## Annex 8

# Directions

# Schedule 1

## Direction under sections 49 and 49A of the Communications Act 2003 and SMP services Condition 1, proposed as a result of the analysis of the wholesale market for low bandwidth traditional interface symmetric broadband origination in the UK excluding the Hull Area, at bandwidths up to and including 8Mbit/s

## Background

- On 28 March 2013, Ofcom concluded its review of the business connectivity markets (BCMR) in which it identified markets, made market power determinations and set appropriate SMP conditions as set out in the Notification at Annex 7 to the BCMR, and explained in the accompanying explanatory statement.
- 2. Ofcom determined in the BCMR that BT, as a Dominant Provider, has significant market power in, amongst others, the wholesale market for low bandwidth traditional interface symmetric broadband origination in the UK excluding the Hull area, at bandwidths up to and including 8Mbit/s.
- 3. SMP services Condition 1 was set in relation to, amongst others, the market referred to in paragraph 2.
- 4. This Direction concerns matters to which SMP services Condition 1 relates.
- 5. For the reasons set out in the explanatory statement accompanying this Direction, Ofcom is satisfied that, in accordance with section 49(2) of the Act, this Direction is:
  - i. objectively justifiable in relation to the networks, services, facilities, apparatus or directories to which it relates;
  - ii. not such as to discriminate unduly against particular persons or against a particular description of persons;
  - iii. proportionate to what it is intended to achieve; and
  - iv. in relation to what it is intended to achieve, transparent.
- 6. For the reasons set out in the explanatory statement accompanying this Direction, Ofcom is satisfied that it has acted in accordance with the relevant duties set out in sections 3 and 4 of the Act.
- 7. Ofcom has considered every representation about the proposed Direction duly made to it and the Secretary of State has not notified Ofcom of any international obligation of the United Kingdom for the purposes of section 49A(6) of the Act.

# NOW, therefore, pursuant to SMP services Condition 1, Ofcom makes the following Direction:

## Definitions

For the purpose of interpreting this Direction the following definitions shall apply:

"Act" means the Communications Act 2003;

"**Dominant Provider**" means British Telecommunications plc, whose registered company number is 1800000 and any British Telecommunications plc subsidiary or holding company, or any subsidiary of that holding company, all as defined in section 1159 of the Companies Act 2006;

"Hull Area" means the area defined as the 'Licensed Area' in the licence granted on 30 November 1987 by the Secretary of State under section 7 of the Telecommunications Act 1984 to Kingston upon Hull City Council and KCOM Group plc;

"**Point of Connection**" means a point at which the Dominant Provider's electronic communications network and another person's electronic communications network are connected;

"**Third Party**" means a person providing a public electronic communications service or a person providing a public electronic communications network.

For the purpose of this Direction the following terms shall have the meaning as set out in the Dominant Provider's Standard PPC Handover Agreement, as at the date of publication of this Direction, but with the necessary changes in order to ensure compliance with the Direction:

- Advance Capacity Order
- Advance Order Commitment
- BT Retail Private Circuit
- BT Serving Node
- Capacity Order
- Capacity Profile
- Customer Sited Handover ("CSH")
- Forecast Profile
- In-Span Handover ("ISH")
- Re-Designation
- Qualifying BT Retail Private Circuit

The following definitions shall also apply for the purpose of this Direction:

Term	Definition
Acceptance of Terms	Date on which a Third Party confirms acceptance of delivery conditions and is committed to the order.
Civil Works	Works that necessitate the digging up of a street for the installation of ducts.
Committed Delivery Date	The date confirmed by the Dominant Provider as the delivery date.
Firm Offer Confirmation ("FOC")	Confirmation by the Dominant Provider in writing (by fax or e-mail) to a Third Party of the delivery conditions including price and Committed Delivery Date, after acknowledging receipt of an order for a Partial Private Circuit or Network Infrastructure from a Third Party.
FOC Acceptance Interval	The number of working days from the FOC Date until the Acceptance of Terms.
FOC Date	The date on which the Dominant Provider makes a Firm Offer Confirmation.
FOC Receipt Interval	The number of working days from the Order Request Date until the FOC Date.
Installation Date	Date of installation of a Partial Private Circuit or Network Infrastructure.
Network Infrastructure	The categories of products listed in the table contained in paragraph 51 of this Direction.
Order Request Date	Date on which a Third Party dispatches a valid Partial Private Circuit order, or Network Infrastructure order, to the Dominant Provider.
Partial Private Circuit ("PPC")	A circuit provided pursuant to the PPC Contract and in accordance with the Directions.
PPC Contract	The Dominant Provider's Standard PPC Handover Agreement as at the date of publication of this Direction.
Provisioning Interval	The number of working days from the Order Request Date until the Installation Date.
Requisite Period	The period commencing on the Order Request Date and ending on the applicable

paragraphs 41 and 51 of this Direction.
The period commencing on the Order Request Date and ending on the applicable working day as set out in the tables in paragraphs 44 and 54 of this Direction.
A Partial Private Circuit which can be delivered on dedicated pre-provided Network Infrastructure where spare capacity exists.

