing fault rates, Openreach states "the development of SJ-MPF would add another level of complexity whereby migrations to and from SJ-MPF and between SJ-MPF and DJ-MPF would need to be developed (as well as migration paths from WLR)".²¹⁶ Openreach considers that "this additional complexity could also result in additional faults including Early Life Failure associated with the new jumpering configurations required".²¹⁷
- 4.156 Regarding training costs, Openreach highlights the "additional training and operational readiness costs that have not been factored into Openreach's estimated development costs".²¹⁸ In response to follow up questions, Openreach informed Ofcom that "[b]ased on the nature of the development (the introduction of an MPF product variant to which the whole suit of existing functionality would apply)"²¹⁹ it estimated the total training cost at [redacted].
- 4.157 Openreach clarified that it "did not proceed to carrying out a feasibility study on SJ-MPF to get a view of development and implementation costs", but said that this cost would include: training/briefing of [redacted] service delivery engineers, [redacted] frames engineers, [redacted] field engineers, [redacted] Service Management Centre (SMC) agents, escalation and Director's Service Office (DSO) team members, as well as [redacted] job controllers.²²⁰

TalkTalk submissions

- 4.158 TalkTalk considers that the "impact on other EMP developments is overplayed" and that a "more competent operator would be able to reschedule the content of releases with little trouble".²²¹ TalkTalk doubts "whether there are other EMP releases that are more valuable than this development" [SJ-MPF].²²²

²¹⁴ Openreach's response to follow-up questions, 28 October 2013, page 5

²¹⁵ Openreach's response to the Provisional Conclusions, 15 October 2013, page 6

²¹⁶ Openreach's response to the Provisional Conclusions, 15 October 2013, page 6

²¹⁷ Openreach's response to the Provisional Conclusions, 15 October 2013, page 6

²¹⁸ Openreach's response to the Provisional Conclusions, 15 October 2013, page 6

²¹⁹ Openreach's response to follow-up questions, 28 October 2013, page 1

²²⁰ Openreach's response to s191 notice, 28 October 2013, page 1

²²¹ TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.50, page 13

²²² TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.50, page 13

- 4.159 TalkTalk considers that under SJ-MPF *“there will be fewer faults which will.... reduce costs for CPs and consumers”*²²³ as Openreach’s costs are reduced. It adds that the suggestion that an additional product and process will add complexity and further faults lacks *“explanation or evidence to support this assertion”*.²²⁴
- 4.160 With respect to training, TalkTalk considers the requirement for further engineer training is *“highly unlikely since a ‘job’ the engineer receives involves a number of instructions for jumper installs/removes. The work they do is agnostic to the actual product they are moving from/to (they do not know which product the jumper installs/removes are for)”*.²²⁵ TalkTalk further notes that Openreach engineers already manage a range of provisioning products, and doubts that adding SJ-MPF provisioning would add complexity or difficulty.²²⁶

Ofcom’s response

- 4.161 We have noted Openreach’s and TalkTalk’s submissions on timescales for deployment of SJ-MPF and the impact on the existing EMP schedule. On balance, we take the view that our original earliest estimate of a 12 month development timeframe for SJ-MPF appears optimistic given that a development period based on the timing of the releases 2750 or 2780 identified by Openreach (January or March 2015) would not allow time for any development by CPs against the release, nor for the two releases that Openreach suggest that SJ-MPF could require *“due to the complexity of the proposed change”*.²²⁷ A release between January and March 2015 does not make any allowance for the anticipated two month order time for TAMs and tie cables.²²⁸ TalkTalk has said it could be ready to consume SJ-MPF immediately, but information from Openreach suggests CP lead times could be significantly longer.
- 4.162 TalkTalk and Openreach have different views on the development CPs would need to make to the EMP interface to be able to order SJ-MPF. Whilst TalkTalk believes that it would need only limited development as changes could be accommodated within Openreach’s systems, Openreach considers that CPs would need to develop their interfaces, and this would impact deployment timescales.
- 4.163 In the light of this, and the new information on the possible releases in which SJ-MPF could be accommodated, we consider that an 18 month timeframe is achievable and so we have retained this as our base case. We consider that a launch in January 2015 is the earliest possible launch although our view is that the probability of this being achieved is low. We have kept this in our high scenario. In light of the clarifications provided by Openreach, we have (as noted at paragraph 4.17 - 4.21 above) revised our low scenario to a Q3 2015/16 start date (i.e. October 2015). Our view is that, based on the data provided by Openreach, there is more risk that launch (including CPs having completed the relevant developments on their systems) will slip back from our base case, rather than being delivered earlier.
- 4.164 We do not have data to quantify the costs associated with running two processes and risks of increasing fault rates. Accordingly we have not revised our model in response to Openreach’s submissions on this. However, in response to TalkTalk’s comments

²²³ TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 2.49, page 13

²²⁴ TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 2.50, page 13

²²⁵ TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 2.50, page 13

²²⁶ TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 2.50, page 13

²²⁷ Openreach’s response to follow-up questions, 28 October 2013, page 3

²²⁸ Openreach response to s191 notice, 16 August 2013, page 2

on faults, we consider the complexity would arise from the migration paths between SJ-MPF and other Openreach products.

- 4.165 Whilst we did not quantify training costs in our Provisional Conclusions, we highlighted these would be likely to be incurred. We asked Openreach to provide some information regarding training costs, which it did and we have incorporated these into our model.

Final view on Step 1: would the introduction of an in-line SJ-MPF product be likely to increase economic efficiency (in particular by reducing forward looking economic costs)?

- 4.166 In the light of TalkTalk's and Openreach's submissions on the cost benefit analysis in Step 1 of our Provisional Conclusions we have made the following changes to our model:

4.166.1 We revised the start date in our low case scenario, pushing it back from Q2 2015/16 to Q3 2015/16.

4.166.2 We revised our geo-type definitions, by raising the lower boundary of the Group 2 geo-type to exchanges where demand for MPF (and hence SJ- or DJ-MPF) exceeded 200 net additions in the past 12 months: in the Provisional Conclusions Group 2 comprised exchanges with net additions between 50 and 400 in the last 12 months. Consequently, our Group 2 geo-type is now narrower, comprising exchanges with net additions between 200 and 400 in the past 12 months and our Group 1 geo-type range is now wider, comprising exchanges with fewer than 200 net additions in the past 12 months.

4.166.3 We have varied the spare capacity on DJ-MPF to between 9% and 14% to provide a reasonable proxy of the NPV impact of removing LIJs to create additional spare capacity. We take the view that removing LIJs would be the efficient approach and this would create up to 14% spare capacity on DJ-MPF TAMs. To take account of increasing utilisation due to growth in MPF volumes prior to SJ-MPF launch we have assumed 10% spare capacity in our base case.

4.166.4 We have revised our assessment of the number of jumper removals per disconnection from 0.35 to 0.67 jumpers to take into account removal of left in jumpers on stopped lines.

4.166.5 We have revised our assumption of the cost of installing and removing a jumper up from [£] per jumper to [£] per jumper.

4.166.6 We have varied the assessment horizon for our medium-high and high scenarios, changing them from 7 years to 10 and 14 years, respectively. In doing so, we have also introduced asset replacement. For the medium, medium low and low scenarios, we continue to regard a 7 year horizon, consistent with our asset life assumption, as reasonable. (For a 7 year horizon, no asset replacement is required since the key assets, TAMs, have an asset life of 7 years.)

4.166.7 We have added in residual values for both SJ-MPF and DJ-MPF assets to into take account the potential economic value of assets after the valuation period.

Statement and Determination concerning a dispute between TalkTalk and Openreach relating to single jumpered MPF

4.166.8 We have added training costs (which had previously been unquantified) into our model.

4.166.9 We have extended our volume forecasts as a result of changing the assessment horizon (discussed in paragraph 4.166.6). Due to the uncertainty of the future of MPF in the long run, we have continued our previous forecast calculations out to 2024/25, and assumed a steady state from then on. For net additions, we have trended these to 0 from 2021/22 to 2024/25 to reflect the steady state assumption.

4.167 In reviewing the model in light of the responses to the Provisional Conclusions, we corrected some modelling errors that we identified on the calculation of SJ-MPF Frame Block D, DJ-MPF TASM and DJ-MPF Frame Block C.²²⁹ In addition, we have also modified the assumption on the number of TASMs that a Master Controller can support to make it precise.

4.168 The impact of these changes on our five scenarios is set out in Table 6 below. This updates Table A2.12 from Annex 2 to our Provisional Conclusions,²³⁰ providing the NPV, the NPV with residual value added in, and also the NPV plus residual value on a per line basis. Table 7 below updates our individual sensitivity analysis from Table A2.13 in Annex 2 to our Provisional Conclusions.²³¹

Table 6 – Ofcom revised model NPV output for each scenario

	High Scenario	Medium-high Scenario	Medium Scenario	Medium-low Scenario	Low Scenario
SJ-MPF launch date	January 2015	July 2015	July 2015	July 2015	October 2015
Volume adjuster	+20%	+10%	0%	-10%	-20%
Duration of Review	14	10	7	7	7
Frame Saving	£1.35	£1.15	£1.00	£0.85	£0.70
Spare capacity	9%	10%	10%	10%	14%
Average net number of jumpers installed	0.9	0.85	0.8	0.75	0.7
Asset replacement	Yes	Yes	N/A	N/A	N/A
<u>NPV (£m):</u>	18.0	1.7	-1.0	-4.4	-7.4
<u>NPV+Residual Value (£m):</u>	17.6	4.2	-0.5	-2.9	-4.0
<u>NPV+Residual Value per MPF line (£):</u>	0.21	0.06	-0.01	-0.06	-0.08

²²⁹ The calculation of SJ-MPF Frame Block D did not consider the capacity constraint from Tie Cable E in the published model while DJ-MPF TASM used a wrong constraint. The formula to calculate DJ-MPF Frame Block costs missed the costs of Frame Block C.

²³⁰ Table A3.12 in Annex 3 to this Statement and Determination

²³¹ Table A3.13 in Annex 3 to this Statement and Determination

Table 7 – Ofcom model medium scenario NPV + Residual Value individual sensitivity analysis

	Base case	Change to	Impact on NPV (£)
Base case NPV + Residual Value	-	-	- £0.5m
Volume adjuster	0%	+10%	+1.6m
Volume adjuster	0%	-10%	-1.9m
Frame savings	£1.00	£1.35	+1.1m
Frame savings	£1.00	£0.70	-1.0m
Spare capacity	10%	9%	+1.1m
Spare capacity	10%	14%	-1.3m
Average net number of jumpers installed	0.8	0.9	+0.3m
Residual value	Yes	No	-0.6m
Jumpering work savings	£2.40	£2.70	+0.4m
SJ-MPF launch date	Q2 2015/16	Q3 2015/16	-1.7m
Assessment period	7 years	10 year & Asset replacement	+1.4m
WACC	8.8%	9.9%	-0.2m

4.169 Accordingly, the NPV of our base case is higher than it was in our Provisional Conclusions, but remains negative, at - £0.5m, or -£0.01 per line. Our high and low ranges are + £17.6m and - £4.0m respectively, (a range of between + £0.21 and - £0.08 per line) with medium high and medium low NPV values at + £4.2m and - £2.9m respectively (+ £0.06 and - £0.06 per line). From our revised sensitivity analysis it can be seen that volumes and launch dates have the greatest individual effects (see Table 7 above).

4.170 In light of this, our judgment based on this revised quantified assessment is that the most likely (base case) scenario produces a slightly negative NPV. The NPV throughout the range of scenarios is slightly higher than in our Provisional Conclusions, but even so, the balance is more likely negative than positive. It should not be assumed that we consider the scenarios either side of the base case are equally likely to occur. Indeed, as noted in the Provisional Conclusions and discussed further below, we consider that there is an asymmetry and that the lower scenarios are more likely than the higher scenarios.

4.171 Accordingly, following the adjustments we have made to our model and input data, we continue to believe that the quantifiable benefits would not outweigh the quantifiable costs over a reasonable time horizon.

4.172 By way of further clarification of our position, Table 8 below sets out the NPV impact and output of key changes we have made, comparing them where appropriate to TalkTalk's estimate of what the impact would be. The key difference between

TalkTalk's estimated NPV from its amendments to our model of [§<] ²³² and our own base case NPV of -£0.5m is volumes. The volume effect is driven by differences in:

- 4.172.1 Start date;
- 4.172.2 Geo-type definition; and
- 4.172.3 Valuation period.

4.173 These factors mean that MPF volumes that make use of SJ-MPF in our model across the assessment period remain substantially less than those estimated by TalkTalk in its response to the Provisional Conclusions. This reduces the benefits of SJ-MPF over DJ-MPF in comparison with TalkTalk's estimates and continues to drive a lower, negative, base case NPV in three out of five of our scenarios.

Table 8 – Cumulative effect of model changes from the Provisional Conclusions base case

	Output (£m)			
Base case in Provisional Conclusions	-4.7			
TTG/BT response	TTG's estimate (£m)	Ofcom's key modelling changes:	Impact (£m)	Output (£m)
		Ofcom corrections	+0.5	-4.2
Type 3 exchanges are "value destroying" (TalkTalk)	+6	Increasing type 3 exchanges threshold	+3.0	-1.2
Cash flows after year 7 not included (TalkTalk)	+8	Adding in residual values	+0.6	-0.6
Training costs not included (BT)		Adding in training costs	-0.2	-0.8
Savings from future left-in jumpers removal (TalkTalk)		Increasing jumper removal per disconnection volumes	+0.2	-0.6
Cost of jumpering work (TalkTalk)	+1	Increasing jumpering work savings	+0.1	-0.5

Step 2: In light of our duties, are there any other relevant factors that we should take into account in deciding whether or not to direct Openreach to provide SJ-MPF?

What other relevant considerations, if any, should we take into account?

4.174 Both Openreach and TalkTalk agreed that the consideration of whether SJ-MPF should be developed should include appropriate other factors. Each had comments on the factors we took into account under Step 2 in our Provisional Conclusions. We set these out below, along with our response, under relevant subheadings.

²³² TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 1.3, page 1

Treatment of risk

- 4.175 In the Provisional Conclusions, we said that some of the risks relating to the introduction of single jumpering, and which would be borne by Openreach, were asymmetric. By this we meant that outcomes which were unfavourable to the case for single jumpering, relative to our 'medium scenario', appeared more likely than more favourable outcomes.
- 4.176 In particular, we considered that the usage of SJ-MPF was likely to be subject to asymmetric risk. For example, Sky had not indicated a firm intention to use SJ-MPF. This meant that take-up could be substantially lower than in our medium scenario, whilst the probability that demand would be very much higher than in our medium scenario appeared to be much lower. We took this into account when interpreting the results of our quantified cost-based analysis.

Openreach's submissions

- 4.177 Openreach agrees with Ofcom's view that the case is subject to asymmetric risk, and states that "*regulation must take into account asymmetric risks whereby (in the case of SJ-MPF) the potential downside risk on Openreach is greater than the potential upside to CPs*".²³³ Openreach considers that the risk that there will be no take-up of SJ-MPF at all is "*especially relevant in this case since the viability of SJ-MPF is particularly sensitive to forecast volumes and expected utilisation factors*".²³⁴ It goes on to say that "*Openreach would bear all the costs of any development coupled with a risk on Openreach of CPs either not consuming the product in the expected (or claimed) volumes or consuming it at a later time than indicated in their forecasts*".²³⁵ Openreach notes that the introduction of SJ-MPF is unlikely to result in higher total number of MPF lines, beyond what would normally be expected under the DJ-MPF configuration. It then says "*[i]f future CP demand for SJ-MPF were not to materialise as forecasted, Openreach would not recover or would take longer to recover its development costs. In contrast, CPs would be better able to align the completion of their development to their planned date for the consumption of the product*".²³⁶

TalkTalk's submissions

- 4.178 TalkTalk considers that the downside risk is "*trivial*" and that "*the risk will not be asymmetric provided that the projections are the 'mid-case' and, we believe, they are*".²³⁷ Also, that with the exception of development costs, which it considers to be £1.3m most of the CAPEX for exchange equipment such as TAMs and test heads "*is made in response to firm demand from CPs so most of the expenditure is not 'at risk'*".²³⁸ TalkTalk argues that the risk lies with CPs and not Openreach under the SJ-MPF arrangement, but that the opposite applies for DJ-MPF "*CPs purchase on a per line basis meaning that Openreach bear much of the risk. Thus the risk for Openreach is actually lower under SJ-MPF than today under DJ-MPF*".²³⁹ Finally

²³³ Openreach's response to the Provisional Conclusions, 15 October 2013, page 4

²³⁴ Openreach's response to the Provisional Conclusions, 15 October 2013, pages 4-5

²³⁵ Openreach's response to the Provisional Conclusions, 15 October 2013, page 5

²³⁶ Openreach's response to the Provisional Conclusions, 15 October 2013, page 5

²³⁷ TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.50, page 11

²³⁸ TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.50, page 11

²³⁹ TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.50, page 11

TalkTalk states that “*Openreach is compensated for the risk it takes since its prices include a return on capital at 8.8% (which is double the risk free rate)*”.²⁴⁰

Ofcom’s response

- 4.179 We note that Openreach does not take issue with the approach to asymmetric risk taken in the Provisional Conclusions.
- 4.180 TalkTalk’s comment that the risk should not be regarded as asymmetric if we rely on the ‘mid-case’ projections suggests that TalkTalk may have misinterpreted our medium scenario.
- 4.181 As set out in the Green Book, when appraising a proposal using cost-benefit analysis it is usual practice to establish a base case which represents “*the best estimate of its costs and benefits*”.²⁴¹ It is also necessary to consider the impacts of changes in key variables and of different scenarios. A decision will not normally be taken on the basis of a single scenario such as a ‘base case’ or ‘medium scenario’, nor will all scenarios necessarily be viewed as equally likely.²⁴² We have adopted this general approach in resolving this Dispute.
- 4.182 In Table 7 above, we set out the input assumptions for each of the five scenarios for which we presented results, and the resulting NPVs. To take the ‘volume adjuster’, for example, the assumptions range from 20% below the medium scenario in the ‘low scenario’ to 20% above it in the ‘high scenario’. But this does not mean that we regard the low and high scenarios as equally likely. In fact, and as we said in the Provisional Conclusions,²⁴³ we consider that lower volumes are more likely than higher volumes. It is in this sense that we describe volume risk as asymmetric. Similarly we consider that the start date risk is likely to be asymmetric. As noted in paragraphs 4.161 to 4.163 above, information provided by Openreach in answer to follow up questions on its response to the Provisional Conclusions suggests that delay from our base case of July 2015 to October 2015 (our low scenario) seems more likely than an earlier start such as Q1 2015 (in our high scenario).
- 4.183 In reaching our final determination, we have taken account of the results of all the scenarios modelled, not just the outcome of the medium scenario. The asymmetry can be taken into account by placing more weight on the results of the low and medium-low scenarios than on the outcomes of the high and medium-high scenarios.²⁴⁴
- 4.184 TalkTalk notes that Openreach may bear a lower share of some risks if CPs use single jumpering than if they use double jumpering. With single-jumpering, CPs bear the risk associated with the purchase of TAMs (for example) in advance of demand which, with double jumpering, is borne by Openreach. However we do not consider that shifting risk in this way is likely to mean there are additional net benefits to SJ-MPF overall.

²⁴⁰ TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 2.50, page 12

²⁴¹ HM Treasury, ‘The Green Book’, 2011 edition, paragraph 2.9

²⁴² According to the Green Book, “*it is essential to consider how conclusions may alter given the likely range of values that key variables may take. Therefore, the need for sensitivity analysis should always be considered, and, in practice, dispensed with only in exceptional cases*”: paragraph 5.69.

²⁴³ Provisional Conclusions, paragraph 3.53

²⁴⁴ If probabilities could be assigned to each of the scenarios, they could be combined mathematically in a single probability-weighted average or “expected value”. However, this would not remove the “*need to understand that there are ranges of potential outcomes, and hence to judge the capacity of proposals to withstand future uncertainty*”: HM Treasury, the Green Book, paragraph 2.15.

- 4.185 This is because, as our NPV analysis takes account of the costs and benefits accruing to all parties, not just Openreach, the outcome is not affected by simply changing the distribution of investment between Openreach and CPs. For this to result in a net benefit, it would have to be more efficient for CPs to purchase the relevant equipment and bear the resulting risk rather than Openreach. We do not believe this to be the case.
- 4.186 Firstly, both Openreach and other CPs face incentives to minimise costs and operate efficiently. Openreach is incentivised through the charge control on MPF charges (the need for a charge control would not be affected by a requirement to provide SJ-MPF), whilst other CPs are subject to competitive pressures. Moreover, Openreach can share assets such as TAMs between CPs if double-jumping is used whereas, if single-jumping is used, CPs will not benefit from efficiencies arising from such sharing.
- 4.187 Secondly, the costs of capital of access seekers such as TalkTalk are likely to be higher than the Openreach cost of capital for copper access services used in our central case. This reflects the fact that Openreach's cash flows are less affected by cyclical variation, or systematic risk, than those of other CPs. We can take account of the effect of CPs making a higher share of up-front investments by changing the discount rate used in our NPV calculations. We have carried out a sensitivity analysis using higher rates to proxy the costs of capital of access seekers such as TalkTalk and Sky because, as we note above in footnote 44, "*LLU CPs are themselves also contributing to (i.e. having to finance) the upfront investment (not just Openreach)*" The impact of using a higher cost of capital is small, but tends to reduce the present value of benefits relative to costs, since benefits tend to occur later in time.²⁴⁵ Hence, we do not consider that the transfer of risk to CPs and away from Openreach necessarily makes the case for single jumping stronger.
- 4.188 Finally, we note that some downside risk may still bear more heavily on Openreach than on CPs. For example, very low SJ-MPF take-up could mean that Openreach would not be able to recoup the costs it incurred in developing SJ-MPF as a result of a regulatory requirement to do so.
- 4.189 TalkTalk also suggests that risk can be regarded as "*trivial*" because of the limited scale of the development costs, because risk is borne by CPs other than Openreach, and because Openreach is compensated for risk through the cost of capital. To the extent that these points are relevant, they are already reflected in the costing analysis. As our DCF model includes the development costs of all parties, and future cost savings are discounted at Openreach's cost of capital, we consider it appropriately takes account of the costs incurred (irrespective of whether they are considered to be small or large) and the risk involved.

Competition effects

- 4.190 At paragraphs 3.6 to 3.10 and 3.43 to 3.44 of the Provisional Conclusions, we considered whether introducing SJ-MPF could have any additional benefits over and above any cost savings captured in our quantified analysis. In particular, we considered whether it would result in dynamic benefits to consumers as a result of more intense competition. We also considered whether it would lead to greater take-up of MPF overall.

²⁴⁵ See Table 7 above

- 4.191 We considered that any additional competition benefits from the introduction of SJ-MPF were likely to be relatively small because most downstream markets where SJ-MPF could be used are already competitive, and because a close substitute product (DJ-MPF) is already available. In addition, our modelling suggested that, even in those scenarios in which SJ-MPF could produce net cost savings, those savings were likely to be relatively small.
- 4.192 We also noted that lower costs could mean that the number of exchanges where it would be economic to roll out LLU was increased, and this could have additional competition benefits. However, we considered that the number of such exchanges was likely to be small in any case as many of the remaining non-unbundled exchanges are very small (in terms of premises served) and therefore unlikely to be economic to unbundle.

TalkTalk's submissions

- 4.193 In its response to the Provisional Conclusions, TalkTalk notes that *"the conclusion as to whether SJ-MPF should be developed rests principally on whether there is a net cost saving"*.²⁴⁶ It describes dynamic and other benefits as a factor to be taken into account *"in the case the cost analysis is inconclusive"*.²⁴⁷ The dynamic benefits it identifies are: *"Less distorted competition and a more level playing field as between MPF and WLR providers leading to stronger merits based competition....increased pressure on other (non-MPF) operators to lower their costs and prices to consumers...more exchange unbundling and increase[d] investment and competition...[and an] increase in service innovation"*.²⁴⁸ TalkTalk also asserts that, in a category that it calls "other benefits," the deployment of SJ-MPF will lead to a *"small increase in demand for MPF/WLR lines (in aggregate) and for broadband"*.²⁴⁹

Ofcom's response

- 4.194 The process by which SJ-MPF could lead to wider benefits is complex, consisting of a number of distinct steps with significant uncertainty at each step. First, there is the question of whether SJ-MPF will lead to net cost savings. The existence of such savings is likely to be a necessary condition for the existence of wider benefits. In other words, for price reductions to be spread to customers of CPs that do not use SJ-MPF, there first have to be efficiency benefits for those that do use SJ-MPF. One implication of this is that taking any such wider benefits into account would be unlikely to affect whether the outcome in a given scenario was positive or negative.
- 4.195 Second, cost reductions from SJ-MPF would need to be passed to MPF-users in lower prices by Openreach. Given the regulation applying in relevant markets and Ofcom's pricing principles for regulated products, it is reasonable to suppose that cost savings will be passed on in some form. However, we are not required to, and are not in fact, setting a price as part of this Dispute, and to do so would be a considerable undertaking (particularly on a hypothetical basis). The scale of any hypothetical future price difference between charges for DJ-MPF and SJ-MPF cannot be estimated with precision.
- 4.196 Third, in terms of retail market-wide effects that CPs might pass on from using SJ-MPF, there is uncertainty both about the extent of the savings and the extent to which

²⁴⁶ TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.47, page 10

²⁴⁷ TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.47, page 10

²⁴⁸ TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.48, page 11

²⁴⁹ TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.49, page 11

they are passed on in retail prices. However, one possibility is that competition between Sky and TalkTalk results in price reductions which reflect the *smaller* of the cost savings to the two individual operators. In addition, it is not possible to say in what form cost savings would be passed on. This could be by means of selective discounts to some customers or a general price reduction to all customers, for example. In the latter case, the average price fall is likely to be particularly small, as a result of averaging savings made on a relatively small number of lines over a much larger customer base.

- 4.197 Fourth, any TalkTalk and Sky price reductions would need to be matched by other operators. It might be argued that such price reductions would be matched by BT and others, either locally or nationally. However, the extent of such wider effects again depends on the size of the likely price reductions by TalkTalk and Sky, where such price reductions might be made, the nature of retail competition and how responsive consumer demand is to prices. For example, if the price reductions were insufficient to stimulate responses by competitors to TalkTalk and Sky, or if price reductions were made but were insufficient to stimulate consumer switching, then any wider competition effects would be very much muted.
- 4.198 In the light of the above, our view is that potential competition benefits are likely to be small, and are not likely to be a decisive factor in this case.
- 4.199 TalkTalk also points out that the potential for SJ-MPF to lead to cost savings may be greater in exchanges which have not previously been unbundled than in exchanges where equipment to use DJ-MPF has already been installed.²⁵⁰ It has not, however, provided an indication of the number of additional exchanges which it might become economic to unbundle using SJ-MPF, or of the number of MPF lines which might be unbundled in such exchanges. In the light of this, we continue to regard this number as likely to be immaterial given the small size of the remaining unbundled exchanges.
- 4.200 TalkTalk does not explain why it expects deployment of SJ-MPF to lead to increased demand for MPF/WLR lines (in aggregate) and for broadband. However, we assume it is because TalkTalk believes that its costs would be reduced by the availability of SJ-MPF, that this would enable it to lower its own prices, and that this would then lead to lower prices across the market which would stimulate demand for fixed broadband access and exchange lines. We acknowledge that this is a theoretical possibility but, for the reasons set out above we consider that such an effect would not happen when the cost savings are negative (as they are in the medium and low scenarios we have modelled) and is not likely to be material even in the high NPV scenarios we have modelled (given the small per line effects).

Other effects on consumers

- 4.201 At paragraphs 3.45 to 3.47 of our Provisional Conclusions we considered potential positive impacts for consumers that might arise from the introduction of SJ-MPF, including reduced costs and lower prices, potential improvements in service speeds and potential reduction in the number of faults. In its submissions on the Provisional Conclusions, TalkTalk makes points concerning complexity and fault rates. We have already considered these above at paragraph 4.164.

²⁵⁰ TalkTalk's response to the Provisional Conclusions, 16 October 2013, paragraph 2.48, page 11

Regulatory considerations

4.202 At paragraphs 3.48 to 3.51 of our Provisional Conclusions we considered potential regulatory considerations if we were to direct Openreach to supply SJ-MPF. We noted that if SJ-MPF were introduced, any implications for DJ-MPF costs and charges would be a matter to consider in the ongoing LLU and WLR charge control.

TalkTalk's submissions

4.203 TalkTalk states that “*requiring Openreach to develop SJ-MPF will create better incentives for Openreach’s future compliance and make clear that it cannot discriminate in product development against the interests of consumers*”.²⁵¹

4.204 TalkTalk also states that “*it is relevant context that Openreach’s/BT’s incentives are to not develop SJ-MPF*”.²⁵² It adds that “*since only BT’s downstream rivals would enjoy the cost saving this would competitively disadvantage BT*”.²⁵³

Ofcom’s response

4.205 We recognise that Openreach may not always have incentives to develop products for which CPs express a demand. That is why there is provision for Ofcom to require Openreach to make products available in certain circumstances. Hence, we have considered whether Openreach should be required to provide SJ-MPF by assessing the costs and benefits which would accrue to all relevant parties. The SMP conditions imposed on Openreach reflect the fact that BT’s market power may give it the incentive and ability to engage in behaviour of the sort outlined by TalkTalk. However, this does not imply that it would necessarily be appropriate to require Openreach to develop SJ-MPF in the absence of a likelihood of an increase in economic efficiency, competition or consumer benefits.

4.206 In addition, we have considered the results of our revised analysis in the light of our duties and regulatory principles. These principles include that the case for intervention must be clear: where a case is marginal, or finely balanced, we prefer not to intervene. We consider this is consistent with the principle that regulatory activity should be targeted only at cases where action is needed.

4.207 In the present case, our analysis indicates that the introduction of SJ-MPF is likely to result in a small overall net cost, taking into account quantified costs and benefits. As our higher scenarios illustrate, it would be possible, if circumstances were sufficiently favourable, for there to be an overall net benefit, although it is somewhat more likely that there would be a larger net cost. However, even in the higher scenarios, we estimate that any overall net benefit is most likely to be small. For example, even in the medium-high scenario, we consider that the quantified net benefit is equivalent to less than 0.1% of the annual MPF line rental. Additionally, we have concluded that any unquantified net benefits are unlikely to be material and there are likely to be some unquantified costs. In the light of this, even if there were a slightly positive net quantified benefit in the base case (which there is not) it would not follow that there

²⁵¹ TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 2.49, page 11

²⁵² TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 3.7, page 13

²⁵³ TalkTalk’s response to the Provisional Conclusions, 16 October 2013, paragraph 3.7, page 13

would necessarily be a clear case for intervention to require SJ-MPF, taking into account the aforementioned regulatory principles.²⁵⁴

Final view on Step 2: in light of our duties, are there any other relevant factors we should take into account in deciding whether or not to direct Openreach to provide SJ-MPF?

- 4.208 Our consideration of Openreach's and TalkTalk's submissions on Step 2 of our Provisional Conclusions has not led us to alter the range of factors we should take into account.
- 4.209 We have reconsidered the treatment of risk, competition effects, other effects on consumers and regulatory considerations in our final assessment of Step 2.
- 4.210 A number of points in respect of risk have been captured in our revised quantified CBA. We continue to consider that the risk is asymmetric because, for example it is more likely that usage of SJ-MPF would be lower than we calculated in our base case than higher. In addition, there is some risk that the introduction of SJ-MPF would be later than assumed in our medium scenario, but a smaller possibility that it could be introduced earlier. We have taken this into account in reaching an overall view on the likely implications of introducing SJ-MPF.
- 4.211 We have concluded that the effects on competition of introducing SJ-MPF are unlikely to be material, given that they depend primarily on the magnitude of any net cost savings arising from SJ-MPF, and these are most likely to be negative. In general, competition benefits tend to be larger where there is no similar or substitute product so that there is enhanced scope for competition and innovation. That is not the case here: DJ-MPF enables the provision of the same services as SJ-MPF and at the same level of the supply chain. The main question we have considered, therefore, is whether SJ-MPF is likely to result in net cost savings or not.
- 4.212 We reconsidered TalkTalk's view that SJ-MPF will result in fewer faults due to fewer jumpers. We continue to take the view that this needs to be balanced against the additional engineering complexity and the possibility of a worse customer experience for end users due to the need to operate two different ways of providing MPF in parallel.
- 4.213 Lastly, we have reconsidered regulatory considerations, in the light of points made by TalkTalk and our revised quantified assessment. We take the view that issues concerning Openreach's incentives are already adequately addressed in the SMP conditions, so ought not to be separately taken into account in our final decision. We also note that we have interpreted the outcome of our quantified assessment (which is in any event negative) in the light of regulatory principles, including that the case for intervention must be clear.

²⁵⁴ For comparison, see Ofcom's approach in its Statement '*Routing calls to ported telephone numbers*', 1 April 2010, paragraphs 1.9 to 1.11

Step 3. Should Ofcom make any declaration setting out the rights and obligations of the Parties under s190(2)(a) of the Act or give any direction fixing the terms and conditions of the provision of SJ-MPF under s190(2)(b) and/or (c) of the Act?

Ofcom's final views

- 4.214 In Step 1, we concluded that we did not believe the quantifiable benefits of introducing SJ-MPF would outweigh the quantifiable costs over a reasonable time horizon. In two of the five scenarios we considered was there a positive NPV for the incremental cost saving from SJ-MPF over DJ-MPF, but in three scenarios there was not, and we noted an asymmetry such that we considered the higher scenarios were less likely than the lower ones.
- 4.215 In Step 2, we considered the likely effect of a number of further factors, namely treatment of risk, competition effects, other effects on consumers, and regulatory considerations.
- 4.216 We considered whether the likely effect of the factors in Step 2 should lead us to conclude that Openreach should be required to provide SJ-MPF. Our conclusion was that these factors taken together were not likely to have a sufficiently significant positive effect to outweigh the findings in Step 1 that providing SJ-MPF would be NPV negative on most reasonable assumptions. As a result, we concluded that SJ-MPF would be unlikely to reduce forward looking economic costs.
- 4.217 We received no specific representations from Openreach or TalkTalk concerning Step 3. Accordingly, our final view is that we should not direct Openreach to offer SJ-MPF, and that there is no need either to direct Openreach as to the terms and conditions of the provision of SJ-MPF, or to offer guidance on the principles that might apply to the pricing of SJ-MPF were it provided. However, we continue to consider it would be appropriate to make a declaration that in not providing SJ-MPF, Openreach is not in breach of SMP conditions FAA1 and FAA9.

Step 4. Was there any breach of FAA2 regarding Openreach's process in handling the original request and if there was should Ofcom make any declaration setting out the rights and obligations of the Parties in relation to FAA2 under s190 (2)(a) of the Act?

- 4.218 In our Provisional Conclusions at paragraphs 3.65 to 3.66 we discussed the relevance of FAA2. We also explained that Openreach's and TalkTalk's arguments concerning FAA2, and our provisional view that FAA2 does not apply instead of, rather than in addition to, FAA1. We referred to the explanation provided in the 2010 WLA Statement which describes the FAA2 requirement as, "*an accompaniment to the obligation on BT to meet all reasonable requests for new network access*" (paragraph 5.28 – emphasis added).
- 4.219 We provisionally concluded that it would not be appropriate for Ofcom to make a declaration in relation to this condition under section 190(2)(a).

TalkTalk's submissions

- 4.220 TalkTalk makes a number of comments in relation to our Provisional Conclusions regarding the handling of its SOR by Openreach. It agreed with Ofcom's approach insofar as it viewed FAA2 as an accompaniment rather than an alternative to FAA1.

However, it argues that Ofcom's assessment of Openreach's handling of its complaint was too narrowly focussed on the question of whether there was a breach of FAA2.

- 4.221 TalkTalk characterises Openreach's handling of its SOR principally as a potential breach of FAA1. FAA1 requires the provision of Network Access on 'reasonable request' by a third party CP. TalkTalk considers both that its request was 'reasonable' and that Openreach failed adequately to consider whether it was reasonable.
- 4.222 TalkTalk makes a number of comments concerning Openreach's behaviour in assessing its request which it concludes "*demonstrate clearly that Openreach did not discharge its obligation under FAA1 to properly assess whether TalkTalk's request was reasonable and if so provide the product*".²⁵⁵
- 4.223 In particular, TalkTalk argues that Ofcom's analysis demonstrated that "*Openreach's model... was error-strewn and not fit for purpose*".²⁵⁶ It also notes that, "*Openreach refused to disclose significant and important details about its model and continued to assert that their model showed a negative NPV value*".²⁵⁷ As particular examples of defects in Openreach's model, TalkTalk referred to the inclusion of common costs which were not incremental, inclusion of irrelevant revenue impacts, overstatement of TAM costs, ignoring the opportunity to top-up, insistence on the use of EvoTAMs, failure to refer to geo-types, exclusion of frame cost savings in one model, the assumption connections equal net adds, and the absence of a feasibility study.

Ofcom's response

- 4.224 It is evident that TalkTalk and Openreach characterised FAA1, FAA2 and the interaction between these two conditions in different ways, and this determination gives an opportunity to add clarity. As noted in our Provisional Conclusions, FAA2 is an accompaniment rather than an alternative to FAA1. FAA1 relates to the obligation on BT to provide network access in response to a reasonable request. In this context, a request is reasonable if it would be reasonable to expect BT to provide access. FAA2 seeks to ensure there is a reasonable and transparent process in place to analyse such requests. There could be circumstances where BT was compliant with FAA1 but not FAA2, or vice versa.
- 4.225 It is clear that Ofcom's analysis differed from Openreach's model (as well as TalkTalk's approach) in a number of ways, with an impact on the magnitude (although not, on the base case, the direction) of the NPV output. As noted above, this tends to confirm that it was appropriate for Ofcom to handle the dispute, since a fresh SOR assessed by Openreach under its model would have been unlikely to lead to a prompt and satisfactory resolution.
- 4.226 However, we do not agree with TalkTalk that our focus on FAA2 in relation to Openreach's handling of the original request was unduly narrow. TalkTalk's original dispute submission focussed on the substantive issues of whether Openreach ought to provide SJ-MPF going forward based on figures which TalkTalk had revised since its original SOR. Openreach itself raised FAA2 in relation to historic handling of the SOR, and TalkTalk indicated it may, additionally, be relevant. We focussed on this in relation to the original request and on FAA1 in relation to the substantive issue going forward.

²⁵⁵ TalkTalk's response to the Provisional Conclusions, 16 October 2013, page 16

²⁵⁶ TalkTalk's response to the Provisional Conclusions, 16 October 2013, page 14

²⁵⁷ TalkTalk's response to the Provisional Conclusions, 16 October 2013, page 14

- 4.227 We note the differences between Openreach's approach and Talk Talk's approach, and in light of our analysis in this dispute consider that some (but not all) of these could have appropriately been resolved through effective engagement between the parties. However, we remain of the view that we have not received sufficient evidence that BT breached any of the specific obligations under FAA2, including the requirement at FAA2.4 for Openreach to follow its own guidance. Accordingly, we conclude that BT did not breach FAA2.

Section 5

Final Conclusions

Ofcom's final conclusions

- 5.1 As noted in section 4, the quantified cost-benefit analysis that we undertook in light of the responses to the Provisional Conclusions confirmed our Provisional Conclusions that moving to SJ-MPF would be more likely to increase the forward looking industry-wide incremental costs of MPF than to reduce them.
- 5.2 We made several changes to our model in light of responses to our Provisional. These included changing the threshold for 'Group 2' exchanges, introducing residual asset values, increasing the number of jumper removals per disconnection from 0.35 to 0.67, increasing jumpering work savings from [£<] to [£<] per jumper, and including engineer training costs.
- 5.3 Although we were able to quantify engineer training costs, and had a clearer picture of the EMP work stack and likely development period, following information provided by Openreach, information on the costs and risks of running two processes remained uncertain, and we could not readily quantify these possible costs and risks.
- 5.4 We also considered the wider factors that should be taken into account in addition to the projected incremental cost differences, notably risk, competition effects, other effects on consumers, and regulatory considerations. We noted in particular the risk that the volumes, upon which the quantified DCF output is particularly dependent, might not materialise, that the start date is more likely to be delayed than brought forward and our expectation that there would be limited (if any) competition effects. These lent further support to the quantified analysis in suggesting that a positive net benefit was less likely than a net cost.
- 5.5 Our analysis does not indicate that material benefits to competition would be likely to arise from the introduction of SJ-MPF. Firstly, our analysis indicates that SJ-MPF is unlikely to be a more efficient way to provide MPF. Secondly, it is only through a combination of favourable assumptions, which we consider unlikely, that SJ-MPF appears to increase efficiency. But even then, the NPV in our high case scenario equates to only 21p per MPF line per annum, or 1.75p per line per month. Both TalkTalk and Sky would need to use SJ-MPF to the level assumed, the cost savings on frames and jumpers would have to be at the maximum extent modelled and, in addition, we would need to assume the full fourteen year period for this level of benefit to arise. Third, we cannot be certain that these benefits would be passed in full to consumers through lower retail prices, noting also the small percentage of total MPF prices that any such benefit might represent. Therefore, it is unclear that any benefit would be passed on to consumers or that any benefit that is passed on would be material.
- 5.6 Accordingly, having regard to our statutory duties and regulatory principles, our final conclusion is that SJ-MPF is unlikely to be a more efficient way of delivering MPF than the status quo (DJ-MPF), and the other relevant factors we had taken into consideration did not alter this conclusion. We therefore consider that we should not require BT to develop and offer SJ-MPF to comply with SMP conditions FAA1 or FAA9, or otherwise. We therefore conclude in relation to Step 3 that it is not necessary to consider a direction under section 190(2)(b) or (c) to fix the terms and conditions of the provision of SJ-MPF.

Statement and Determination concerning a dispute between TalkTalk and Openreach relating to single jumpered MPF

- 5.7 Instead we have concluded that BT's decision not to offer SJ-MPF, as an alternative to the currently provided DJ-MPF, is compliant with its regulatory obligations. Our assessment is therefore that we should make a declaration under section 190(2)(a) that BT is not required to develop and offer SJ-MPF.
- 5.8 We also conclude, in relation to Step 4, that Openreach did not breach FAA2 in the handling of the SOR and it would not be appropriate for Ofcom to make a declaration in relation to this condition under section 190(2)(a).

Assessment of consistency of Ofcom's conclusion with our statutory duties and Community obligations

- 5.9 In conducting our final analysis, we have considered our general duties in section 3 of the Act and also the six "Community requirements" set out in section 4 of the 2003 Act, which give effect, among other things, to the requirements of Article 8 of the Framework Directive.
- 5.10 In particular, we have had regard to:
- 5.10.1 our duty to further the interests of citizens (i.e. all members of the public in the United Kingdom) in relation to communications matters and to further the interests of consumers in relevant markets, where appropriate by promoting competition (section 3(1));
 - 5.10.2 our duty to have regard to the principles under which regulatory activities should be transparent, accountable, proportionate, consistent and targeted only at cases in which action is needed; as well as any other principles appearing to Ofcom to represent best regulatory practice (section 3(3)); and
 - 5.10.3 our duty to promote competition (section 4(3)) and to encourage, to the extent Ofcom considers it appropriate, the provision of network access and service interoperability for the purposes of securing efficiency and sustainable competition in communications markets, efficient investment and innovation and the maximum benefit for the customers of communications network and services providers (sections 4(7) and 4(8)).
- 5.11 We consider that our final determination is consistent with these duties, for the reasons explained throughout this document.
- 5.12 In setting out our final determination, we have kept in mind our duty under subsection 3(3)(a) of the 2003 Act to ensure that our regulatory activities are, among other things, transparent, accountable, proportionate and targeted only at cases where action is needed. In particular, this document sets out the Parties' arguments and the reasoning that underpins our provisional assessment, and the Parties had an opportunity to comment on this in advance of our final determination of the Dispute.

Annex 1

Determination

Dispute between TalkTalk and BT

Determination under sections 188 and 190 of the Communications Act 2003 (“2003 Act”) for resolving a dispute between TalkTalk Telecom Group plc (“TalkTalk”) and British Telecommunications plc (“BT”) concerning whether BT should be required to develop and offer single jumpered metallic path facility (“SJ-MPF”) in addition to its existing double jumpered metallic pathway facility (“DJ-MPF”).

WHEREAS—

(A) section 188(2) of the 2003 Act provides that, where Ofcom has decided pursuant to section 186(2) of the 2003 Act that it is appropriate for it to handle the dispute, Ofcom must consider the dispute and make a determination for resolving it. The determination that Ofcom makes for resolving the dispute must be notified to the parties in accordance with section 188(7) of the 2003 Act, together with a full statement of the reasons on which the determination is based, and Ofcom must publish so much of its determination as (having regard, in particular, to the need to preserve commercial confidentiality) they consider appropriate to publish for bringing it to the attention of the members of the public, including to the extent that Ofcom considers pursuant to section 393(2)(a) of the 2003 Act that any such disclosure is made for the purpose of facilitating the carrying out by Ofcom of any of its functions;

(B) section 190 of the 2003 Act sets out the scope of Ofcom’s powers in resolving a dispute which may, in accordance with section 190(2) of the 2003 Act, include—

- making a declaration setting out the rights and obligations of the parties to the dispute;
- giving a direction fixing the terms or conditions of transactions between the parties to the dispute;
- giving a direction imposing an obligation, enforceable by the parties to the dispute, to enter into a transaction between themselves on the terms and conditions fixed by Ofcom; and
- for the purpose of giving effect to a determination by Ofcom of the proper amount of a charge in respect of which amounts have been paid by one of the parties to the dispute to the other, giving a direction, enforceable by the party to whom sums are to be paid, requiring the payment of sums by way of adjustment of an underpayment or overpayment;

(C) TalkTalk first issued a Statement of Requirement (“SOR”) to BT concerning development and offering of SJ-MPF in October 2010, and issued a second such SOR in May 2012, which was rejected by BT in December 2012;

(D) on 25 June 2013, TalkTalk submitted a dispute with BT to Ofcom for resolution;

(E) on 17 July 2013, Ofcom decided that it was appropriate for it to handle the dispute, and informed the parties of this decision noting the scope of the dispute as being;

Statement and Determination concerning a dispute between TalkTalk and Openreach relating to single jumpered MPF

- whether, in providing MPF only on the basis of double jumpering in local exchanges and without developing and offering a single jumpering alternative on receipt of a request to do so, BT is compliant with its obligations under SMP Conditions set by Ofcom as a result of its review of the Wholesale Local Access market; and
- whether Ofcom should exercise its powers to make a declaration under section 190(2)(a) of the Communications Act 2003, and/or give a direction under section 190(2)(b) and/or section 190(2)(c) of the Communications Act 2003.

(F) on 18 July 2013, Ofcom published details of the dispute on its website and invited stakeholders with relevant information and evidence to submit this to Ofcom by 1 August 2013;

(G) in order to resolve this dispute, Ofcom has considered (among other things) the information provided by the parties and Ofcom has further acted in accordance with its general duties set out in section 3 of, and the Community requirements set out in section 4 of the 2003 Act;

(H) a fuller explanation of the background to the dispute and Ofcom's reasons for making this Determination is set out in the explanatory statement accompanying this Determination; and

NOW, therefore, Ofcom makes, for the reasons set out in the accompanying explanatory statement, this Determination for resolving this dispute—

Declaration of rights and obligations, etc.

1. It is hereby declared that BT is not required, as at the date of this Determination, to develop and/or offer SJ-MPF as an alternative to DJ-MPF. Consequently, it is not necessary to consider whether Ofcom should give a direction fixing the terms and conditions on which SJ-MPF should be offered to TalkTalk or any other party.

Binding nature and effective date

2. This Determination is binding on TalkTalk and BT in accordance with section 190(8) of the 2003 Act, and shall take effect on the day it is published.

Interpretation

3. For the purpose of interpreting this Determination—
 - (a) headings and titles shall be disregarded; and
 - (b) the Interpretation Act 1978 shall apply as if this Determination were an Act of Parliament.
4. In this Determination—
 - (a) "2003 Act" means the Communications Act 2003 (c.21);

Statement and Determination concerning a dispute between TalkTalk and Openreach relating to single jumpered MPF

- (b) "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 by section 1159 of the Companies Act 2006;
- (c) "Ofcom" means the Office of Communications;
- (d) "TalkTalk" means TalkTalk Telecom Group PLC whose registered company number is 7105891, and any of its subsidiaries or holding companies, or any subsidiary of such holding companies, all as defined by section 1159 of the Companies Act 2006.



Neil Buckley

Director, Competition Investigations

A person duly authorised in accordance with paragraph 18 of the Schedule to the Office of Communications Act 2002

15 November 2013

Annex 2

Technical background on single and double jumpering services

Introduction

- A2.1 This annex outlines the equipment and activities involved in providing MPF under both the existing Double Jumpering and potential Single Jumpering configurations. Before describing these activities, we will first provide some background on how local loop unbundling (LLU) and particularly full unbundling (via Metallic Path Facility (MPF)) services are provided and describe the equipment involved. The final section discusses the different jumpering arrangements required for various MPF provisioning scenarios.
- A2.2 This annex contains information that was provided by BT prior to our s191 Notices on the matter.²⁵⁸

Local Loop Unbundling in the Local Exchange

- A2.3 Within each of BT's local exchanges, flexibility points allow lines to be connected to and switched between different equipment in the exchange. This flexibility has allowed LLU, where other communications providers (CPs) locate their own equipment in BT's local exchanges, and end-users can then be directly connected to these CPs.
- A2.4 BT offers two primary products for LLU, namely MPF (see Figure A2.1) and Shared MPF, also known as SMPF (see Figure A2.4). MPF facilitates the provision of telephony and broadband services by connecting telephony lines with a CP's network. SMPF facilitates the provision of broadband services by a different CP to BT whilst BT continues to provide voice services via the Wholesale Line Rental (WLR) service. The line is connected to the broadband CP's network, which passes the voice signals back to BT's voice network.
- A2.5 The CP, also referred to as the LLU Operator, deploys telecommunications equipment for the provision of telephony and broadband services. The most common types of equipment deployed are Digital Subscriber Line Access Multiplexers (DSLAMs), for the provision of broadband services, or Multi-Service Access Nodes (MSANs), for the provision of telephony and/or broadband services.
- A2.6 This annex focuses on two possible configurations of MPF, namely the Double Jumpered Metallic Path Facility ("DJ-MPF"), which is currently used, and the Single Jumpered Metallic Path Facility ("SJ-MPF"). More specifically, it explains the activities required to establish the physical connections between network elements for the provision of MPF.
- A2.7 Depending on the configuration, some of the following network elements are used:

²⁵⁸ Openreach's response to confirmation questions, 2 August 2013

Telephone Line (line)

- A2.8 The telephone line consists of a pair of copper cables connecting the Local Exchange to the end user. Every line is terminated by a fixed connection at the Main Distribution Frame.

Main Distribution Frame (MDF)

- A2.9 The Main Distribution Frame (MDF) serves as the flexibility point for connecting telephone lines with operators' equipment, using jumper cables, also called jumpers.

Main Distribution Frame Block (MDF block)

- A2.10 The MDF consists of blocks, each MDF block providing the termination points to facilitate the connection of telephone lines with the required network elements. Each MDF block has a capacity of 100 pairs.

MDF Jumper Cable (jumper)

- A2.11 A jumper is a flexible pair of copper wires. A jumper provides the connection between any two copper pairs being terminated on the MDF blocks. The MDF blocks provide appropriate connectors that facilitate the connection and removal of jumpers.
- A2.12 Jumper cables are added and/or removed for the provision of different services.
- A2.13 When a service is suspended or stopped, jumpers can be left in place with services being suspended on the CP's equipment, deferring the jumper removal step, so that the line can be reactivated efficiently, within a short period of time, with minimal cost or disruption. This is called a soft-cease (or flexi-cease), and the line is referred to as a 'stopped-line'. During a soft-cease, the ports on the equipment (e.g. MSAN port, TAM port) remain reserved for use with the particular line. Depending on demand for ports, soft-ceased lines may eventually be ceased and jumpers removed through a clean-up process.
- A2.14 Once a jumper is disconnected, it may be removed. However, in exchanges, where a high number of jumper cables are installed, jumpers may not be physically removed from the MDF to avoid damaging other connections. The jumper is disconnected from the blocks to which it connects but is physically left in the frame.

Handover Distribution Frame (HDF)

- A2.15 A Handover Distribution Frame terminates and interconnects the tie cables coming from the CP's equipment with the tie cables coming from the MDF. The HDF represents a demarcation point between BT's network and the CPs' network. Tie cables are connected to the HDF with connectors, with covers used where appropriate.

Tie Cable

- A2.16 Tie cables are used to connect between different pieces of equipment, between equipment and frames (e.g. the MDF) and between frames.

Statement and Determination concerning a dispute between TalkTalk and Openreach relating to single jumpered MPF

A2.17 A single tie cable may provide 32, 64 or 100 lines (copper pairs).²⁵⁹ The capacity of the tie cable is typically chosen to match the capacity of a corresponding connector on the CP's equipment.

Test Access Matrix (TAM)

A2.18 A Test Access Matrix (TAM) is a system that facilitates testing telephony lines. BT currently uses two different types of TAMs, the standard TAM and the evoTAM.

A2.19 A standard TAM comprises one or more standard TASM units, one or more test head units and a master controller unit, each of which is explained below. The operation of the standard TAM is based on the master controller unit efficiently managing and coordinating the use of TASMs and test heads.

A2.20 An evoTAM comprises one or more evoTASM units,²⁶⁰ one or more test head units and a master controller unit. The operation of the evoTAM is based on the same principle as that of a standard TAM.

Test Access Switch Matrix (TASM)

A2.21 A TAM or evoTAM includes one or more Test Access Switch Matrix (TASM) units. A TASM is a special type of switch that facilitates testing of the line from the end user to the CP's equipment. A TASM provides multiple line ports, each line port serving a single line.

A2.22 The TASM mediates between the telephone line and the CP's equipment, making it possible to test (a) the line segment from the TASM to the end user, (b) the line segment from the TASM to the CP's equipment and (c) both segments together, while the line is in use. When not being tested, a line passes through the TASM.

A2.23 When a line needs to be tested, the TASM's switch connects the line to the appropriate test head (explained below), which tests the line. To facilitate the efficient allocation of lines to test heads, tests are scheduled and controlled by a master controller (also explained below).

A2.24 A standard TASM requires reserving one copper pair from each 100-pair tie cable,²⁶¹ for testing purposes. Hence, ninety nine (99) pairs can be used per tie cable.²⁶² There is no such requirement with an evoTASM.

A2.25 The standard TAM is used with the current MPF product, which is based on the double jumpering approach. The inputs and outputs of each port are connected by tie cables to the MDF. The evoTAM is used in an 'in-line' configuration, where the inputs are connected by a tie cable to the MDF and the outputs are connected via a tie cable to the CP-specific HDF. This in-line configuration is currently used by BT when connecting SMPF lines to its broadband equipment,²⁶³ but is not currently used by other CPs purchasing MPF.

A2.26 The characteristics of standard TASMs and evoTASMs are illustrated in Table A2.1.

²⁵⁹ In relation to LLU products, Openreach provides tie cables of 32, 64 and 100 lines. Cables of different capacity could also be used, if more appropriate.

²⁶⁰ An evoTASM (unit) is also referred to as an evoTAM sub-rack.

²⁶¹ A single end-user is connected via a twisted copper pair, therefore a '100-pair tie cable' provides capacity for 100 end-users.

²⁶² Openreach's response to s191 notice, 16 August 2013, page 1

²⁶³ This approach is used for its Wholesale Broadband Connect (WBC) service.

Table A2.1: Standard TASM and evoTASM characteristics

TASM Characteristics	Standard TASM	evoTASM
Connectors per Unit	8	6
Ports per Connector	25	32
Ports per Unit	200 (8 sockets x 25 pairs) 198 usable + 2 for testing ²⁶⁴	192 (6 sockets x 32 pairs) ²⁶⁵ All usable ²⁶⁶
Test head Type	Narrowband only	Narrowband only
TASM units per Rack	8 units or 7 units + Master Controller	9 units or 7 units + Master Controller

Test Head

A2.27 For a line to be tested, the TASM connects the appropriate segment(s) of the line to a specialised piece of equipment called the test head. A TASM may be capable of supporting multiple test heads, allowing the concurrent testing of multiple lines.

A2.28 BT has indicated that a test head is allocated to serve up to 5,000 lines.²⁶⁷

Master Controller

A2.29 To support a large number of lines served by a local exchange, multiple test heads and TASMs are typically used. The TAM's master controller is responsible for the efficient operation of the TASMs and the efficient allocation of test heads to TASM ports.

A2.30 A standard TAM master controller can support up to 9,800 lines and an evoTAM master controller can support up to 13,824 lines.²⁶⁸

Rack

A2.31 A rack can house eight standard TASM units (i.e. 8 x 200 TAM ports), or seven standard TASM units and one master controller.

A2.32 A rack can house nine evoTASM units (i.e. 9 x 192 ports) or seven evoTASM units and one master controller.

Rack Shelf

A2.33 Rack shelf is the expression we will use in this document to describe rack space, where a single standard TASM or evoTASM could be installed.

Equivalence Management Platform (EMP)

A2.34 The Equivalence Management Platform is a BT system providing CPs with access to BT's ordering, procurement, fault reporting, billing and other operations support

²⁶⁴ Openreach's response to s191 notice, 16 August 2013, page 1

²⁶⁵ Openreach's response to s191 notice, 16 August 2013, page 1

²⁶⁶ Openreach's response to s191 notice, 16 August 2013, page 2

²⁶⁷ Openreach's response to Ofcom's follow up questions to the s191 notice, 4 September 2013

²⁶⁸ Openreach's response to Ofcom's follow up questions to the s191 notice, 4 September 2013

systems. When a new product is developed by Openreach, the EMP is updated to provide the required additional functionality. Major updates on the EMP are scheduled and undertaken periodically by Openreach, every six months.

A2.35 To support SJ-MPF, development of the EMP would be required.²⁶⁹ Furthermore, CPs may have to adapt their systems to support SJ-MPF as a new product, e.g. to allocate tie pairs to TAM ports.

Double Jumpered Metallic Path Facility (DJ-MPF)

A2.36 The current configuration for DJ-MPF is illustrated in Figure A2.1. Three tie cables (A, B, C) and two jumpers are required.

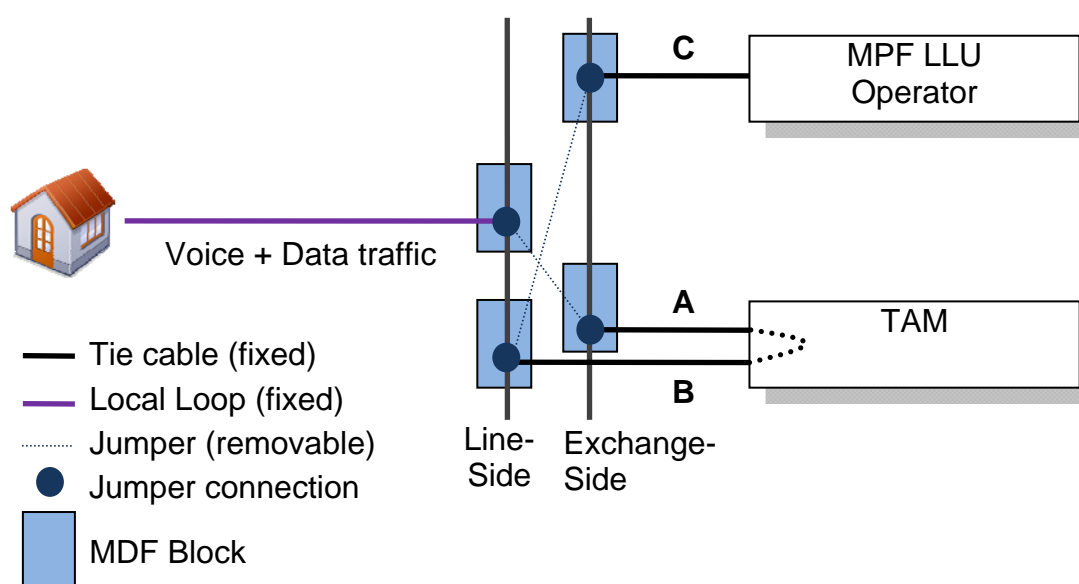


Figure A2.1: Standard (Double Jumpered) MPF Configuration

Table A2.2: Double jumpered MPF configuration characteristics²⁷⁰

Configuration Characteristics	Standard TAM	evoTAM
Minimum 'C' Tie Cables Required	N/A	N/A
Tie Cable 'C' Capacity	100 pairs	N/A
Tie Cable 'C' Max. Utilisation	Up to 100 pairs (depends on CP)	N/A
Tie Cables 'A' / 'B' Capacity	100 pairs (99 utilised, 1 for testing)	N/A
Tie Cable 'A' / 'B' Max. Utilisation	99 pairs	N/A
Minimum 'A' / 'B' Tie Cables Required	2 tie cables	N/A

²⁶⁹ Openreach's response to s191 notice, 16 August 2013, pages 3-4

²⁷⁰ Openreach's response to s191 notice, 16 August 2013, page 1

- A2.37 In double jumpered MPF, when a TASM unit (200 ports) is deployed, two 'A' tie cables connect the inputs of the TASM ports to two 100-pair MDF blocks on the Exchange-Side of the MDF. Similarly, two 'B' tie cables connect the outputs of the TASM ports to two 100-pair MDF blocks on the Line-Side of the MDF. In this configuration, TAM capacity (and the capacity of the associated tie cables) is managed by Openreach and TAMs can be used to serve all CPs in the exchange.
- A2.38 The TAMs are placed as close as possible to the MDF in the main exchange area. This reduces the complexity of surveying (e.g. cable runs) and reduces the TAM installation cost.
- A2.39 The CP is responsible for managing the utilisation of tie cable 'C'. One or more 100-pair tie cables may be used.²⁷¹ The CP orders these tie cables from Openreach. On receipt of the order, the tie cable(s) is/are installed and terminated on (a) previously unused or new MDF block(s), on the Exchange-Side of the MDF.
- A2.40 When an MPF new provide order is received, Openreach provides two jumpers (see Figure A2.1). The connection of the line to a TASM port is achieved by installing a jumper from the termination point of the line on the Line-Side of the MDF to the termination point where the relevant TASM port is connected via tie cable 'A' on the Exchange-Side of the MDF. To connect the telephone line to the CP, a jumper is installed from the termination point of tie cable 'B' on the Line-Side of the MDF to the termination point of the relevant pair on tie cable 'C' on the Exchange-Side of the MDF. The CP allocates the relevant pair on tie cable 'C' to which the line should be connected.
- A2.41 In the DJ-MPF configuration, the purpose of the first jumper is to provide a flexibility point for the connection of a telephone line to a TASM port, irrespective of CP, while the purpose of the second jumper is to provide the flexibility of connecting to the equipment of the appropriate CP. Hence, one of the jumpers in DJ-MPF facilitates sharing of the TAM between different CPs.

Single Jumpered Metallic Path Facility (SJ-MPF)

- A2.42 The proposed configuration for SJ-MPF is illustrated in Figure A2.2. The main elements are the telephone line (from the exchange to the end user), the MDF, the TAM or evoTAM, the LLU operator's equipment, fixed tie cables (D, E) and one jumper cable on the MDF.

²⁷¹ Openreach's response to s191 notice, 16 August 2013, page 1

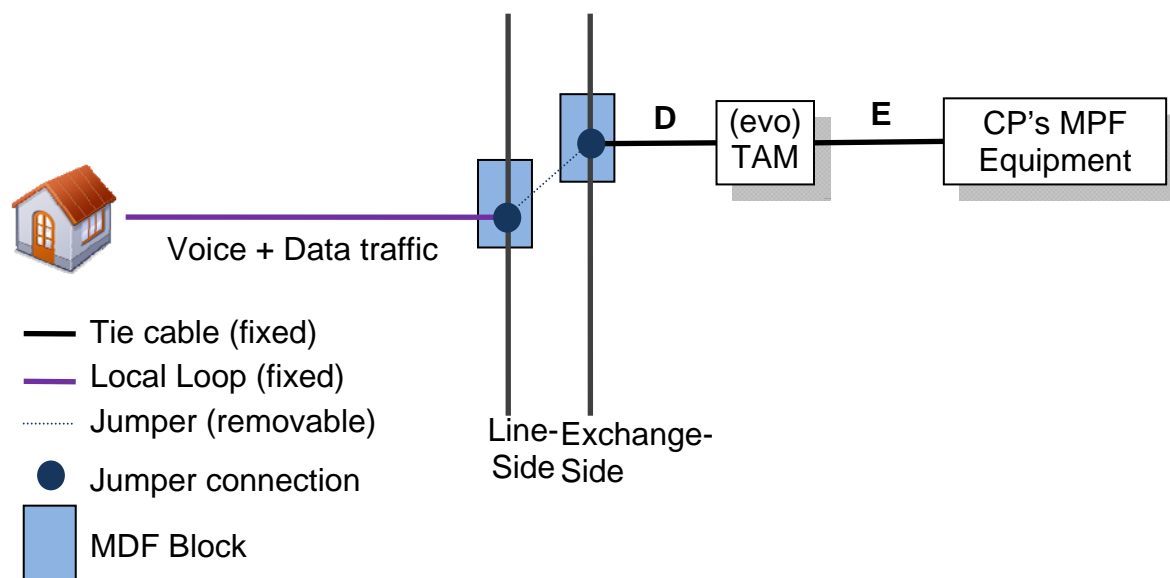


Figure A2.2: Single Jumpered MPF Configuration

- A2.43 To connect the telephone line to a particular CP, a single jumper cable is installed from the appropriate termination point of the MDF on the Line-Side to the corresponding termination point of the MDF on the Exchange-Side.
- A2.44 Because the TAM is provided 'in-line', CPs would have to allocate copper pairs of tie cables 'D' and 'E' to the MDF termination points and/or the TASM ports and maintain inventory records for TASM port allocation. In-line TAMs would ideally be located in between the MDF and the CPs' equipment in the co-mingling space. TAM rack installation surveys could take relevant CP equipment locations, as well as the location of the MDF, into consideration. CPs' equipment could be located in different comingling areas, which could be on different levels within the exchange building.
- A2.45 In SJ-MPF, each CP would have to manage the utilisation of its own in-line TAM.
- A2.46 In the following paragraphs, we present two different SJ-MPF options: standard TAM or evoTAM.

SJ-MPF with standard TAM

- A2.47 When a standard TAM is deployed in an in-line installation, two 100-pair 'D' tie cables and two 100-pair 'E' tie cables are required to connect the input and output lines of each of the 200 ports on the TASM.
- A2.48 A standard TAM requires reserving one pair per tie cable for testing purposes. Hence, it allows the use of the remaining 99 pairs on each of the tie cables.²⁷²
- A2.49 Each tie cable connects to the TASM's inputs or outputs by use of four 25-pair connectors. The two 'D' tie cables connect the TASM's inputs to empty/new MDF blocks, on the Exchange-Side. The two 'E' tie cables connect the TASM's outputs to the CP's equipment.

²⁷² Openreach's response to s191 notice, 16 August 2013, page 1

A2.50 To support SJ-MPF in an exchange using standard TAMs, an additional (new) master controller would have to be deployed to support the in-line configuration.²⁷³ This is because existing TAMs and master controllers could not support both in-line SJ-MPF and the current DJ-MPF configuration.

SJ-MPF with evoTAM

A2.51 An evoTASM provides 192 ports. Hence, when deployed, six 32-pair 'D' tie cables are also deployed,²⁷⁴ while the number of 'E' tie cables deployed depends on the capacity of the tie cables selected by the CP. The 'E' tie cables may combine 32-pair, 64-pair and 100-pair tie cables, as long as the total number of pairs provided by the tie cables are sufficient for the 192 ports provided by the evoTASM.²⁷⁵

A2.52 Unlike standard TASM, an evoTASM does not reserve any ports for testing; hence evoTASMs allow all 192 ports to be used.

A2.53 A tie cable can be connected to an evoTASM using 32 pair connectors.²⁷⁶ The number of connectors used per tie cable will depend on the cable capacity. Six 'D' tie cables connect the TASM's inputs to 192 termination points on MDF Blocks, on the Exchange-Side. The 'E' tie cables connect the TASM's outputs to the CP's equipment.

Table A2.3: Single jumpered MPF configuration characteristics²⁷⁷

Configuration Characteristics	Standard TAM (in-line)	evoTAM
Tie Cable 'D' Capacity	100 pairs	32 pairs
Tie Cable 'D' Maximum Utilisation	99 pairs (1 pair used for testing)	32 pairs on 32-pair cable
Minimum 'D' Tie Cables Required (on TAM/evoTAM deployment)	2 tie cables	6 tie cables
Tie Cable 'E' Capacity	100 pairs	32 or 64 or 100 pairs
Tie Cable 'E' Maximum Utilisation	Up to 99 pairs (1 pair used for testing. Utilisation of the remaining ports depends on CP)	32 pairs on 32-pair cable 64 pairs on 64-pair cable 96 pairs on 100-pair cable (Depends on CP)
Minimum 'E' Tie Cables Required (on TAM/evoTAM deployment)	2 tie cables	6 x 32-pair tie cables, or 3 x 64-pair tie cables 2 x 100-pair tie cables

A2.54 Openreach tell us that if evoTAMs are used for the provision of SJ-MPF, no new master controller units would be required.²⁷⁸

²⁷³ Openreach's response to s191 notice, 16 August 2013, page 3

²⁷⁴ We note this is the approach currently taken by Openreach in installing evoTAMs.

²⁷⁵ Openreach's response to s191 notice, 16 August 2013, page 1

²⁷⁶ Openreach's response to s191 notice, 16 August 2013, page 1

²⁷⁷ Openreach's response to s191 notice, 16 August 2013, page 1

²⁷⁸ Openreach's response to s191 notice, 16 August 2013, pages 3-4

A2.55 Openreach say that a rack can house nine 192-port evoTASM units, which reduces to seven 192-port units where a master controller is located in the rack. Existing evoTAMs could support up to 4 CPs per chain (or rack) without affecting test access. However, the CPs would need to be on separate evoTAM shelves.²⁷⁹ Additional racks would be needed if more than 4 CPs required connection at the same exchange.

MPF Provisioning Scenarios

A2.56 The number of jumpers that need to be installed or removed when an MPF line is provided will depend on whether it is a new connection or whether the line is being migrated from another CP's service. Hence, before discussing this, we need to introduce wiring arrangements for other relevant services, namely WLR and SMPF.

A2.57 WLR allows CPs to resell Openreach's voice telephony network infrastructure and services. SMPF allows the provision of broadband services using the CP's own equipment and voice telephony services using BT's network.

A2.58 For the provision of the WLR service on a telephone line, a jumper is installed on the MDF, connecting the telephone line with a fixed tie cable, leading to the telephony network (see Figure A2.3).

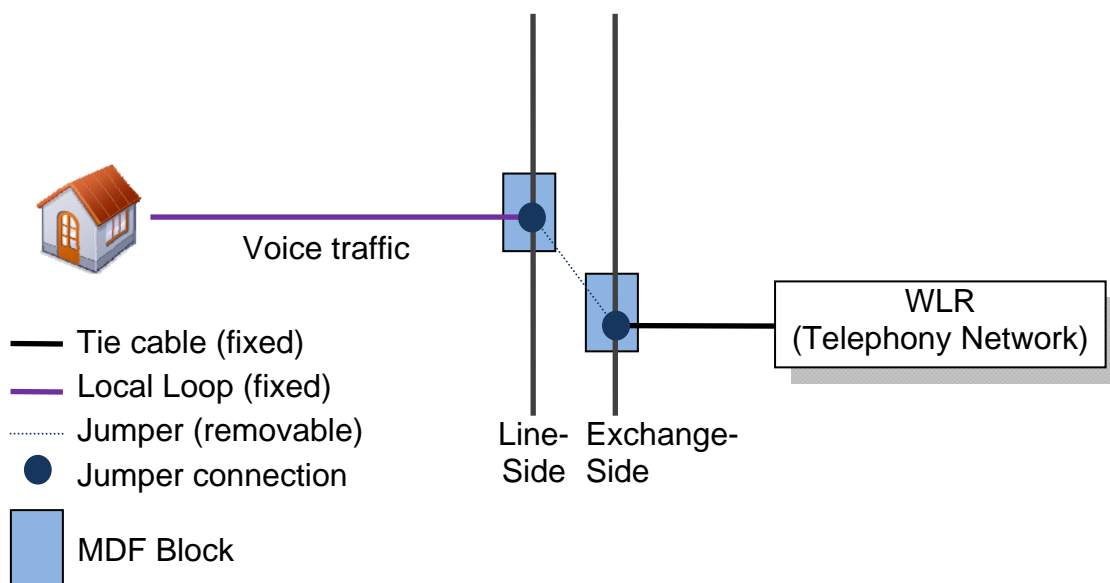


Figure A2.3: WLR Network Topology

A2.59 Figure A2.4 shows the configuration of WLR + SMPF. For the provision of the SMPF service on a telephone line, a jumper is installed on the MDF, connecting the telephone line via a tie cable to the CP's equipment. A splitter separates the broadband (data) signal from the telephony (voice) signal. The data signal is forwarded to the CP's broadband equipment, while the voice signal is forwarded, via a tie cable back to the MDF. Another jumper cable connects the voice-carrying line to the telephony network (via a third tie cable).

²⁷⁹ Openreach's response to Ofcom's follow up questions to the s191 notice, 28 August 2013

Statement and Determination concerning a dispute between TalkTalk and Openreach relating to single jumpered MPF

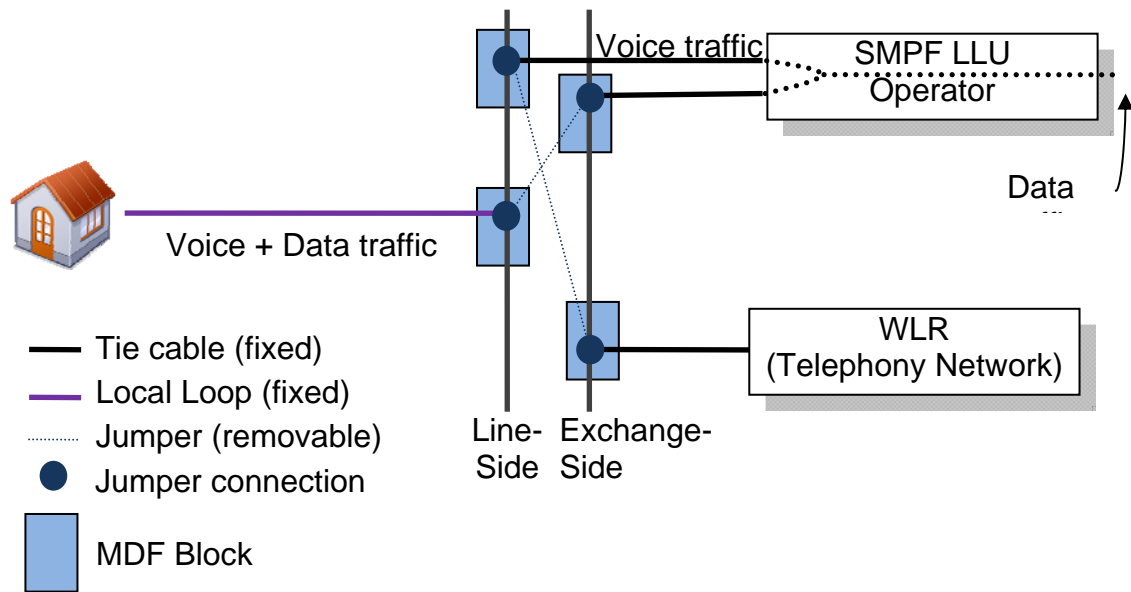


Figure A2.4: SMPF+WLR Network Topology

A2.60 Table A2.4 presents our understanding of jumpering activities undertaken on the MDF when DJ-MPF or SJ-MPF is provisioned, taking into consideration the type of provision and the previous product provided on the line, where applicable. We do not differentiate between the types of in-line TAM used in the SJ-MPF configuration, i.e. standard TAM or evoTAM, because the choice of TAM does not impact jumpering activities.

Table A2.4: Jumpering activities required for the provision of DJ-MPF and SJ-MPF.

Type of Order	Change of CP	From Product	To DJ-MPF		To SJ-MPF	
			Jumpers Added	Jumpers Removed	Jumpers Added	Jumpers Removed
New provision	N/A	N/A	2	0	1	0
Stopped Line Provide	Yes	DJ-MPF	1	1	1	2
	No	DJ-MPF	0	0	1	2
	Either	WLR	2	1	1	1
	Either	WLR+SMPF	2	2	1	2
Working Line Take-Over	Yes	DJ-MPF	1	1	1	2
	Yes	WLR	2	1	1	1
	Yes	WLR+SMPF	2	2	1	2
Singleton or Mass Migration	Yes	DJ-MPF	1	1	1	2
	Yes	WLR	2	1	1	1
	Yes	WLR+SMPF	2	2	1	2

A2.61 While the costs for different order types may differ, the jumpering activities may be the same. For example, the jumpering work required for singleton migrations is the same as for mass migrations, although other costs related to these types of order may be different.

Statement and Determination concerning a dispute between TalkTalk and Openreach relating to single jumpered MPF

- A2.62 A mass migration involves the migration of multiple lines on a single engineering visit to an exchange, typically saving travel time and administrative overheads, compared to singleton migrations.
- A2.63 A 'working line take-over' involves a new CP taking over a telephone line while the line is active, while a 'stopped line provide' involves a CP taking over a telephony line that was previously soft-ceased.
- A2.64 For 'stopped line provide' from DJ-MPF to DJ-MPF, we distinguish between two different cases. In the first case, a new CP re-activates the existing DJ-MPF line; in the second case the same CP re-activates the line without any jumpering work being required.
- A2.65 Taking into consideration that this dispute considers the use of SJ-MPF only for new provides, in cases where the same CP re-activates the line, we assume that a stopped DJ-MPF line would be re-started as DJ-MPF.

Annex 3

Cost benefit analysis of SJ-MPF and DJ-MPF

Introduction

- A3.1 In support of our assessment, we compared the industry-wide costs of providing new MPF demand using SJ-MPF with the counterfactual of continuing to meet all demand using DJ-MPF. We constructed a discounted cash flow (“DCF”) analysis of the forward looking incremental costs incurred by BT, TalkTalk and Sky from the provision and use of a SJ-MPF product.
- A3.2 The next section summarises the models we received in this dispute (from TalkTalk and Openreach) that assessed whether SJ-MPF should be required from Openreach. We reviewed the input volumes, costs and assumptions, which helped us to identify the key factors that will affect the DCF analysis.
- A3.3 We then explain why we felt none of the models we received were entirely suitable for our assessment of how SJ-MPF would affect the forward looking industry-wide incremental costs of MPF provision. We then explain our own model methodology, focusing first on its structure before going on to describe the key assumptions we have made. The final section presents the model’s outputs for different scenarios.

Parties’ models

- A3.4 As part of the Parties’ submissions, we received DCF models that considered the financial case for SJ-MPF compared to DJ-MPF. All models assessed the case for both an evoTAM and a standard TAM solution for SJ-MPF. A brief overview of the models we received in this dispute is provided below, followed by some more detail on each of the models, including a brief discussion of their strengths and weaknesses.
- 3.4.1 **TalkTalk Model:** The TalkTalk model considered forecast MPF volumes for Sky and TalkTalk, and used these to derive the volume of assets required to provide a service under both SJ-MPF and DJ-MPF configurations. The forecast asset volumes were then multiplied by unit costs to calculate total costs. The difference between these cash flows was then discounted to derive a net present value (“NPV”). TalkTalk’s model suggested the cost saving (over SJ-MPF) from a move to SJ-MPF would be NPV positive by £60m.
- 3.4.2 **Openreach (Industry View) Model:** Openreach provided two models. The first was an ‘industry view’ model. This forecast the difference in Openreach charges that a CP might incur if it purchased an SJ-MPF service compared to the current DJ-MPF service. These forecast charges were multiplied by forecast volumes and the resulting cash flow difference then discounted to

derive a NPV. This model suggested the move to SJ-MPF would not be NPV positive.²⁸⁰

- 3.4.3 **Openreach (Business Case) Model:** Openreach's 'business case' model forecast the changes to Openreach's revenues and costs that might result if a SJ-MPF service was introduced. This model assumed the same forecast volumes as for its industry view model. Again this model suggested the move to SJ-MPF would not be NPV positive.²⁸¹

TalkTalk's Model

- A3.5 TalkTalk's model evaluated cash flows over a 7 year period starting from the beginning of the 2013/14 financial year. It forecast volumes for Sky and TalkTalk separately and assumed that all the resulting cumulative demand would be provided across all the exchanges that would be unbundled by 2013/14. It further disaggregated the demand into five different geo-types in order to capture the heterogeneity in net adds across exchanges.²⁸² The effect of these geo-type assumptions was to concentrate demand on certain exchanges more than others.
- A3.6 Equipment volumes were estimated separately for the exchanges within each geo-type from assumptions about equipment capacities and utilisations and the relationship between different equipment types - for example the maximum number of lines per master controller.
- A3.7 TalkTalk's capital cost assumptions were generally derived from published regulatory cost data. For example TalkTalk's assumptions on the costs of TAMs and frames were derived from 2013/14 cost estimates published during the 2012 Charge Control Statement.
- A3.8 TalkTalk's model has many similarities with the model that we have developed. However, there were some drawbacks with TalkTalk's model, notably:
- 3.8.1 **Input costs.** TalkTalk's lack of access to relevant cost data meant it was forced to make several high level assumptions. For frame costs it had no split of operating or capital costs and so was forced to assume cost savings based on accounting costs that included a contribution from a return on capital employed and depreciation. By definition these savings are not cash flows incurred by Openreach, but using them distorts the timing of cash flows by effectively smoothing lumpy capital expenditure. We discuss our assumptions on frame costs in paragraphs A3.186 to A3.197.
- 3.8.2 **Double Jumpering costs.** TalkTalk estimated these separately for Sky and TalkTalk. However one of the main features of DJ-MPF arrangements is that demand at the TAM unit is aggregated across all CPs which results in economies of scale and higher TAM and tie cable utilisation.
- 3.8.3 **Jumpering Connection and Disconnection Costs.** SJ-MPF requires fewer jumpers to be connected than DJ-MPF. TalkTalk argued that this will

²⁸⁰ For a standard TAM solution Openreach's Industry View model suggested the NPV for SJ-MPF would be [redacted] depending on the discount rate that was used. The corresponding results for an evoTAM solution were [redacted]

²⁸¹ For a standard TAM solution Openreach's model suggested the NPV would be [redacted] depending on whether the assessments was run over 3, 5, 6, or 7 years. The corresponding results for an evoTAM solution were [redacted]

²⁸² Geo-types are discussed in more detail in paragraphs A3.172 to A3.177.

lead to fewer jumpers needing to be disconnected in the future. The TalkTalk model calculated connection savings using gross demand for SJ-MPF. However TalkTalk estimated disconnection savings using all churn on SJ-MPF. This will have overstated the volumes that will generate any disconnection savings for two reasons. Firstly some disconnections will be flexi-ceased and these will not lead to cost savings. Secondly any savings associated with disconnections that are migrations to another CP's MPF service will already have been included in connection savings. So whilst there will be some disconnection savings associated with migration from MPF to WLR (or WLR + SMPF) this will only be a proportion of all disconnections or ceases. We discuss this point further in paragraphs A3.166-A3.171 below, but this will have led TalkTalk to overstate the potential disconnection cost savings from SJ-MPF.²⁸³

Openreach (Industry View) Model

- A3.9 Openreach's industry view model assessed the impact of different Openreach charges for SJ-MPF services over five years starting from 2013/14. It assumed demand for all relevant MPF operators of [x] per annum. The model treated this as additional (net) demand per year or 'net adds'. It did not provide volumes for total new provides. The model did not estimate cash costs but rather used outputs from an Openreach model that estimated the impact on fully allocated costs (FAC) to determine the impact on connection and rental charges. We have not assessed this other Openreach model.
- A3.10 Further impacts on charges were made by assumptions on, for example, how the costs of operator specific TAMs and development costs would be recovered. The assessment also included an estimate of how other charges, such as WLR and SMPF, might change as a result of cost reallocation resulting from the introduction of SJ-MPF services. Again we have not assessed this (and do not think it is relevant).
- A3.11 This model was of limited use for our purposes. In particular, it did not assess the incremental cash costs of providing SJ-MPF services. All estimated charges were based on FAC including a cost of capital.

Openreach (Business Case) Model

- A3.12 Openreach's business case model assessed the impact on Openreach's costs and revenues over 3, 5 and 7 years again starting from 2013/14. As for its industry model Openreach assumed demand for all relevant MPF operators, this time explicitly Sky and TalkTalk, of [x] per annum. Openreach assumed this demand was concentrated on [x] of unbundled exchanges, although it was not clear whether this was at the same or different sites every year. This assumption resulted in a net demand of [x] MPF lines per site per annum.
- A3.13 Rental and connection revenue impacts were assessed in the same way as those for the industry model, although the impact on connection charges appeared different between the two models. The model included the same impact of cost reallocation across services that might result from the introduction of SJ-MPF services that was assumed within the industry view model.

²⁸³ We have revised our analysis in this Statement and Determination. See paragraph 4.78 – 4.105 for details.

A3.14 The cost impacts modelled were:

3.14.1 Saved costs of MDF blocks, calculated from demand for tie cables.

3.14.2 Saved costs from reduced jumpering connection activity. These were calculated using net add MPF volumes per annum multiplied by the estimated cost of installing one less jumper. However the relevant volume here is the number of lines that will be connected using SJ-MPF and this is higher than net adds. That is because net adds are total new provides less ceases (or churn). So total new connections or provides will be the sum of net adds and churn. We discuss jumpering installation volumes more in A3.160 to A3.165 below. By understating connection volumes Openreach understated the cost savings of SJ-MPF. The assumed saved unit cost was different to that assumed for the impact on connection revenues within the industry view model.

3.14.3 Saved costs from reduced jumper disconnections as a result of installing fewer jumpers initially. Openreach estimated these savings in the same way as TalkTalk via the churn rate on SJ-MPF volumes. As we have noted above in the discussion on the TalkTalk model this will have overstated disconnection cost savings as it will have overstated the relevant volumes. Within its model Openreach includes the following comment; *“However Openreach leave jumpers in situ as part of flexicease. Benefit overstated as jumper recovery is only a fraction compared to jumper provision”*.²⁸⁴ The costs in the model do reflect these savings though they are not reflected in any changes to rental prices. We discuss jumpering disconnection volumes further in A3.166 to A3.171 below

3.14.4 Increased TAM costs. Incremental equipment volumes were estimated for both DJ-MPF and SJ-MPF arrangements using the demand assumptions above and current contract costs for installation of a standard TAM and evoTAM. We discuss a flaw in this calculation in more detail below.

3.14.5 Development costs. It was assumed these would be incurred in 2013/14, i.e. concurrent with the start of services.

A3.15 We consider that this model is also of limited use for our purposes. As noted in paragraph 3.14 in Section 3 in the Provisional Conclusions document we do not consider it appropriate to consider prospective revenue impacts and we also consider that the Openreach model overstated the impact of demand growth on the costs of SJ-MPF significantly.

A3.16 Under DJ-MPF, future TAM equipment volumes were calculated by taking total demand and dividing it by the average size of unit to be installed, assumed to be a 400 port TAM (i.e. a standard TAM with two 200 port TASM). This effectively assumed utilisation will be close to 100% for most sites. In contrast, equipment volumes under SJ-MPF were calculated assuming that a 400 port standard TAM (or 392 port evoTAM) would be installed at each site every year. This was on the basis that additional demand per site per annum was over 200 ports (but less than 400).

A3.17 This latter assumption leads to significant assumed overcapacity in the long run. If demand was 250 lines per site in the first year then installing a 400 port standard

²⁸⁴ Comment in Openreach (business case) model, sheets ‘Business case EvoTAM Only’ and ‘Business case LLU TAM Only’

TAM in the first year would be logical. The next year demand would have reached 500 lines, and under the assumption of an additional TAM each year the model assumed 800 ports would be provided. Similarly the following year with demand being now 750 lines, the model assumed an additional TAM would be installed, making a total of three 400-port TAMs (capacity to support 1200 lines), but one of the 400-port TAMs would potentially be redundant (depending on the appropriate utilisation assumption).

- A3.18 Whilst we disagree with some of the methodology of the Openreach models, we considered that the equipment cost inputs contained in the Openreach business case model were likely to be the most reliable starting point for equipment costs and we have subsequently asked Openreach, under our formal powers, to confirm these cost inputs.

Building our own model

- A3.19 We decided not to base our analysis on any of the Parties' models because each had shortcomings, some of which were discussed above, and which, in general, can be summarised under the following headings:

- 3.19.1 **Accuracy of assumptions:** For example, none of the submitted models were able to access costs, volumes or utilisation assumptions for assets owned or operated by other parties.
- 3.19.2 **Structural issues:** For example, Openreach's models included revenue impacts and the effect of reallocation of costs, none of which we consider relevant to an analysis of forward looking, industry-wide, incremental costs. We discuss this further in Section 3 (paragraphs 3.14 and 3.15). A further important issue we had to consider was the issue of demand heterogeneity across exchanges, captured through a geo-type assumption. In order to simplify the modelling we considered using fewer geo-types than TalkTalk had used and also wanted to allow for the possibility that single jumpering might not be used in all unbundled exchanges (setting demand in one of its geo-types to zero caused errors in TalkTalk's model). Conversely we wanted to consider more geo-types than Openreach had assumed since a single geo-type model would risk missing relevant variation in demand between exchanges.
- 3.19.3 **Sensitivity analysis:** We wanted to run a wider range of sensitivity analysis than could be provided by the Openreach or TalkTalk models alone. For example we wanted to be able to vary when SJ-MPF services might be launched and how SJ-MPF volumes might vary due to DJ-MPF topping-up. None of the models we reviewed provided these or other options we wanted to test.

- A3.20 We considered whether we could address these issues by updating either TalkTalk or Openreach's model. However, in the particular circumstances of this case, given the complexity and time involved in re-engineering an existing model to be fit for purpose, and the extent of issues outlined above which would each need to be addressed, we chose to develop our own.

Ofcom model: Overview

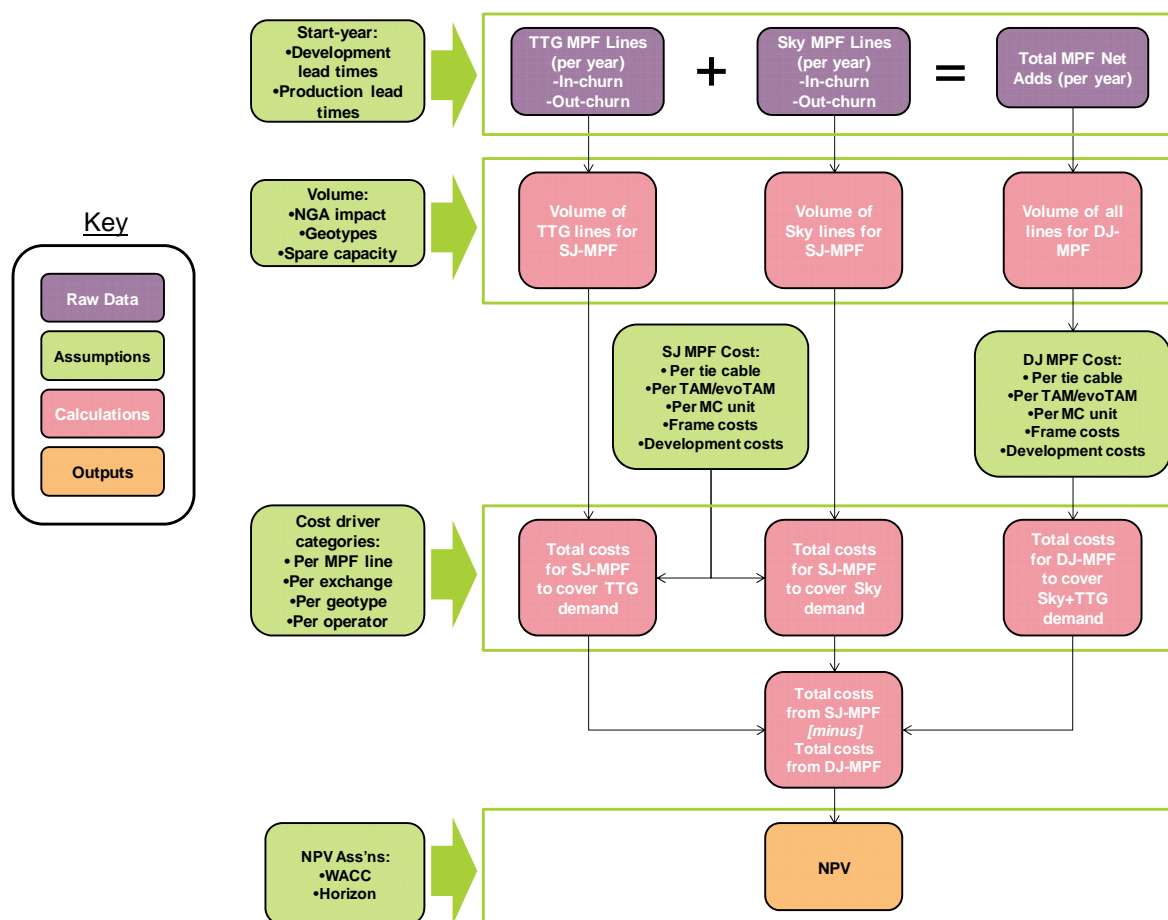
- A3.21 Our model conducts a DCF analysis of the forward looking incremental cost difference between SJ-MPF and DJ-MPF. The key inputs and assumptions are

Statement and Determination concerning a dispute between TalkTalk and Openreach relating to single jumpered MPF

- i) An assumption on the launch date of SJ-MPF services driven by an assumption about development lead times.
- ii) Ofcom generated volume forecasts that were informed by parties' submissions. The most important volumes of interest are net add MPF connections.
- iii) Openreach provided input costs and engineering rules, particularly with respect to maximum equipment capacities.

A3.22 An overview of the model is given in Figure A2.1 below.

Figure A3.1: Ofcom model methodology



A3.23 In the rest of this section we describe the model's main processes under the following headings:

- Demand volume calculations
- Equipment volume calculations
- Cost calculations
- Outputs

Ofcom model structure: Demand volume calculations

A3.24 Table A3.1 below identifies the terms that we will use to describe the various volume measures in this Annex. The rental base (or system size) at the end of the period is the system size at the start of the period system plus any new lines that have been added less any lines that have been removed. We refer to the lines that have been added as gross supply and the lines that have been removed as cessations (which TalkTalk calls ‘churn’ in its model).

Table A3.1: Volume Measures

Volume Measure	Includes
System Size at the start of the year	
Plus Gross supply	<ul style="list-style-type: none"> • New Provides • Single Migrations • Bulk Migrations • Stopped line provides • Take-over of another CP’s lines
Less Cessations (or churn)	<ul style="list-style-type: none"> • Stopped lines • Lines taken-over by another CP • Single Migrations to other CPs • Bulk Migrations to other CPs
Equals system size at the end of the year.	

A3.25 The model converts the total number of MPF lines forecast into the number of MPF connections (net adds) for Sky and TalkTalk that could be put onto SJ-MPF, in each exchange, in each year of the assessment.

A3.26 The main rationale for using net adds as the demand volume driver is that it is likely to be the least cost option for an operator. There is some discussion of this within Annex 9 of the 2012 Charge Control Statement,²⁸⁵ and TalkTalk’s dispute submission provides some support for this. TalkTalk suggests that it would only wish to use SJ-MPF for its net additional MPF customers.²⁸⁶

A3.27 Net additions (or net adds) are defined in this analysis as those MPF connections that are the difference between gross supply and cessations, i.e. they are the number of connections in a year above the installed base of the previous year. Yearly net adds are calculated using the following formula:

²⁸⁵ Paragraphs A9.85 to A9.91.

²⁸⁶In paragraph 6.6 of its dispute submission of 25 June 2013 TalkTalk explains that adopting this net adds approach (which is consistent with the ‘expansion only case’ as described in Annex 9 of the 2012 Charge Control statement) “*avoids the possibility of stranded assets/equipment used for DJ-MPF. It also avoids the engineering costs involved in migrating lines from DJ-MPF to SJ-MPF*”. In fact the actual number may be lower than the net additions due to CPs meeting some of the demand by topping-up spare capacity on DJ-MPF assets (see paragraphs A2.35-A2.44).

Total MPF lines at end of year (minus) Total MPF lines at start of year

- A3.28 The model takes the forecasts for the total number of MPF lines for each of TalkTalk and Sky and uses these to calculate the net additional connections for each operator in each year. These drive our calculations for SJ-MPF demand.

Volume scale

- A3.29 Demand volumes drive equipment volumes and accordingly costs. Conducting a sensitivity assessment for demand volumes is therefore important. The model allows the user to vary volumes according to the following weightings: -30%, -20%, -10%, 0% (base case), +10%, +20%, +30%. We discuss our volume assumptions in more detail in paragraphs A3.145 to A3.159 below.
- A3.30 The weights apply to each assessment year. As such, a selection of '-20%' would have the effect of reducing the net adds in every year by 20%.

Timing

- A3.31 A key input into the model is the date at which SJ-MPF could be launched. Our assumptions on this are discussed below in paragraphs A3.131 – A3.135 but are based on views about development and equipment production lead times. The model allows the user to select two different dates for when SJ-MPF becomes available: Q4 of 2014/15 (i.e. January 2015, based on a 12 month development time, starting from January 2014);²⁸⁷ or Q2 2015/16 (i.e. July 2015, based on an 18 month development time).
- A3.32 While this option will determine when SJ-MPF is launched, and therefore when the benefits from SJ-MPF begin to flow, the NPV assessment starts in January 2014 (this is the date to which our model outputs are discounted back to), as from this point we assume Openreach (along with Sky and TalkTalk) would begin to incur up-front system and process development costs. As the assessment start date is January 2014, and we conduct the assessment on a yearly basis, all volumes for net adds are based on/converted into calendar year volumes. Once the SJ-MPF launch date is selected, the model converts the net adds per year (e.g. 2014/15) into assessment years (e.g. 12 month cycles starting from January 2014).

Geo-types

- A3.33 The distribution of net adds is not uniform across exchanges, with large exchanges tending to have many more net adds. The model needs to capture this heterogeneity as the volume of net adds will determine equipment volumes and hence costs.
- A3.34 The model captures this potential heterogeneity by allowing the user to define up to four different geo-types. These geo-types define groups of exchanges which can be considered as being similar in terms of the demand for MPF – and hence the demand for SJ-MPF or DJ-MPF. We discuss the way that we have generated these geo-types in our model in paragraphs A3.175 to A3.177 below.

²⁸⁷ We have chosen January 2014 as the start of development as we assume our final dispute decision will be published by December 2013 with the expectation that development can start shortly thereafter.

Use of existing DJ-MPF assets

- A3.35 In considering the most efficient way of serving MPF demand, our model assumes that spare capacity on DJ-MPF assets are used ('topped up') before SJ-MPF assets are deployed. This spare capacity corresponds to the already sunk investment in excess network capacity on DJ-MPF.
- A3.36 We take this view on the basis that this is the most efficient industry wide use of assets. An individual CP may wish to immediately migrate to SJ-MPF but from an industry wide perspective, the most efficient outcome would be first to use spare DJ-MPF capacity (i.e. not leave under-utilised DJ-MPF assets).
- A3.37 If there was zero spare capacity on DJ-MPF assets, then the most efficient way of serving MPF demand would be through the least cost method of provision, be that SJ-MPF or DJ-MPF.
- A3.38 The model makes an assumption about how much spare capacity there exists on DJ-MPF TAMs, which from an industry wide efficiency perspective should be fully utilised before considering alternative methods of provision.
- A3.39 We consider the DJ-MPF TASM's the most appropriate unit to determine spare capacity, as they are the largest cost item (along with the associated tie cable A and B). We are also using this as a lower bound for spare DJ-MPF capacity since there is more spare capacity on all CP's tie cable C than on DJ-MPF TASM's.
- A3.40 The underlying assumption is that existing (DJ-MPF) TASM's would continue to be topped-up until utilisation reaches 99% (the operational maximum for a TASM). This delays when SJ-MPF would start to be used. To illustrate, if there were 10 net adds per year (starting in year 1) in an exchange, and 35 spare DJ-MPF ports, SJ-MPF would not be used until year 4. We also note that it may not be practical for a CP to deploy SJ-MPF at all exchanges immediately given limitations in resources to deploy the necessary TAM's, tie cables etc.
- A3.41 The model calculates the spare DJ-MPF capacity by the time SJ-MPF is launched by estimating the total number of MPF lines (based on our forecasts), and combining this with an estimate for the DJ-MPF TAM average utilisation by SJ-MPF launch.
- A3.42 Our estimate for average DJ-MPF TAM utilisation by SJ-MPF launch is based on the current 85% utilisation,²⁸⁸ plus an adjustment to account for the likely increase in TAM utilisation in the lead up to SJ-MPF launch, as a result of operational planning. As a result of this, we have used a 90%²⁸⁹ DJ-MPF TAM utilisation rate by SJ-MPF launch.
- A3.43 The model converts the total MPF lines to per exchange MPF lines, before using the utilisation assumption to calculate the number of spare TASM ports in each exchange (for each geo-type). As the model volumes are calculated on a per CP bases, the model then makes an assumption about how net adds are split between Sky and TalkTalk. We have assumed that 80% of net adds are for Sky and 20% for TalkTalk [X].

²⁸⁸ Openreach's response to s191 notice, 22 August 2013, page 1

²⁸⁹ We have updated this figure in this Statement and Determination at paragraph 4.44

Statement and Determination concerning a dispute between TalkTalk and Openreach relating to single jumpered MPF

A3.44 The model uses this calculation of spare-ports on DJ-MPF TAMs in each geo-type exchange, to reduce the volume of net adds that drive the asset volumes for SJ-MPF as well as DJ-MPF. Note, setting the usable TASM port utilisation to 100%, would mean that when SJ-MPF is launched, there are no spare DJ-MPF TASM ports, and all net adds are put onto SJ-MPF.

Cumulative volumes

A3.45 In order to calculate the asset volume requirements in each exchange, through time, we must calculate the cumulative net additions in each exchange, in each year. This is used to drive changes in asset requirements. As cumulative demand reaches various thresholds, it triggers the requirement to purchase additional capacity. Additional capacity is installed in various modularities that reflect the technical specifications of the necessary equipment as discussed in Annex 2.

A3.46 Under SJ-MPF each CP manages its own TASMs, so cumulative net add volumes are required for each CP. For DJ-MPF most equipment is shared so volumes are aggregated for all CPs, except for tie cable C which is managed separately by each CP.

Ofcom model structure: Equipment volume calculations

A3.47 The costs of supplying future MPF demand under SJ-MPF or DJ-MPF will be driven by one or more of the following factors:

3.47.1 Demand for MPF lines (number of end-user connections) using either SJ-MPF or DJ-MPF (see 'Ofcom model structure: Demand volume calculations', above)

3.47.2 How much of that demand is at each exchange type (see 'Geo-types', above)

3.47.3 Whether operators are sharing the use of assets or whether assets are being used by each operator separately.

A3.48 Using these cost drivers, the model first calculates the number of each asset type below required to meet the net add volumes:

- TASMs;
- tie cables;
- master controllers;
- racks;
- test heads; and
- frame blocks.

A3.49 The methodology the model uses to calculate the required assets in each exchange (per year) is explained for each asset in the sub-headings below.

A3.50 The model then multiplies these asset volumes by the relevant unit costs (see 'Ofcom model Structure: Input costs and cost calculations' below) to derive the total incremental cash costs for SJ-MPF and DJ-MPF in each year.

TAM units (TASMs)

A3.51 As described in Annex 2, TAMs are comprised of the switching module (TASM), master controllers, test heads and racks. The number of TASMs required in an exchange is driven by the net adds at that exchange per year. This is considered in conjunction with the port capacity of the TASM, its maximum TASM operational utilisation²⁹⁰ and the utilisation of connected assets (e.g. tie cables). Since the TASM and connected tie cables are installed in a fixed proportion, the number of TASMs required will be driven by the lowest 'maximum utilisation' out of TASMs and connected tie cables.²⁹¹

A3.52 The model allows the user to select two different types of TAM: standard TAMs and evoTAMs (see Annex 2 paragraphs A2.18 – A2.20 for more details). There are differences in the TASMs between these two types of TAM (which we call the standard TASM and evoTASM respectively). The evoTASM is provided as a 192 port unit. The standard TASMs may be provided as a single 200 port unit, or two 200 port TASMs may be provided together.²⁹² As such, the user can select from two standard TAM installation capacities, either 200 or 400 ports. The TAM types and capacity selections available in the model are based on the cost data that we received from Openreach.²⁹³

A3.53 Only standard TASMs, (not evoTASMs) are used to support the current DJ-MPF jumpering arrangements. The model therefore assumes that evoTASM configurations are not appropriate for DJ-MPF, only allowing 200 port or 400 port standard TAM configurations. When SJ-MPF is provided using an evoTASM configuration, the model makes the simplifying assumption (to ensure comparability) that DJ-MPF is provided using a 200 port standard TASM.

A3.54 The model uses whichever TASM type and capacity is selected, across the entire period of assessment, for both the SJ-MPF and DJ-MPF case. SJ-MPF is more likely to use 200 port TASMs (because they are CP specific), whereas DJ-MPF is more likely to benefit from 400 ports of capacity. So a 200 port TASM configuration may act to slightly favour SJ-MPF, whereas a 400 port configuration may act to slightly favour DJ-MPF in an NPV analysis.

²⁹⁰ The maximum TASM operational utilisation is based on the requirement of some ports to remain available for line testing. See paragraph A2.24. Openreach also told us in its response of 16 August 2013 to s191 request "*the TAM change-out threshold is 20% of faulty ports and this has very rarely been reached, as faults tend to be investigated long before their number reaches this stage*"

Openreach's response to s191 notice, 16 August 2013, page 9

²⁹¹ For example assuming a 200 port TASM connected to 2 x100 connector tie cables, if the TASM had a maximum utilisation rate of 90% and tie cables of 80%, this means that while the TASM could achieve usage of 180 ports, since the tie cables connected to it can only achieve 80 connections each (160 connections in total), the TASM capacity will actually be restricted to 160 connections, since there is no ability to install additional tie cables to this TASM.

²⁹² The difference in cost relates to savings in survey and installation costs.

²⁹³ Openreach's response to s191 notice, 16 August 2013, page 8. We note that while Openreach did provide us with 600 port standard TASM costs (i.e. three 200 port TASMs installed together), we did not include them in the model because our analysis suggested that 600 port TASMs would not be the lowest cost option for CPs in most exchanges.

Statement and Determination concerning a dispute between TalkTalk and Openreach relating to single jumpered MPF

- A3.55 Due to the modularity of TASM, the number of TASM required is always rounded-up in the model: a CP will need one TASM even if it has only a single end-user connection at an exchange.
- A3.56 Under SJ-MPF, each CP would manage the utilisation of its own TASM. The number of TASM each CP requires in each exchange in each year is driven by the relevant CP's volume of net adds. In contrast, under DJ-MPF, TASM utilisation is managed by Openreach and the TASM support the MPF lines of all CPs. So, the relevant volume driving the number of TASM is the aggregate volume of net adds for all CPs. As an example, if an exchange had only two net adds in a year, one for Sky and one for TalkTalk, in the SJ-MPF case two TASM would be needed (one for each CP), compared to the DJ-MPF case where only a single TASM would be needed. For this reason SJ-MPF will have at least as many TASM as DJ-MPF.
- A3.57 For both SJ-MPF and DJ-MPF the model differentiates between the number of new build TASM required and the number of growth TASM required in order to correctly calculate the cash flows.
- A3.58 New build TASM correspond to the first TASM to be installed in an exchange. These new build TASM incur higher survey and installation costs, due to the need for planning of routing for tie cables, floor space, installation of a rack, a test head and a master controller unit, in addition to the TASM.
- A3.59 Growth TASM are incremental TASM that can make use of an existing master controller, test head, tie cables and any spare rack space. If there is no spare rack space, the TAM cost will include the cost for a new rack.

Tie cables

SJ-MPF

- A3.60 SJ-MPF requires the installation of two different tie cables (see Annex 2 paragraph A2.42).
- A3.61 The number of each tie cable required at an exchange at any point in time will depend on the tie cable capacity (in terms of the number of pairs), the maximum operational utilisation of tie cables, the TASM capacity (and number of TASM installed), and the assumption about how many tie cables should be installed at one time.
- A3.62 Based on information provided by Openreach, we understand that tie cables come in fixed capacities of 32, 64 or 100 pairs.²⁹⁴ However it may be that not all pairs can be utilised. From its s191 response,²⁹⁵ we understand that Sky only makes use on average of [redacted] of the 100 pairs on its 'C' tie cables.²⁹⁶ We expect that utilisation of tie cables C and E will be similar. [redacted] our base case assumption is that the maximum operational utilisation of tie cable E is 95%.
- A3.63 The model makes the simplifying assumption that in the case of an evoTASM, 32-pair tie cables are used (i.e. 6x32 cables for each of the tie cables D and E, for each 192 port evoTASM unit). In the case of a standard TASM, the model makes the

²⁹⁴ Openreach's response to s191 notice, 16 August 2013, page 10

²⁹⁵ Sky's response to Ofcom's follow-up questions to the s191 notice, 29 August 2013

²⁹⁶ Sky explained that this was because its equipment configuration only allowed it to utilise this amount of connections per tie cable.

assumption that two 100 pair cables are used for each of the tie cables D and E, for each 200 port TASM unit.

- A3.64 The model assumes that for SJ-MPF a CP would install tie cables in the same modularity as TASMs, i.e. it would not install only a single 100 pair tie cable with a 200 port TASM (regardless of the demand), with the intention of installing a second tie cable in the future. We assume a CP would instead install two 100 pair tie cables, and leave excess capacity to be utilised in later years. This assumption is based on evidence provided by Openreach that installing tie cables incurs significant fixed survey cost.²⁹⁷

DJ-MPF

- A3.65 Under DJ-MPF there are three tie cables, (see paragraph A2.36). The model treats tie cables A and B in the same way as tie cables D and E are treated under SJ-MPF: i.e. they are assumed to be installed in the same modularity as the installed TASM and at the same time. The main tie cable difference between SJ-MPF and DJ-MPF is tie cable C. Unlike tie cables A, B, D and E tie cable C is not connected to a TASM, and therefore does not need to be installed with any regard to the capacity of the TASM.
- A3.66 The model assumes that CPs install tie cables C one at a time, as and when they need more capacity. In practice, a CP might install sufficient tie cables at the same time, to support the full capacity of its MSANs. However, MSANs come in a range of different capacities so any assumption based on this hypothesis would be somewhat arbitrary. Our simplifying assumption has two effects. Firstly, it delays some of the cash flows for DJ-MPF. This makes the case for DJ-MPF more favourable. But secondly, it means the DJ-MPF case incurs higher costs because the scale economy of lower installation costs per tie cable for multi-cable installation would not be realised. This makes the case for DJ-MPF less favourable. We believe that any over- or under-estimate of costs is therefore small.

Master controller units

- A3.67 The requirement for, and features of, a master controller are explained in (Annex 2, paragraphs A2.29 – A2.30). In the SJ-MPF configuration, a master controller is capable of managing a number of TASMs used by different CPs (as many as 49²⁹⁸ for standard TAMs, and 72²⁹⁹ for evoTAMs, including BT).
- A3.68 In response to s191 requests, Openreach confirmed that “*no new master controllers units would be required to provide an EvoTAM SJ-MPF solution (though software and other development may be required)*”.³⁰⁰ We therefore understand that in the case of an evoTAM SJ-MPF setup, new evoTASMs could use the existing master controller unit, so no new master controller unit would be required until volumes exceeded the capacity threshold of 13,824 lines in the exchange.

²⁹⁷ Openreach’s response to s191 notice, 16 August 2013, page 10

²⁹⁸ Calculated as the capacity of a standard TASM master controller (9,800 lines, from Annex 2 paragraph A2.29) divided by the capacity of standard TASM unit (200 lines) = 49 TASMs.

²⁹⁹ Calculated as the capacity of an evoTAM master controller (13,824 lines, see Annex 2 paragraph A2.29) divided by the capacity an evoTASM unit (192 lines) = 72 evoTASMs.

³⁰⁰ Openreach’s response to s191 notice, 16 August 2013, pages 3-4.

Racks

- A3.69 As explained in Annex 2, paragraphs A2.31 – A2.32, racks are used to house the TASMs and master controller units in the exchange.
- A3.70 For the model, based on information provided by Openreach, we have assumed that, for standard TAMs, eight 200 port TASM units can be installed in a rack.³⁰¹ Where a master controller is required, this would take up one rack space, reducing the number of 200 port units to seven. For evoTASMs, Openreach indicated that a rack can house 9x192 port evoTASMs but that if a master controller is required this again reduces to seven.

Frame blocks

- A3.71 Frame blocks connect the tie cables to the MDF. In our analysis we have not included the frame block on the end-user side (referred to as line-side or L-side) of the frame that connects the local loop to the MDF as both SJ-MPF and DJ-MPF make use of this particular block, so the cost difference (between SJ-MPF and DJ-MPF) will be zero. We understand that blocks come in fixed capacities of 100 connections.³⁰²

SJ-MPF

- A3.72 In the SJ-MPF case, since there are only two blocks required (to connect the single jumper across the frame), and we are ignoring the L-side block connecting the end-user to the MDF (explained above), we have only to consider the E-side block, (see Annex 2 Figure A2.2). As this block is connected to tie cable D, the number of blocks will be driven by the number of tie cables D and the tie cable capacities.
- A3.73 In the case of a standard TAM configuration, where 100 pair tie cables are used, blocks are installed 1:1 with tie cables. This is regardless of any difference in utilisation. In the case of an evoTAM configuration, where 32 pair tie cables are used, blocks are installed in the ratio of one block to every three tie cables. This has the implicit effect of establishing a maximum block utilisation of 96% (i.e. 3 x 32 connections for a block with 100 connection capacity).

DJ-MPF

- A3.74 In the DJ-MPF case we have three blocks to consider (there are four blocks in total but we ignore the L-side block connecting the end-user to the MDF for the reasons explained above): two E-side blocks and one L-side block (the latter connecting tie cable B to the MDF).
- A3.75 Like SJ-MPF, the number of DJ-MPF blocks will be driven by the number of tie-cables, however unlike SJ-MPF, they are not driven by tie cable capacity. This is because, since we have assumed (see paragraph A3.63) only 100 pair tie cables are used for DJ-MPF, the number of incremental blocks required will always match the number of incremental tie cables.

Test heads

- A3.76 Test heads are explained in more detail in paragraphs A2.27 to A2.28 in Annex 2.

³⁰¹ Openreach's responses to confirmation questions, 2 August 2013, page 2

³⁰² Openreach's response to s191 notice, 16 August 2013, page 11

A3.77 Based on Openreach’s email response to our follow-up questions from our s191 request,³⁰³ we understand that a new test head is required for each new build and when the existing test head reaches its full utilisation of 5000 lines.

SJ-MPF

A3.78 In SJ-MPF, we calculate the number of test heads by considering firstly, the number of new build TASMs (see paragraphs A3.58 – A3.59 above for definition). Each site where SJ-MPF will be installed for the first time will require a test head. Secondly, we consider how many exchanges (if any) have SJ-MPF demand volumes that exceed the test head capacity by the end of the assessment period.

A3.79 For example, if for a particular geo-type, net additions in each exchange were 1,000 per year, assuming a new build TAM is installed in year 1, a second test head would be required in year 6.

DJ-MPF

A3.80 Based on the current take-up of MPF in each exchange and each test head’s capacity of 5,000 lines, we have carried out the following calculation:

3.80.1 We have calculated the current number of test heads and the utilisation of these test heads in each exchange.

3.80.2 We have then scaled the number of MPF lines based on the ratio of the current number of lines to the forecast number of lines when SJ-MPF becomes available and calculated the resulting utilisation of test heads.

3.80.3 We have grouped exchanges by spare test head capacity into 1,000 line bands - i.e. how many exchanges can support less than 1,000 additional lines, between 1,000 and 2,000 additional lines, etc. This distribution is shown in Table A3.2 below.

Table A3.2: Estimated distribution of exchanges by number of spare test head ports

Number of spare ports	Percentage of exchanges
4,001 to 5,000	40%
3,001 to 4,000	23%
2,001 to 3,000	15%
1,001 to 2,000	12%
0 to 1,000	10%

Source: Ofcom analysis of Openreach data³⁰⁴

3.80.4 For each geo-type the model then compares the total cumulative net additions per exchange over the seven years against this distribution to work out how many exchanges would need a new test head. This number is then spread evenly over the seven years. For example, if cumulative demand over the seven years for a geo-type is less than 1,000 new MPF lines, we have assumed 10% of these exchanges would need a new test head over the period. Similarly, if cumulative demand is above 1,000 but

³⁰³ Openreach’s response to follow up questions to s191 notice, 6 September 2013

³⁰⁴ Source: Ofcom analysis of “299-Ofcom Supplement” (LLU WSS report) from Openreach.

below 2,000 we have assumed that 22% of exchanges would need new test heads over the period.

Net jumpers installed and removed

- A3.81 In general SJ-MPF requires one less jumper to be installed than under DJ-MPF. However, there are occasions where that is not the case. The level of jumpering activity will depend on the status of the line before the customer is connected. For example, it will depend on whether the MPF line is a newly provided line, a take-over of an existing line, the provision of a line that was ceased and is now being reactivated, or a migration from another CP's service which may or may not have been provided via MPF.
- A3.82 Table A2.4 in Annex 2 shows the jumpering movements required for all the different possible combinations under both DJ-MPF and SJ-MPF. Seven of the eleven possible combinations require one less jumpering movement under SJ-MPF, three require one more and one requires three more. The combination that requires three more jumper movements, a line that was ceased but left in place (a stopped line) that is now being reactivated to the same CP, is more likely to be provided under DJ-MPF and so is unlikely to be part of the lines installed using SJ-MPF, leaving ten combinations (of which seven require one less jumpering movement). The three that require one more are all associated with a line that was with one MPF provider moving to a different MPF provider.
- A3.83 The average number of jumpers required under SJ-MPF compared with DJ-MPF will depend on what proportion of demand each combination is of total MPF demand. Openreach was unable to provide us with a complete breakdown of MPF demand. Whilst 4% of demand was for MPF to MPF working line takeovers and a further 1% for singleton MPF to MPF migrations, Openreach was only able to tell us that 29% of total MPF demand was from what were previously stopped lines ('stopped line provides'). It was not able to tell us how much of this 29% was from lines that were previously with another MPF provider.³⁰⁵ The proportion of lines requiring one extra jumpering movement under SJ-MPF will therefore lie between 5% (the 4% plus 1% MPF to MPF takeover and migrations referred to above) and 34% (this 5% plus all stopped line provides).³⁰⁶ It is likely that the proportion will lie towards the bottom of this range as the proportion of stopped line provides from what were other CP's MPF lines is likely to be relatively low given the relative proportions of WLR and MPF in overall line populations.
- A3.84 Our base case assumption is that 10% of installation volumes will require one extra jumpering movement under SJ-MPF with the remaining 90% requiring one less. Thus on average 0.8 fewer jumpers will need to be installed.³⁰⁷ We have run sensitivities at 0.7 to 0.9.

Ofcom model structure: Input costs and cost calculations

- A3.85 Having calculated the volume of each asset type and jumpers connected and removed per each exchange, each year, in both SJ-MPF and DJ-MPF cases, the model then multiplies these by the unit cost of each asset (or incremental works

³⁰⁵ Openreach response to s191 notice, 16 August 2013, page 7

³⁰⁶ In this Statement and Determination, we have revised our view. This is discussed at paragraphs 4.78 – 4.105.

³⁰⁷ For example if 10% of demand requires one extra jumper and 90% requires one less jumper then on average 0.8 fewer jumpers will need to be installed (10% x 1 + 90% x -1).

cost), in order to calculate the incremental cash flows. We have broken down costs by capital expenditure (“CAPEX”) and operating expenditure (“OPEX”) in the model. We discuss our approach to cost inflation and asset prices changes in paragraph A3.199 below.

A3.86 With the exception of frames operating costs, we have based all our cost assumptions on input provided by Openreach in response to our s191 information requests. Many of these costs were based on contractual arrangements with, [X]. In general we have taken the average cost across the suppliers. We have sought to verify these cost inputs against other sources where we can.

A3.87 We discuss these input costs in the following order

- TASM
- Tie cables
- Master controllers
- Racks
- Frames
- Test heads
- Development costs

TASM CAPEX

A3.88 TASM costs form a large proportion of total CAPEX under both DJ-MPF and SJ-MPF. The TASM costs we have used are summarised in Table A3.3 below. These are based on contract costs provided by Openreach. We note that the same survey and installation costs are included for DJ-MPF and SJ-MPF, although Openreach has indicated that costs for survey for SJ-MPF may be higher³⁰⁸ as the survey would seek to locate TAMS conveniently between the MDF and the CP’s equipment, whereas TAMS for DJ-MPF will be located close to the MDF. These are broadly consistent with those used in the Openreach business case model but are significantly greater than those assumed by TalkTalk. We verified that these costs were reasonable by asking Openreach to provide us with its actual capital expenditure on TASMs and evoTASMs over the last two years together with information on the numbers of units of each type installed. This gave some reassurance that the numbers we have used are reasonable.

³⁰⁸ Openreach’s response to confirmation questions, 2 August 2013

Table A3.3 – TASM CAPEX per unit by type and number of units

Description	Unit	Capacity	TASM type	Unit cost
SJ-MPF New Build	Per TASM	200 port	Standard	[X]
SJ-MPF New Build	Per TASM	2x200 port	Standard	[X]
SJ-MPF New Build	Per TASM	192 port	evoTASM	[X]
SJ-MPF Growth	Per TASM	200 port	Standard	[X]
SJ-MPF Growth	Per TASM	2x200 port	Standard	[X]
SJ-MPF Growth	Per TASM	192 port	evoTASM	[X]
DJ-MPF New Build	Per TASM	200 port	Standard	[X]
DJ-MPF New Build	Per TASM	2x200 port	Standard	[X]
DJ-MPF Growth	Per TASM	200 port	Standard	[X]
DJ-MPF Growth	Per TASM	2x200 port	Standard	[X]

TASM OPEX

A3.89 As well as the costs of purchasing and installing TASMs, there are also some running costs associated with their use, though these are relatively small. The model assumes there are different annual unit operating costs for a TASM and an evoTASM.

A3.90 This unit cost data, summarised in Table A3.4 below, was derived by dividing Openreach’s annual operating expenditure on standard TASMs and evoTASMs by the average number of units installed in the 2012/13.³⁰⁹

Table A3.4 TASM Annual Operating Costs per TASM

	TASM type	Unit cost
Pay	Standard	[X]
Non Pay	Standard	[X]
Pay	evoTASM	[X]
Non Pay	evoTASM	[X]

Tie cables CAPEX

A3.91 The model differentiates between two-types of tie cables:

- Those connecting the frame to the TASM (tie cables A and B in the DJ-MPF case and tie cable D in the SJ-MPF case), and

³⁰⁹ Openreach’s response to s191 notice, 16 August 2013, page 9; and Openreach’s response to follow up questions to the s191 notice, 28 August 2013, page 3

Statement and Determination concerning a dispute between TalkTalk and Openreach relating to single jumpered MPF

- Those connecting to the CPs' equipment (tie cable C in the DJ-MPF case and tie cable E in the SJ-MPF case).

A3.92 According to the contractual cost schedules that we received from Openreach,³¹⁰ tie cables connecting the frame to the TASM are installed at the same time as the TASM, and so share the same engineering visit and survey costs. The installation cost data that we have used for tie cables A, B and D in the model has been based on these contractual schedules. This is summarised in Table A3.5, below.

A3.93 In DJ-MPF, the tie cables connecting to the CPs' equipment are installed separately to the TAM installation. They require their own survey and installation work. In SJ-MPF, the costs of tie cable E are not included in the TAM costs provided by Openreach. Therefore, the installation cost data that we have used for cables C and E has been derived from separate information provided by Openreach on the installation and cable costs of tie cables. The unit costs used in the model are also summarised in Table A3.5 below. These unit costs are the sum of installation (labour costs), the cost of the tie cable itself, and the cost of an HDF connector and connector cover.³¹¹

Table A3.5 Tie Cable CAPEX Unit Costs

Description	Unit	Capacity	TASM type	Unit cost
Tie cable A, B and D	Per Cable	100 pair	Standard	[X]
Tie cable D	Per Cable	32 pair	evoTASM	[X]
Tie Cables C and E				
• Single cable installation				
• Cost for each additional cable installed	Per cable	100 pair	Standard	[X]
	Per cable	100 pair	Standard	[X]
• Cost of Cable	Per Cable	100 pair	Standard	[X]
Tie Cables C and E				
• Single cable installation				
• Cost for each additional cable installed	Per cable	32 pair	evoTASM	[X]
	Per cable	32 pair	evoTASM	[X]
• Cost of Cable	Per cable	32 pair	evoTASM	[X]

Tie cables OPEX

A3.94 Openreach has told us that there were no incremental operating costs for tie cables.³¹²

Master controller CAPEX

A3.95 The unit costs for the master controllers in the model have been derived from the same contractual cost schedules referred to above. These split out the costs of

³¹⁰ Openreach's response to the s191 notice, 16 August 2013 page 8

³¹¹ HDF connectors connect the tie cables to the HDF, the connector covers act to protect the connectors. See Annex 2, paragraph A2.15

³¹² Openreach's response to s191 notice, 16 August 2013, page 11

Statement and Determination concerning a dispute between TalkTalk and Openreach relating to single jumpered MPF

master controllers. The input costs within the model are summarised in Table A3.6 below.

Table A3.6 Master Controller CAPEX Unit Costs

Description	Unit	TASM type	Unit cost
Master Controller Unit	Per Master Controller Unit	Standard	[X]
Master Controller Unit	Per Master Controller Unit	evoTASM	[X]

Master controller OPEX

A3.96 Any operating costs of master controllers are included in the operating costs of TASMs, as confirmed by Openreach.

Racks CAPEX

A3.97 The unit CAPEX costs relating to installing a new rack in the exchange (due to the existing racks being full), are provided in the contractual cost schedules provided by Openreach.

Table A3.7 Rack Unit Costs

Description	Unit	TASM type	Unit cost
Rack	Per Rack	Standard	[X]
Rack	Per Rack	evoTASM	[X]

Racks OPEX

A3.98 Openreach did not separately identify operating costs for racks.

Frames CAPEX

A3.99 The only incremental capital frame costs that we have been able to identify are the costs of frame blocks. We discuss Frame costs further in paragraphs A3.182 – A3.197 below.

A3.100 We obtained input data on the cost of blocks from Openreach. These costs are again summarised in table A3.8 below. The costs of each E-side block (A, C, D) are the same, whereas the cost of the L-side block (B) is slightly higher.³¹³

Table A3.8: Frame Block Unit Costs

Description	Unit	TASM type	Unit cost
E-side blocks A, C and D	Per Block	All	[X]
L-side block: B	Per Block	All	[X]

³¹³ As discussed in paragraph A3.71 above, we have omitted from the analysis the L-side blocks connecting the end-user connection to the frame. This is the same for both SJ-MPF and DJ-MPF and so does not contribute to any incremental cost difference between the two.

Frames OPEX

- A3.101 In the Provisional Conclusions, we said that there are two operating costs associated with frames. The first is the cost of installing and removing jumpers. We asked Openreach to provide the cost of installing or removing a jumper. Openreach estimated this as the cost of [X] minutes of an engineer's time at [X] per hour, giving a cost of [X] per jumper.³¹⁴ Openreach did not identify any non pay costs, such as the cost of the jumper itself, though that is likely to be minimal.
- A3.102 This again is a critical input so we have sought to verify this by comparing the Openreach input above to the incremental costs of installing a jumper that we derived for the recent dispute on simultaneous provision of SMPF and WLR services.³¹⁵ Undertaking similar calculations as we outlined in that dispute on both a current cost accounting (CCA) FAC and LRIC basis gave the incremental cost of a jumper as being around [X] based on 2011/12 regulatory financial statement (RFS) data and [X] using 2012/13 RFS data.³¹⁶ On this basis we do not believe the latest Openreach input is an unreasonable value to use for the incremental cost of jumper activity.³¹⁷
- A3.103 The second cost is the cost of frame maintenance. In response to our s191 request Openreach did not believe that there were any incremental costs associated with the repair of frames that would arise on moving from DJ-SMPF to SJ-MPF working. This is a further critical assumption which we discuss in some detail in paragraphs A3.182 to A3.197 below.

Test head CAPEX

- A3.104 A new test head would be required for each new master controller that needs to be installed. The current cost of a test head unit is [X]. In addition, installation costs are [X] if the unit is installed as part of a new build activity, i.e. when a new master controller is installed. Openreach confirmed that these costs were not included within the installation costs of TAMs that it had provided.³¹⁸

Test head OPEX

- A3.105 Openreach did not provide any information on the OPEX of test heads. We have therefore assumed that any costs are minimal or are already included in the operating costs of TASMs.

³¹⁴ Openreach's response to s191 notice, 16 August 2013, page 12

³¹⁵ Dispute between BT and TalkTalk relating to MPF + SMPF simultaneous migration offer, 23 April 2013. Available at http://stakeholders.ofcom.org.uk/binaries/enforcement/competition-bulletins/closed-cases/all-closed-cases/cw_01097/Final_Determination_Non_Con1.pdf

³¹⁶ In this Statement and Determination, we have revised our view. Details can be found at paragraphs 4.114 – 4.127

³¹⁷ In Ofcom's Consultation on new charge controls for LLU and WLR services, Ofcom has proposed to align the charge for all migration services which involve jumpering activity to a single target charge. It is noted that "*the incremental costs of services involving jumpering activity appear to be similar*" because costs are partially driven by factors other than the number of jumper movements. See "*Fixed access market reviews: Approach to setting LLU and WLR Charge Controls*" 11 July 2013, paragraphs 4.128 – 4.129, at: http://stakeholders.ofcom.org.uk/binaries/consultations/llu-wlr-cc-13/summary/LLU_WLR_CC_2014.pdf

³¹⁸ Openreach's response to follow up questions to s191 notice, 30 August 2013, page 4

Development costs

A3.106 Development costs cover upfront system development and re-configuration costs, as well as the ongoing management costs. The model includes development costs for Openreach, TalkTalk and Sky.

A3.107 Our base case assumes that: Openreach would incur development costs of £1m and £1.26m for evoTAM and standard TAM development respectively; Sky and TalkTalk would incur up front development costs of £0.25m each in all cases, and ongoing costs of £0.05m each year post development, in all cases.

A3.108 We assume that Openreach's development costs for SJ-MPF will be incurred from January 2014, i.e. the fourth quarter of 13/14. This defines the start of our NPV assessment.³¹⁹ TalkTalk's and Sky's initial development costs would be incurred from the same date. We assume these upfront development costs are spread evenly over the period up until SJ-MPF is launched. After SJ-MPF is launched, the model assumes only ongoing system management costs are incurred.

Ofcom model structure: Outputs

A3.109 Taking the unit costs for each asset and combining them with the asset volumes required each year, we can calculate the yearly (cash flow) costs of satisfying the MPF net-demand via SJ-MPF or DJ-MPF. The difference between each year's cash cost for SJ-MPF and DJ-MPF is then discounted and summed to arrive at the NPV calculation.

A3.110 The model produces results for a number of different scenarios. Each utilising different, yet reasonable input assumptions. See paragraphs A3.202 to A3.206.

Ofcom model: Key assumptions and sensitivities

A3.111 This section details the most important modelling assumptions in terms of impact on the incremental NPV assessment. These are:

- Development costs
- SJ-MPF launch date
- Topping up DJ-MPF assets
- Length of assessment
- Volume assumptions
- Demand concentration and geo-types
- Type of TAM (standard TAM or evoTAM)
- Frame costs

³¹⁹ We therefore discount back all future cash flows to January 2014. With January 2014 – December 2014 essentially being year 0, as this corresponds only to development work. The first SJ-MPF volumes can occur from year 1 (i.e. January 2015 – December 2015) onwards, once development work is completed. However the first SJ-MPF volumes may be installed later than this if there is spare DJ-MPF capacity that can be topped up first.

Statement and Determination concerning a dispute between TalkTalk and Openreach relating to single jumpered MPF

- Input price inflation and efficiency
- Discount rate

Development costs

TalkTalk view

- A3.112 The TalkTalk model estimated that Openreach's development costs might be around [X] for product development and management, and a further [X] for 'new instance' development in the year the service was launched, and [X] per annum thereafter for product development and management.³²⁰
- A3.113 Based on its experience, TalkTalk estimates its costs to develop its network, processes and systems, if it were to use SJ-MPF, as [X] upfront and [X] per year.³²¹ Within its model it assumed the same costs would also be incurred by Sky. It believed these costs were 'conservative', i.e. if anything too high.
- A3.114 TalkTalk states that the annual [X] cost "*covers any incremental on-going costs in addition to the initial costs resulting from the introduction of SJ-MPF*", being "*any subsequent changes to engineering planning rules / allocation algorithm (as a result of introducing SJ-MPF)*".³²²
- A3.115 In terms of the costs of development work required for Openreach to offer SJ-MPF, TalkTalk does not believe that there would be a need for changes to the CP interface to Openreach's Equivalence Management Platform (EMP), were single jumpering to be offered by Openreach.
- A3.116 TalkTalk believes that Openreach's inventory management system would be able to use tie pair information from TalkTalk's order to assess whether a DJ-MPF or a SJ-MPF line should be provided, based on the specific tie cable on which the tie pair was requested. For this reason, TalkTalk submits that the order process remains the same regardless of whether the tie pair uses SJ-MPF or DJ-MPF, and that there is no additional information needed from TalkTalk to allow Openreach to determine this.³²³

Openreach view

- A3.117 The Openreach business plan and industry view model both assumed development costs of [X] for the standard TAM case and [X] for the evoTAM case.
- A3.118 Following further discussions with Openreach, we understand that Openreach estimates that development costs may be somewhat lower. Openreach now estimates that the total development costs for SJ-MPF would be [X] for an evoTAM based solution.

³²⁰ TalkTalk's dispute submission, 25 June 2013, page 15

³²¹ Although it noted in TalkTalk's response to follow up questions to s191 notice, 27 August 2013, page 2 that on reflection it considered these costs too high. It did not, though, provide revised figures.

³²² TalkTalk's response to follow up questions to the s191 notice, 27 August 2013, pages 1-2

³²³ TalkTalk's response to follow up questions to the s191 notice, 28 August 2013, and Ofcom/TalkTalk conference calls on 3 September 2013

Statement and Determination concerning a dispute between TalkTalk and Openreach relating to single jumpered MPF

A3.119 For a standard TAM based solution, Openreach estimates that the total development costs would be [redacted].³²⁴ Openreach supported this estimate with examples of recent developments, which it considered were of similar scale.³²⁵

A3.120 Openreach notes that these costs include:

- [redacted] for EMP development costs, to develop and launch a single jumpering variant of the existing MPF product which is capable of:
 - being ordered, modified and billed;
 - being maintained (service maintenance options as well as Special Fault Investigations); and
 - supporting all functionalities available with the existing product (e.g. working line takeover, stopped line provide, singleton and mass migrations).
- An element for impact on other system costs, as an SJ-MPF product would interact with other copper products (WLR and MPF) and GEA-FTTC.
- System development costs to support the plan and build of the evoTAM or TAM product (e.g. ordering, billing, managing the inventory, etc.).
- “[redacted] for other system development costs to support in-line working of the TAM”.³²⁶

A3.121 We understand that the large [redacted] potential variance in Openreach’s estimates are because they are based on a “high level impact assessment” and not supported by a feasibility study, which Openreach states it would ordinarily conduct but has not been able to in the time available.³²⁷

Ofcom view

A3.122 Having considered the Parties views on development costs, our base case assumes that: Openreach would incur development costs of [redacted] and [redacted] for evoTAM and standard TAM development respectively; Sky and TalkTalk would incur up front development costs of [redacted] each in all cases, and ongoing costs of [redacted] each year post development, in all cases.

SJ-MPF launch date

A3.123 The decision on when SJ-MPF could be launched is determined by when our final decision on this dispute is published and the timescales for SJ-MPF development.

TalkTalk view

A3.124 TalkTalk assumes that services would be launched from the start of 2013/14.

A3.125 In terms of the required changes that would need to be made TalkTalk states that:

³²⁴ Openreach’s response to s191 notice, 16 August 2013, page 4

³²⁵ Openreach’s response to s191 notice, 22 August 2013, page 2. Openreach provided information on the development costs for sub-loop unbundling considered in May 2011 of [redacted] and MPF working line takeover of [redacted] which was considered in March 2010

³²⁶ Openreach response to s191 notice, 16 August 2013, page 4

³²⁷ Openreach response to s191 notice, 16 August 2013, page 4. Openreach states that a feasibility study could take 5-6 weeks.

*“the only changes from TalkTalk’s perspective would be to develop / change the engineering planning rules (e.g. where to deploy TAMs, tie cable for SJ-MPF), a modification to the tie cable and TAM ordering approach, a small change in the algorithm used to decide which tie cables to assign new MPF connection to and a change in the tie pair naming convention”.*³²⁸

A3.126 TalkTalk believes that it would take two months to complete this work, after which it would be ready to consume SJ-MPF. It believes that *“since Openreach’s development will be longer we will be ready to consume the SJ-MPF product as soon as it is available”.*³²⁹

Openreach view

A3.127 Openreach also assumed that services would be launched in 2013/14 Openreach said that its business plan was put together in May/June 2012 and that its *“assessment was based on the best possible outcome for CPs and assumed that for the year of launch CPs would benefit from a full year’s worth of savings to offset the upfront investment they would have to make”.*³³⁰

A3.128 Openreach estimates development timescales to be between 12 and 18 months, *“depending on which EMP release the necessary changes could be included in”.*³³¹ This estimate applies to both evoTAM and TAM based solutions, however, Openreach notes that an evoTAM-based solution may potentially be implemented *“marginally quicker”* because the evoTAM is *“currently configurable to accept in-line configuration”.*³³²

A3.129 In justifying its development timescales estimate, Openreach submits the following:

“Openreach currently operates an EMP release schedule consisting of six evenly sized releases a year. Openreach avoids re-prioritising the content of a release once work has started as it is not cost effective and leads to wasted design effort. This can also lead to disruption of CPs planning for adoption of previously advised developments.

Overall, there is little flexibility to re-prioritise current scheduled releases as this would require removing from the scope of a particular schedule items for which work might have already started, at a cost to Openreach and potentially to any other CP that has started its own development in parallel. The same practical considerations that affect the scheduling of a particular development into a particular release (e.g. size of the development, capacity of the release, skills required, etc.) would also apply to the re-prioritisation of current releases to bring forward a particular development.

*Replacing a development item in one release with another could potentially have a domino effect on a number of other developments in a number of subsequent releases unless the displaced items get pushed right back to the latest available release”.*³³³

³²⁸ TalkTalk response to s191 notice, 14 August 2013, page 5

³²⁹ TalkTalk response to s191 notice, 14 August 2013, page 8

³³⁰ Openreach response to follow-up questions to the s191 notice, 30 August 2013, page 2

³³¹ Openreach response to the s191 notice, 16 August 2013, page 4

³³² Openreach response to follow-up questions to the s191 notice, 30 August 2013, page 1

³³³ Openreach response to follow-up questions to the s191 notice, 30 August 2013, page 2

A3.130 Openreach suggests based on its experience to date that it may take from two months to two years for a CP to consume a product release, and notes that CPs would not commence their own required development work until Openreach published its release documentation, typically occurring 90 days before the product release date.³³⁴

Ofcom view

A3.131 We note Openreach's submissions regarding the type of development work required, and impact of the EMP release schedule. Openreach also told us³³⁵ that when it advised the industry group (Copper Products and Commercial Group) that it was rejecting the SOR in December 2012, it advised that "*considerable systems development would be required to create a new product – the earliest release anticipated end 13/14*". This would have been a 15 month horizon. This illustrates that TalkTalk was aware of the potential timeframes but did not explicitly question them in its dispute submission. While TalkTalk has not explicitly commented on how long Openreach would need for development, we note that the TalkTalk model upon which it based its May 2012 SOR assumed a start date of 2013/14.

A3.132 Our provisional view is that, based on the information it has provided, Openreach's estimate of 12 to 18 months for product development is not unreasonable. The development is likely to need to interact with other products and possibly encompass changes to inventory systems but more importantly would need to be scheduled within the EMP programme. We do not have any evidence to suggest that Openreach's 12 to 18 month timeframe for product development is unreasonable.

A3.133 Assuming we publish the final determination of this dispute in mid November 2013, then 12-18 months development lead time suggests a launch date of either December 2014/January 2015 or mid 2015. There are risks that it could be after this if there are further requirements and lead times associated with CPs implementing changes on their systems and ordering procedures.

A3.134 The model therefore has two options for the date from which SJ-MPF would start to be ordered: either January 2015 (i.e. from the start of quarter four of 2014/15) or July 2015 (i.e. the start of quarter two (Q2) 2015/16).

A3.135 Our base case assumes that SJ-MPF would be available, and therefore ordered, from Q2 2015/16. Whilst Openreach has said that a 12 month development timeframe might be possible, there are factors that could introduce delays, the most notable of which concern the scheduling of SJ-MPF development within the EMP programme. We also consider this not unreasonable given that we effectively assume that all demand can be met across all exchanges within a geo-type from the day that SJ-MPF services are launched; if there is sufficient demand after allowing for topping up of DJ-MPF assets (see paragraphs A3.35 – A3.44). In practice, implementation is likely to be phased, given the need to deploy SJ-MPF assets across the country, which would act to delay SJ-MPF take-up, and reduce the net adds available to use it.

³³⁴ Openreach response to follow-up questions to the s191 notice, 30 August 2013, page 1

³³⁵ Openreach response to follow-up questions to the s191 notice, 30 August 2013, page 3

Topping up DJ-MPF

A3.136 As explained in paragraphs A3.35 – A3.44 above, we expect the most efficient outcome for MPF provision would be to exhaust the remaining DJ-MPF capacity, before moving to SJ-MPF.

TalkTalk view

A3.137 The TalkTalk model assumed that CPs would use their spare capacity first under DJ-MPF. TalkTalk achieved this through 'rounding'. Under DJ-MPF it assumed that any incremental utilisation below 50% would not result in the installation of a new DJ-MPF asset. The implicit assumption was therefore that there was 50% spare capacity on each asset unit (i.e. 100 spare ports on a 200 port TASM, 50 spare ports on a 100 pair tie cable). The TalkTalk model therefore did incorporate a form of asset top-up though one that is different to what we have used in our model.

Openreach view

A3.138 The Openreach models did not include any explicit or implicit assumption about the topping-up of DJ-MPF assets.

Ofcom view

A3.139 TalkTalk's model did include spare capacity on DJ-MPF assets however did not remove net add volumes going onto SJ-MPF as a result of potential top-up of DJ-MPF assets.

A3.140 Our model includes input assumptions that allow the user to determine how much spare capacity there is on DJ-MPF assets in each geo-type exchange that will determine the extent of 'topping up' before investing in SJ-MPF.

Length of Assessment

A3.141 Any new product or service is likely to incur costs at the beginning (upon start-up), with any potential benefits (in this case cost savings) being achieved later (in the years following launch). As such, the longer the assessment period, the more likely it is that the NPV will be positive when the cash flow pattern involves an initial negative outlay(s) followed by a stream of positive cash flows.

A3.142 Some input into this decision comes from the economic lives of the most important assets. Under Openreach's accounting policies evoTASMs have a 7 year life, whereas standard TASMs have a 5 year life.³³⁶ However, Openreach also told us that currently [X] % of standard TASMs are fully depreciated suggesting that since DJ-MPF was launched over 8 years ago the economic life of TASMs is longer than 5 years.

A3.143 We understand that none of the other assets - tie cables, master controller units, test heads, and frame blocks - have a shorter economic life than TASMs.

A3.144 We have run our DCF analysis over 7 years. The economic life of TAMs appears to be at least 7 years, and no other assets have a shorter economic life. We therefore consider that a period of 5 years is too short but an assessment over 7 years is reasonable.

³³⁶ Openreach response to s191 notice, 16 August 2013, page 9

Volume Assumptions

A3.145 Given our 7 year horizon and potential starting date of 2015/16, we need to forecast MPF volumes out to 2021/22. But we also need forecasts for each of Sky and TalkTalk to assess the costs of SJ-MPF services.³³⁷

A3.146 We have developed our own forecasts based on the forecasting model used in the 2013 Charge Control Consultation³³⁸ coupled with the information received from TalkTalk, Sky and Openreach during our work on this Dispute.

A3.147 We asked TalkTalk and Sky to provide information on their MPF lines as follows:

- historic data from 2009/10 to 2012/13;
- 5 year forecasts made in each year from 2009/10 to 2012/13; and
- their most up to date forecasts for the period 2013/14 to 2020/21 (where available)

showing, in each case, total number of MPF lines at the start of the year, MPF gross supply throughout the year (including migration from other CPs) and MPF cessations throughout the year.

A3.148 We also asked for details of any critical assumptions underlying the forecasts and in particular details of their assumptions as to the effect of take-up of NGA³³⁹ on demand for MPF, and whether WLR or MPF will be used to provide the voice element for any customers taking fibre (i.e. 'next generation access' ("NGA")). Finally, we asked for assumptions as to the relative spread and concentration of new demand across exchanges and the key drivers that lead to variations in new demand across exchanges.

A3.149 Sky and TalkTalk both provided forecasts out to 2016/17. Both confirmed that their forecasts assumed that [X<].

Evidence on the accuracy of TalkTalk's and Sky's forecasts

A3.150 To assess the robustness of TalkTalk's and Sky's forecasts, we compared the historic forecasts they provided to the actual end year figures they reported to us. The results are presented in Figure A3.2 and Figure A3.3 below. These show that, as expected, forecast accuracy improves through time but, more importantly, that their forecasts have not been over optimistic.

³³⁷ We assume that no other operators would have sufficient scale to consider adopting SJ-MPF services given the requirement to pre-fund the installation of an in-line TAM.

³³⁸ This can be found at <http://stakeholders.ofcom.org.uk/consultations/llu-wlr-cc-13/>

³³⁹ Openreach currently provides two main fibre wholesale access services: Generic Ethernet access (GEA) fibre to the cabinet (FTTC) and fibre to the premises (FTTP) services. FTTP services provide a fibre connection all the way from the customer's premises to a handover point in an exchange. FTTC services provide a fibre connection from a street cabinet to a handover point in an exchange but rely on a copper connection from the customer's premises to the street cabinet. Openreach GEA-FTTC services generally have to be taken with either MPF or WLR. More information on Openreach's fibre services can be found at

<http://www.openreach.co.uk/orpg/home/products/pricing/loadProductPrices.do?data=Po3KnmqvCqPyVFu37aLXIdpyYOJW58IELJ3a1hFsXScqDWVqEbA2PDIT5Y2OhxKy>

Figure A3.2: TalkTalk Total MPF Forecasts [X]

□

Figure A3.3: Sky Total MPF Forecasts [X]

□

BT Forecasts of MPF

A3.151 We asked BT to provide its most up to date forecasts for the period 2013/14 to 2020/21 (where available) for each of: the total number of MPF lines at the start of the year; MPF gross supply throughout the year (including migration from other CPs); and MPF cessations throughout the year. We also asked for any details of any critical assumptions.³⁴⁰

A3.152 BT provided forecasts out to 2017/18 for the whole of the UK. BT also assumed that practically all [X] of non BT demand for GEA-FTTC would be provided in conjunction with MPF to provide voice services.³⁴¹

Ofcom's MPF forecasts

A3.153 On 11 July 2013, Ofcom published its 2013 Charge Control Consultation on its approach to LLU and WLR charge controls. The consultation included midyear forecasts for the total number of MPF lines out to 2016/17.³⁴²

A3.154 We have reviewed these forecasts and have refreshed them in the light of the volume data published within the 2013 RFS and volume data provided in support of this dispute. As forecasts are required beyond 2016/17 we have also extended the model to generate forecasts out to 2021/22³⁴³. These forecasts have been prepared using the same methodology as within the 2013 Charge Control model with one exception as follows. The charge control model assumed an all copper network whereas we are interested in actual demand for MPF. In reality, there will be some for GEA-FTTP volumes which will reduce MPF volumes as any GEA-FTTP lines will not require MPF or WLR to provide voice services. Our estimates of demand for FTTP services have been based on independent forecasts out to 2017/18, which we have then extended, although the impact is small (see below).

A3.155 The forecasts we have adopted are shown in Figure A3.4 below and are higher than those in the 2013 Charge Control Consultation. That is because reduced demand as a result of reflecting demand for FTTP is more than offset by the impact of using more up to date base year volume information.

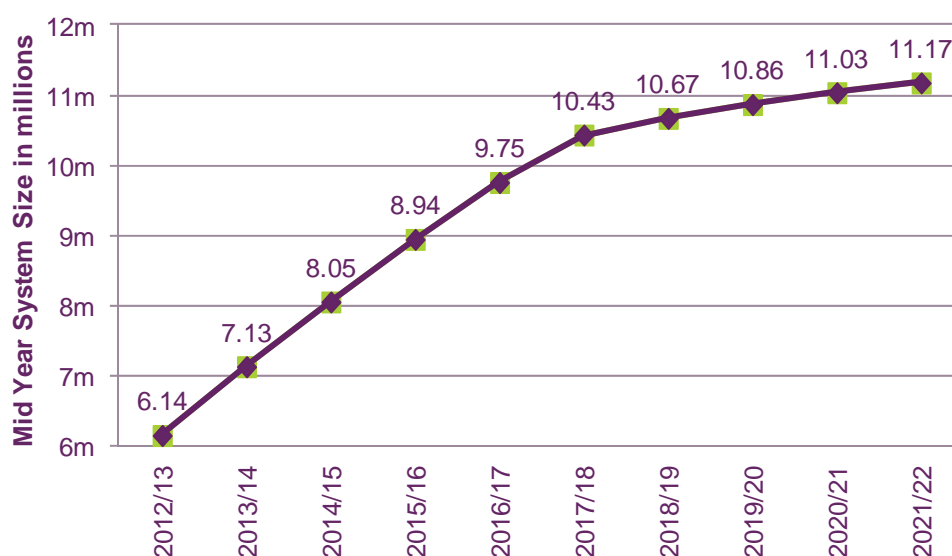
³⁴⁰ Openreach response to s191 notice, 16 August 2013, page 5 and to follow-up questions to the s191 notice, 30 August 2013, page 3

³⁴¹ Openreach response to s191 notice, 16 August 2013, page 6

³⁴² See Annex 8 and Annex 9, <http://stakeholders.ofcom.org.uk/consultations/llu-wlr-cc-13/>

³⁴³ We have extended our forecasts since the Provisional Conclusions out to 2024/25. This is discussed in paragraphs 4.166.9 to 4.166.10.

Figure A3.4: Ofcom forecasts of MPF



A3.156 We are forecasting that growth in MPF will start to reduce after 2017/18. The key assumptions that drive this are:

- 3.156.1 Broadband penetration approaches saturation, thus reducing the potential for growth;
- 3.156.2 Sky and TalkTalk will by then have migrated all their [redacted] customers served via SMPF onto MPF; and
- 3.156.3 Demand for FTTP has a further, though relatively small, impact on growth, with demand for Sky and TalkTalk FTTP estimated to be around 350,000 lines by 2021/22.³⁴⁴

Comparison of total MPF Forecasts

A3.157 Figure A3.5. below compares an aggregate of TalkTalk and Sky's MPF forecasts, Openreach's forecast and our forecast for the year end total number of MPF lines. Whilst there are differences, the forecasts are fairly consistent with each of them within 10% of each other by 2016/17.

Figure A3.5: Comparison of MPF forecasts [redacted]

Forecasts of Net demand by Operator

A3.158 The model requires forecasts for each of TalkTalk and Sky in order to be able to estimate equipment volumes for the SJ-MPF case. We have generated these from the above total forecasts for MPF based on the data provided to us by Openreach, Sky and TalkTalk. [redacted]. The data provided by Sky and TalkTalk also provides the split of net adds between these two CPs.³⁴⁵

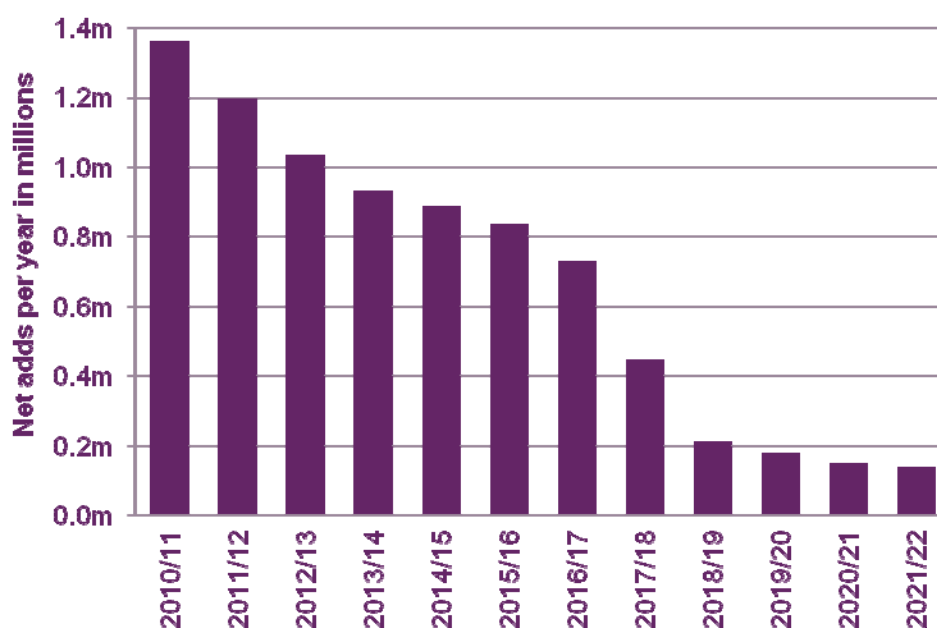
³⁴⁴ We have updated our forecasts of FTTP since the Provisional Conclusions. This is discussed in paragraph 4.166.10

³⁴⁵ To make all forecasts consistent we revised Sky's data to reflect that its reporting year was July to June whereas the remainder of the data we had was April to March. We did this via simple

A3.159 We have therefore generated separate net add forecasts for Sky and TalkTalk by assuming these operators account for 98% of our net add forecasts and dividing this between them in the ratio of the forecast each made of net adds in each year. This process produced the profile of net adds shown in Figure A3.6 below.

Figure A3.6: Net Add Forecasts of MPF by Operator [X]

Figure A3.6: Net Add Forecasts of MPF



Jumpering Installation Volumes

A3.160 Any jumpering cost savings that might result from moving to SJ-MPF will be driven by the volume of MPF lines that need to be installed each year. However these installation or gross supply volumes are not necessarily the same as 'net adds'. That is because net adds in a year is the result of gross supply (or installations) less cessations or churn. (See Table A3.1)

A3.161 The relevant volume that we are interested in is, therefore, the sum of net adds and churn. We are not, however, interested in any churn from DJ-MPF lines because we assume that these will be replaced by new lines being provided on DJ-MPF. The relevant churn is therefore only from those lines that have been installed on SJ-MPF.

A3.162 In the first year that SJ-MPF is introduced its gross supply will be the same as net adds as there will be very little churn from this base: all ceases will come from the existing DJ-MPF base and will be assumed to be met by DJ-MPF. However, in future years there will be churn from the installed SJ-MPF base. These cessations need to be included within the total number of SJ-MPF lines – and hence jumpers – that need to be installed.

interpolation. So for example the April 2013 figures were 25% of Sky's 1 July 2013 figures and 75% of Sky's 1 July 2014 figure.

Statement and Determination concerning a dispute between TalkTalk and Openreach relating to single jumpered MPF

TalkTalk view

A3.163 TalkTalk assumed that jumpering volumes were the sum of net adds and churn from the SJ-MPF base.

Openreach view

A3.164 Openreach assumed that jumpering volumes were driven by net adds, so it did not make any allowance for churn. We believe this will have understated the volume of lines that need to be installed on SJ-MPF in later years and hence have understated jumpering cost savings.

Ofcom view

A3.165 We have adopted TalkTalk's approach to estimating installation volumes for jumpering savings. We have forecast the relevant installation volumes as the sum of net adds plus churn, estimated at 15% of the SJ-MPF base at the start of the year.

Disconnection Volumes

A3.166 TalkTalk's model included savings from reduced disconnection activity. Its argument was that if fewer jumpers are installed under SJ-MPF then there will be fewer to remove in the future.

TalkTalk view

A3.167 TalkTalk estimated disconnection volumes as being the same as the churn rate. It estimated these volumes at 15% of the SJ-MPF total number of MPF lines at the start of the year.

Openreach view

A3.168 Openreach also included an allowance for disconnection savings within its model though this did include the following comment: "*However Openreach leave jumpers in situ as part of flexicease. Benefit overstated as jumper recovery is only a fraction compared to jumper provision*".³⁴⁶ It estimated these savings as being 15% of connection savings. Since connection savings were based on net adds the implicit volume Openreach added was 15% of net adds.³⁴⁷

Ofcom view

A3.169 We believe that there will be some savings from disconnection activity in the future but that the relevant volume is not the forecast total churn rate.

A3.170 There are several different components to total MPF cessations:

- Stopped lines. These are flexi-ceased, which means that jumpers are not physically removed though there will be periodic clean-ups of frames.

³⁴⁶ Comment in Openreach (business case) model, sheets 'Business case EvoTAM Only' and 'Business case LLU TAM Only'

³⁴⁷ Openreach response to s191 notice, 16 August 2013, page 7

Statement and Determination concerning a dispute between TalkTalk and Openreach relating to single jumpered MPF

- Lines that migrate to other MPF providers. The jumpering activity associated with these migrations has already been included in the jumpering installation volumes discussed above.
- Lines that migrate to WLR or WLR + SMPF. This would result in one less jumpering movement under SJ-MPF compared to DJ-MPF.

A3.171 In the Provisional Conclusions, we said that we did not have any data to estimate what proportion of MPF cessations each of the above might be. The only element we need to forecast is the last element, lines that migrate to WLR or WLR + SMPF. We have assumed that this accounts for 35% of migrations. This is broadly consistent with the ratio of WLR new provides (excluding takeovers) to MPF new provides within the 2013 Charge Control Consultation forecasts at the end of the charge control period. We believe this is, if anything, likely to be too high given that the ratio is likely to decrease over time as the proportion of MPF increases as a proportion of total copper lines (i.e. WLR and WLR + SMPF is forecast to decline).³⁴⁸

Demand concentration and geo-types

A3.172 The way demand is concentrated across exchanges is important because different quantities of assets (e.g. TAMs, tie cables, master controllers) may be needed depending on the demand level, which will affect costs. The lower demand (net additions) there is at any given exchange the higher the costs will be per line as a result of installing assets (such as TAMs for SJ-MPF) with lumpy capacity.

TalkTalk view

A3.173 The TalkTalk model has five geo-types, each of which carries a proportion of total demand (i.e. net adds). TalkTalk allocated 600 exchanges to each of its five geo-types, with the following demand/volume concentrations [3]. In essence this says that net adds in the 'top 600 volume exchanges' will be seven times that of the 'bottom 600 volume exchanges'.³⁴⁹

Openreach view

A3.174 The Openreach models assume that CPs (TalkTalk and Sky) would only adopt SJ-MPF in [3] exchanges. The models justify this assumption based on the proportion of sites where new tie cables had been ordered in 2011/12. They assume that demand (net adds) is uniformly distributed across these [3] exchanges.

Ofcom view

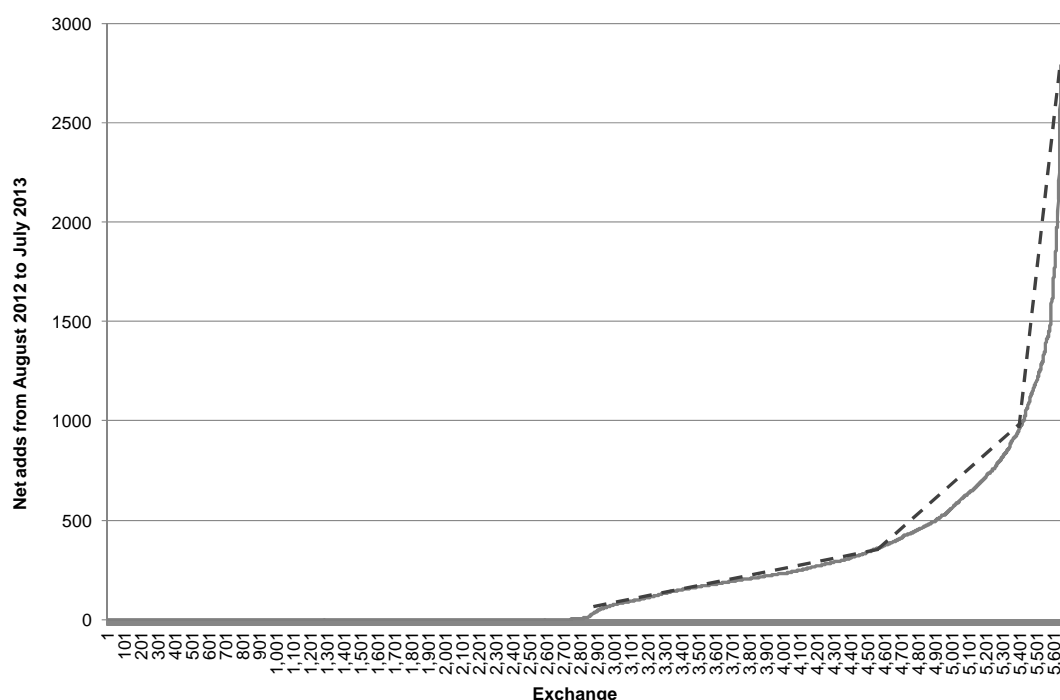
A3.175 Net additions are the main cost driver and therefore the distribution of net adds across exchanges is important. Figure A3.7 below shows net adds by exchange from August 2012 to July 2013, along with our segmentation of the chart.³⁵⁰

³⁴⁸ In this Statement and Determination we have updated our view. See paragraphs 4.78 – 4.101

³⁴⁹ TalkTalk dispute submission, 23 June 2013, page 10, paragraph 6.17

³⁵⁰ Source: Ofcom analysis of '299-Ofcom Supplement' (LLU WSS report) from Openreach

Figure A3.7: Net adds by exchange from August 2012 to July 2013



Source: Ofcom analysis of data from BT.

A3.176 Whilst the distribution of net adds is fairly smooth it covers a wide range. Rather than model very many geo-types, we have simplified the analysis by defining four groups of exchanges:

- Group 1: exchanges with fewer than 50 net adds in the past 12 months from August 2012 to July 2013. Given that there is a minimum number of net adds required to make single jumpering worthwhile, and net adds are falling, we think that it would not be economic for CPs to supply single jumpering in these exchanges.
- Group 2³⁵¹: exchanges with net adds between 50 and 400 in the past 12 months. These exchanges are low demand exchanges and would likely need one or two TASMs to meet demand in the first year and may need several more TASMs in the future.
- Group 3: exchanges with net adds between 400 and 1,000 in the past 12 months. These are medium demand exchanges and would require a higher number of TASMs throughout the assessment period.
- Group 4: exchanges with net adds more than 1,000 in the past 12 months. These are the exchanges with the largest demand for TASMs in the future.

A3.177 As the dashed line in Figure A3.7 shows, our segmentation approximates the actual net adds curve reasonably well. We refer to the above four groups of exchanges as being different geo-types. Table A3.9 below summarises the results of our analysis. It shows the number of exchanges in each geo-type together with the shares of net adds.

³⁵¹ In this Statement and Determination we have updated the range for Group 2, see paragraphs 4.25 - 4.29

Table A3.9: Ofcom model geo-type breakdown

Band of Net adds	No of Exchanges	% of Exchanges	Total Net adds	% of net adds
0-50	272	52%	[<]	0.22%
51-400	1,763	31%	[<]	32.20%
401-1000	743	13%	[<]	40.46%
1000+	222	4%	[<]	27.12%
Total	3,000	100%	[<]	100.00%

Standard TASM versus evoTASM

TalkTalk view

A3.178 The TalkTalk model assumes in its base case that a standard TASM is used, but included an option to instead use evoTASMs.³⁵² The use of evoTASMs resulted in a significantly higher cost, and therefore a lower NPV.

Openreach view

A3.179 The Openreach models include NPV analysis for both evoTASM and standard TASM solutions. In Openreach's models evoTASMs are considerably more expensive.

Ofcom view

A3.180 If the evoTASM provided additional functionality that was beneficial to CPs compared to the standard TASM, a higher cost may be justified. However, TalkTalk claims that there is no benefit from a SJ-MPF solution provided by evoTASMs as opposed to standard TASMs. Our understanding is that there are two potential benefits. First, the evoTASM is already configured to work in an in-line configuration whereas the standard TASM is not. However, as explained above, we have taken this into account by including the higher development costs for a standard TASM based solution as provided by Openreach. Second, the evoTASM also provides the capability for multiple test heads to access the line – the voice line test head used by Openreach and, potentially, a broadband test head used by the CP. However, as the CPs that are likely to use SJ-MPF already have alternative broadband testing solutions, we do not consider this additional functionality of the evoTASM would be beneficial. Finally, based on information provided by Openreach, we understand that there would be a delay introduced if evoTASMs are used as the supplier would need to re-start the production process.³⁵³ Longer production lead times would, as well as delaying the benefits from SJ-MPF (due to the effect of discounting), yield lower benefits due to falling volumes of net adds over time.

A3.181 Therefore, whilst the model is set-up to test the cost impact of utilising an evoTASM based SJ-MPF solution, we do not consider it appropriate for any of our scenarios. We have instead favoured a standard TASM in all the Ofcom scenarios.

³⁵² TalkTalk dispute submission, 23 June 2013, page 15, paragraph 6.33

³⁵³ Openreach response to s191 notice, 16 August 2013, page 2

Frame costs

TalkTalk's view

A3.182 In its dispute submission TalkTalk explains that:

*“The frame cost (from MDF-use and MDF-repair costs) for SJ-MPF is lower since only one jumper is used and therefore less space on the MDF is used and less repair activity will be required. The saving is £4.13. This is based on the figure (£3.13) provided by Ofcom in its LLU Charge Control Statement for 2013/14 (Table A9.6 of statement) which excludes ROCE and assuming £1.00 for ROCE”.*³⁵⁴

A3.183 This frame saving is a cost per jumper. As TalkTalk assumed there is one less jumper for each connection this is therefore also a cost per line. Frame costs were a key component of TalkTalk's model, contributing [x] of its total estimated NPV of £60 m.

Openreach's view

A3.184 In its models Openreach identified the costs of frame blocks as being the only relevant contribution to any costing savings of SJ-MPF working. Openreach explained that, with respect to frame capital *“In addition to the MDF block, there is capital cost for the frame ironwork, i.e. the physical infrastructure that the blocks sit on, including ladders and lighting”.*³⁵⁵ It also explained that *“frame maintenance is a combination of replacement of faulty blocks, repairs to jumpers and periodic maintenance of ladders (e.g. regular ladder checks for safe operation). There is no detailed breakdown available between the costs of these different activities”.*³⁵⁶ Finally Openreach said *“it is unlikely that there would be any overall material difference in the shared cost of frame maintenance with the addition of a SJ configuration”.*³⁵⁷

A3.185 In Openreach's 'business case' model, the only reference to frame costs was to saved frame block costs. These have been separately included in the Ofcom DCF model. Openreach's 'industry wide' model included two impacts of frame costs on rental prices, both of which were derived from forecasts of 2013/14 fully allocated costs within an internal Openreach model. These impacts were [x] for 'use of main distribution frame'³⁵⁸ and [x] for 'repairs on main distribution frame'.³⁵⁹

Ofcom's view

A3.186 We consider that it is unlikely that the cost of ironwork, ladders or physical infrastructure that frame blocks rest on will vary if the number of jumpers changes. Therefore, our provisional view is that there do not appear to be any incremental capital costs of frames that we need to consider other than the costs of frame blocks.

³⁵⁴ TalkTalk dispute submission, 25 June 2013, page 15, paragraph 6.32

³⁵⁵ Openreach response to follow-up questions to the s191 notice, 28 August 2013, page 5

³⁵⁶ Openreach response to follow-up questions to the s191 notice, 28 August 2013, page 5

³⁵⁷ Openreach response to follow-up questions to the s191 notice, 28 August 2013, page 5

³⁵⁸ Being [x] for DJ-MPF minus [x] for SJ-MPF

³⁵⁹ Being [x] for DJ-MPF minus [x] for SJ-MPF

Statement and Determination concerning a dispute between TalkTalk and Openreach relating to single jumpered MPF

A3.187 It is less clear, though, whether SJ-MPF would produce any incremental savings in frame repair costs or other operating costs associated with frames. We note in this regard that:

3.187.1 Maintenance of ladders is unlikely to vary with the number of jumpers;

3.187.2 It is possible that some replacement of faulty blocks would be required, though Openreach have told us this is minimal;

3.187.3 It is possible that some repair of jumpers would be required, though again Openreach has said this is minimal; and

3.187.4 Whilst the reduced number of jumpers and blocks may lead to lower fault rates (and therefore lower costs) in SJ-MPF, fault rates may be increased due to the complexity of operating two sets of provisioning processes and systems for MPF.

A3.188 Openreach's view was that there would be no incremental costs associated with frame maintenance though Slide 5 of its presentation of its evaluation of SOR 8333 notes that a benefit (or 'pro') of SJ-MPF was "*reduced cabling and termination associated with the LLU TAM avoiding cost and future congestion of MDFs*".³⁶⁰ There is therefore some inconsistency in Openreach's position.

A3.189 We believe that there would be at least some incremental savings on frame operating costs as a result of SJ-MPF working. However, we do not have cost data consistent with that used in the remainder of the model, upon which to base any estimates. The only data available to us is regulatory FAC or LRIC data supporting BT's RFS.

A3.190 In our 2012 Charge Control Statement, Annex 9, we noted that "*the WLR cost stack provides a reasonable proxy for the costs of the use of the MDF and the tie cables from the MDF to the TAM for the single jumpering approach*".³⁶¹ That is because a WLR line requires only one jumper and therefore has the same jumpering as SJ-MPF.³⁶² We then included 2013/14 forecast costs, which we noted did not include an element for ROCE,³⁶³ for use of MDF and repair of MDF. These are the basis of TalkTalk's input assumptions on frame cost savings. These are set out in Table A3.10 below:

³⁶⁰ SOR 8333 Evaluation presentation, December 2012 (Annex 3 to Openreach's response to TalkTalk's dispute submission)

³⁶¹ Ofcom, 'Charge control review for LLU and WLR services', 7 March 2012, paragraph A9.71

³⁶² See Figure A2.3 in Annex 2 for WLR wiring diagram

³⁶³ Ofcom, 'Charge control review for LLU and WLR services', 7 March 2012, paragraph A9.72

Table A3.10: 2013/14 Forecast Costs for Frames Components

	MPF	WLR	Difference
Use of MDF	£3.20	£1.60	£1.60
Repair of MDF	£2.89	£1.36	£1.53
Sub-total	£6.09	£2.96	£3.13

Source: Figure A9.6 of 2012 Charge Control Statement

A3.191 We have updated this analysis using data from BT's RFS. In its RFS BT reports costs for the components '*local exchanges general frames capital*' and '*local exchanges general frames current*'. These are analogous to '*use of MDF*' and '*repair of MDF*' referred to above.³⁶⁴ Table A3.11 shows the results using data published in BT's 2012 and 2013 RFS.

Table A3.11: Frame component costs from RFS

	2011/12 RFS Costs			2011/12 RFS (restated)			2012/13 RFS		
	MPF	WLR	Difference	MPF	WLR	Difference	MPF	WLR	Difference
LE general frames capital	£3.41	£1.71	£1.70	£3.43	£1.72	£1.71	£3.61	£1.81	£1.80
LE general frames current	£2.34	£1.17	£1.17	£2.34	£1.17	£1.17	£2.21	£0.86	£1.35
Total	£5.75	£2.88	£2.87	£5.77	£2.89	£2.88	£5.82	£2.67	£3.15

Source: BT's RFS

A3.192 We believe that we have captured any potential CAPEX savings that might occur from moving to SJ-MPF on the cost component '*LE general frames capital*' through block cost savings. As noted above, we have not been able to identify any other forward looking CAPEX savings. This suggests that any savings that might be appropriate to include would be associated with the costs covered by the '*LE general frames current*' cost component.

A3.193 The RFS, however, generally reports FAC with some disclosure of LRIC costs for some services, not components. Ofcom receives some LRIC data for components from BT under its Additional Financial Information (AFI) schedules. However the increment on which these calculations are based is demand for the whole component and therefore may not be a good measure of how costs might vary as the numbers of jumpers installed changes.

A3.194 In the absence of any other data we have used the component LRIC data that BT provides within its AFIs to estimate the likely scale of operating cost savings on frame repair and maintenance costs. We have adjusted these costs by restricting the analysis to costs within the following sectors: provision, maintenance, general support, plant support, customer support, planning and development and supplies

³⁶⁴ 'Use of MDF' and 'Repair of MDF' was the description used in the model to set charges for the 2012 Charge Control Statement.

and transport. We have excluded costs from the following sectors: POLOs,³⁶⁵ marketing and sales, finance and billing, computing, personnel, accommodation, general management and other on the grounds that these are unlikely to vary with the number of jumpers that are installed. We have also excluded depreciation and capital costs. For *LE general frames current* these are small and will not reflect the direct costs of the frame itself as these will be within the *LE general frames capital* component.

A3.195 Applying the same methodology but to these LRIC estimates (and only for the component *LE general frames current*) produces estimates of incremental costs of [x] and [x] per jumper in 2011/12 and 2012/13 respectively. Those compare to the FAC differences (between MPF and WLR) reported above of £1.17 and £1.35.

A3.196 We have also undertaken some further cross checks with the outputs from the 2013 Charge Control model. This model estimates that the difference in local exchange frames current FAC between MPF and WLR is [x] in 12/13 decreasing to [x] in 16/17. We would expect LRIC costs to be around 90% of the FAC costs for this component.³⁶⁶ This suggests the LRIC differential between MPF and WLR is about [x] for frames current costs.

A3.197 Reflecting the uncertainty in our estimates above we have rounded the base case to £1 per line per annum, noting that the higher these costs the greater the cost savings from SJ-MPF. The upper bound we consider to be £1.35 which is the fully allocated operating cost estimate from the RFS in 2012/13.

Input price inflation, and efficiency assumptions

Openreach and TalkTalk views

A3.198 The Parties' models did not account for any price inflation or efficiencies.

Ofcom view

A3.199 Absent evidence to the contrary and because to a degree input price inflation and efficiency are likely to work in opposite directions, as a proportionate modelling simplification we have assumed, like the Parties, that all input prices remain flat in nominal terms.

Discount Rate

Openreach and TalkTalk views

A3.200 Openreach assumed various discount rates in its models ranging from 11.4% for the Openreach business case assessment to 6-10% in its industry models. TalkTalk assumed a discount rate of 8.8% in its model, which is consistent with Ofcom's

³⁶⁵ POLOs are payments to other licensed operators and relate to call conveyance services. The amounts reported against POLOs are very low. They probably relate to 'own use' calls, i.e. calls made by BT support staff working on activities associated with these components.

³⁶⁶ See for example Table 6.1 on page 161 of the most recent WLR/LLU charge control consultation. This gives the CVE (a reasonable proxy for the LRIC/FAC ratio) for local exchanges frames current to be 0.94. Also see Figures 8.9 and 8.10 in <http://stakeholders.ofcom.org.uk/binaries/consultations/wlr-cc-2011/summary/wlr-cc-2011.pdf>. These imply the LRIC/FAC ratio was around 87% for this component in 2010/11.

latest assessment of Openreach's pre-tax nominal weighted average cost of capital (WACC).

Ofcom view

A3.201 The Ofcom DCF model is a nominal model so it is appropriate to use a nominal discount rate in the analysis. We have used our most recent assessment of Openreach's WACC of 8.8% (pre-tax nominal) as the base case. We have also run a sensitivity at 9.9% (pre-tax nominal), which is our latest assessment of the WACC for the rest of BT.

Ofcom model outputs

A3.202 Due to the number and material impact of sensitivities in the model, we have done some scenario analysis, which shows how the NPV of the incremental cost difference varies, depending on different input assumptions. These scenarios and their respective NPV outputs are displayed in Figure A3.12 below.

A3.203 We have applied across all scenarios the same assumptions for:³⁶⁷

3.203.1 TASM type: All scenarios use a 200 port standard TASM, as following some sensitivity analysis we think this likely to be the lowest cost option

3.203.2 Geo-type: We use the same geo-type exchange split for all scenarios

3.203.3 Years of assessment: In the Provisional Conclusions we used³⁶⁸ a 7 year assessment period for all scenarios

3.203.4 TASM CAPEX: We assume that in all scenarios the cost of TASM and associated equipment (i.e. blocks, tie cables, racks, master controllers, etc) is the same

3.203.5 WACC: All scenarios use the same WACC

3.203.6 DJ-MPF top-up: The amount of spare DJ-MPF capacity to top-up by the time SJ-MPF is launched.

A3.204 Of the many assumptions in the model, a number require forecasts or estimates that are more uncertain than the assumptions summarised in the preceding paragraph. These include:

- Demand volumes (driven by the volume adjuster assumption and the SJ-MPF launch date assumption)
- Frame savings (frame saving assumption)

A3.205 To sufficiently capture the impacts of different parameters, we have generated five scenarios, which range from a 'high scenario' which produces a high-end SJ-MPF NPV cost saving, to a 'low scenario' which produces a low-end SJ-MPF NPV cost saving.

³⁶⁷ We note that while we did conduct some analysis on terminal TASM values, due to the negligible impact they had, we did not include them in this scenario analysis.

³⁶⁸ In this Statement and Determination, we have revised the number of years over which we make our assessment. See paragraphs 4.139 - 4.143

Statement and Determination concerning a dispute between TalkTalk and Openreach relating to single jumpered MPF

A3.206 The modelling sensitivities for each scenario are detailed in Table A3.12 below, along with the output NPV figure. The table shows that given different assumptions, there are a wide range of possible NPV outputs.

Table A3.12 - Ofcom model NPV output for each scenario³⁶⁹

	High Scenario	Medium-high Scenario	Medium Scenario	Medium-low Scenario	Low Scenario
SJ-MPF launch date	Start Q4 2014/15	Start Q2 2015/16	Start Q2 2015/16	Start Q2 2015/16	Start Q2 2015/16
Frame saving	£1.30	£1.15	£1.00	£0.85	£0.70
Volume adjuster	+20%	+10%	0%	-10%	-20%
Average net number of jumpers installed	0.9	0.85	0.8	0.75	0.7
NPV:	+ £5.6m	- £1.8m	- £4.7m	- £7.5m	- £9.2m

A3.207 We have also done some sensitivity analysis on the above medium scenario, around individual parameters.

Table A3.13 - Ofcom model medium scenario individual sensitivity analysis³⁷⁰

	Base case	Change to	Output
Base case	-	-	-£4.7m
SJ-MPF launch date	Start Q2 2015/16	Start Q4 2014/15	-£0.8m
Assessment life	7	6	-£7.1m
Volume adjuster	0%	-10%	-£7.0m
Volume adjuster	0%	+10%	-£2.6m
Frame saving (per line)	£1	£1.35	-£3.4m
WACC	8.8%	9.9%	-£4.8m
Top-up – TASM utilisation	90%	92%	-£3.8m
Top-up – TASM utilisation	90%	88%	-£7.1m

A3.208 Finally, we also considered how the NPV per line compared to the Openreach (rental and connection) revenue per line. Using 2012/13 RFS data, Openreach had revenues of £124.5 per MPF line.

A3.209 Table A3.14 (below) converts the NPV output figures from table A3.12, above to yearly figures using an annuity formula over 7 years at 8.8% interest. Each yearly

³⁶⁹ This table has been updated in this Statement and Determination, see Table 6 above

³⁷⁰ This table has been updated in this Statement and Determination, see Table 7 above

Statement and Determination concerning a dispute between TalkTalk and Openreach relating to single jumpered MPF

figure is then divided by the number of MPF lines in 2013/14 (the assessment start year). The result is a figure for the annual NPV cost impact per MPF line from SJ-MPF for each of the five scenarios.

Table A3.14 – Annual NPV value per line for each scenario

	High Scenario	Medium-high Scenario	Medium Scenario	Medium-low Scenario	Low Scenario
Annual effect per line	+£0.15	-£0.05	- £0.13	- £0.21	- £0.25

Annex 4

SMP Conditions

Introduction

A4.1 This annex sets out, for ease of reference, the SMP Conditions that are most relevant to this Dispute. The full set of SMP Conditions, along with the accompanying explanatory statement, was published as the 2010 WLA Statement.³⁷¹

The SMP conditions

Condition FAA1 - Requirement to provide Network Access on reasonable request

FAA1.1 Where a Third Party reasonably requests in writing Network Access, the Dominant Provider shall provide that Network Access. The Dominant Provider shall also provide such Network Access as Ofcom may from time to time direct.

FAA1.2 The provision of Network Access in accordance with paragraph FAA1.1 above shall occur as soon as it is reasonably practicable and shall be provided on fair and reasonable terms, conditions and charges and on such terms, conditions and charges as Ofcom may from time to time direct.

FAA1.3 The Dominant Provider shall comply with any direction Ofcom may make from time to time under this Condition.

FAA1.4 The Direction dated 20 March 2008 concerning service level agreements, as published on the same day at Annex 2 of the statement entitled 'Service level guarantees: incentivising performance', given by Ofcom under Condition FA1.2 shall continue to have force, until such time it is modified or withdrawn, as if it has been given under Condition FAA1.2 from the date that this Condition enters into force and that Direction shall be read accordingly.

Condition FAA2 – Requests for new Network Access

FAA2.1 The Dominant Provider shall, for the purposes of transparency, publish reasonable guidelines, in relation to requests for new Network Access made to it. Such guidelines shall detail: (a) the form in which such a request should be made; (b) the information that the Dominant Provider requires in order to consider a request for new Network Access; and (c) the time-scales in which such requests will be handled by the Dominant Provider.

FAA2.2 These guidelines shall meet the following principles: (a) the process should be documented end-to-end; (b) the timescales for each stage of the process shall be reasonable; (c) the criteria by which requests will be assessed shall be clearly identified; and (d) any changes to the guidelines be agreed between the Dominant Provider and industry.

FAA2.3 The Dominant Provider shall, upon a reasonable request from a Third Party considering making a request for new Network Access, provide that Third Party with information so as to enable that Third Party to make a request for new Network Access.

³⁷¹ Available at:

http://stakeholders.ofcom.org.uk/binaries/consultations/wla/statement/WLA_statement.pdf

Statement and Determination concerning a dispute between TalkTalk and Openreach relating to single jumpered MPF

Such information shall be provided within a reasonable period. Review of the wholesale local access market 190

FAA2.4 On receipt of a written request for new Network Access, the Dominant Provider shall deal with the request in accordance with the guidelines described at paragraph FAA2.1 above. A modification of a request for new Network Access which has previously been submitted to the Dominant Provider, and rejected by the Dominant Provider, shall be considered as a new request.

FAA2.5 The Dominant Provider is required to provide Ofcom with a description of the processes it has put in place to ensure compliance with this Condition. The Dominant Provider shall keep those processes under review to ensure that they remain adequate for that purpose. Where changes to the process are agreed with industry, the Dominant Provider should notify Ofcom of those changes.

Condition FAA9 – Requirement to provide Local Loop Unbundling Services (LLU)

FAA9.1 Where a Third Party reasonably requests in writing Local Loop Unbundling Services, the Dominant Provider shall provide those Services, which shall include, where also so requested by the Third Party, such Ancillary Services as may be reasonably necessary for the use of those Services. The Dominant Provider shall also provide such Ancillary Services or other Network Access as Ofcom may from time to time direct to ensure the provision of Local Loop Unbundling Services.

FAA9.2 The provision of Local Loop Unbundling Services, together with any Ancillary Services, in accordance with paragraph FAA9.1 shall occur as soon as reasonably practicable and shall be provided on fair and reasonable terms, conditions and charges and on such terms, conditions and charges as Ofcom may direct from time to time.

FAA9.3 The Dominant Provider shall comply with any direction Ofcom may make from time to time under this Condition.

FAA9.4 In this Condition: (a) “Ancillary Services” mean an Associated Facility or services associated with an Electronic Communications Network and/or an Electronic Communications Service which enable and/or support the provision of services via that Network and/or Service or have the potential to do so, which include at a minimum (but without limitation) the following: (i) power; (ii) Co-Location; (iii) Co-Mingling; (iv) Site Access; (v) Internal Tie Circuits; (vi) External Tie Circuits.