Except as otherwise defined and/or as the context otherwise requires, words or expressions shall have the same meaning as in the Act.

The Interpretation Act 1978 shall apply as if this Direction was an Act of Parliament.

Headings and titles shall be disregarded.

# The Dominant Provider shall provide Partial Private Circuits and shall do so in accordance with this Direction.

#### Migration

1. The 12 month contractual minimum term placed upon a Third Party, for the provision of a Partial Private Circuit which has been migrated pursuant to the PPC Contract, shall be measured from the date that the original BT Retail Private Circuit was brought into service.

2. The Dominant Provider shall not impose any deadline before which a Third Party must inform the Dominant Provider that it requires a BT Retail Private Circuit to be migrated to an equivalent Partial Private Circuit status under the PPC Contract.

3. The Dominant Provider shall allow a BT Retail Private Circuit, which fell within paragraph 1.3 of the Phase 1 PPC Direction published on 14 June 2002, to be considered under the PPC Contract as a Qualifying BT Retail Private Circuit.

4. A circuit deemed to be a Qualifying BT Retail Private Circuit under paragraphs 20 or 21 of the Phase 2 PPC Direction published on 23 December 2002 shall continue to be a Qualifying BT Retail Private Circuit.

5. Where a Third Party was not previously eligible to migrate a BT Retail Private Circuit to a Qualifying BT Retail Private Circuit, but subsequently becomes eligible to do so, the Dominant Provider shall, for 60 working days following the date on which the Third Party's circuits become eligible for migration, allow migration without the Third Party incurring any penalty (including any default or early termination charge) under its agreement with the Dominant Provider for the provision of BT Retail Private Circuits.

6. Where, at the date of publication of this Direction, the Dominant Provider offers a BT Retail Private Circuit product and does not offer an equivalent Partial Private Circuit product, but subsequently offers to provide an equivalent Partial Private Circuit product, it shall allow a Third Party to migrate to the equivalent Partial Private Circuit product without it incurring any penalty (including any default or early termination charge) under its agreement with the Dominant Provider for the provision of BT Retail Private Circuits, for a period of 60 working days following the date on which the equivalent Partial Private Circuit product is first offered by the Dominant Provider.

7. Where the Dominant Provider has taken, or will take, longer than five working days from receiving a request from a Third Party to migrate a Qualifying BT Retail Private Circuit to a Partial Private Circuit, it shall give to the Third Party a refund as set out in paragraphs 8 and 9 of this Direction.

8. Where paragraph 7 of this Direction applies, the Dominant Provider shall refund to the Third Party a sum of money equal to the difference between:

- the charge levied by the Dominant Provider for the BT Retail Private Circuit to which the request for migration relates; and
- the charge levied by the Dominant Provider for the Partial Private Circuit to which the request for migration relates.

9. The refund set out in paragraph 8 of this Direction shall cover the period from the date the Dominant Provider receives the request to migrate until the date the Dominant Provider completes the migration.

10. The Dominant Provider shall, upon a Third Party's written request, provide to the Third Party a map of its network within the United Kingdom which clearly illustrates and labels the geographic location of each Dominant Provider tier 1, tier 1.5, tier 2, and tier 3 nodes.

## Forecasts

11. The Dominant Provider shall only require a Third Party to provide a profile of future Partial Private Circuit capacity ordering intentions over a 12 month period, on a national aggregate basis for groupings of bandwidths no narrower than the following:

- less than 1Mbit/s; and
- 1Mbit/s through to 2Mbit/s.

12. The Dominant Provider shall allow a Third Party to set its Advance Capacity Order and Advance Order Commitment without any penalty by up to, 10% (by volume) below, or 20% (by volume) above, the amount stated in the Third Party's previous Capacity Profile or Forecast Profile for the period covered by the Advance Capacity Order or Advance Order Commitment.

13. The Dominant Provider shall allow a Third Party to revise periods covered by its previously stated Capacity Profile and Forecast Profile without any penalty by up to, 30% (by volume) below, or 30% (by volume) above, the amount stated in the Third Party's previous Capacity Profile or Forecast Profile, provided that paragraph 12 of this Direction does not apply.

14. In calculating any increase to an Advance Capacity Order, Advance Order Commitment, Capacity Profile or Forecast Profile pursuant to paragraphs 12 and 13 of this Direction, the outcome of the revision shall, if not an integer, be rounded up to the nearest integer.

15. In calculating any decrease to an Advance Capacity Order, Advance Order Commitment, Capacity Profile or Forecast Profile pursuant to paragraphs 12 and 13 of this Direction, the outcome of the revision shall, if not an integer, be rounded down to the nearest integer.

16. Where a Third Party places a Capacity Order at a Point of Connection for the period corresponding to that of the Advance Capacity Order, which total less than its Advance

Capacity Order for the Point of Connection, the Dominant Provider may levy a charge no more than a sum equal to:

[(80% of B) – C] x £2,490

Where B is the total capacity provision by number of VC4-equivalent units specified in the relevant Advance Capacity Order in respect of each Point of Connection; and

Where C is the number of VC4-equivalents ordered during the period to which the relevant Advance Capacity Order relates in respect of each Point of Connection, but does not include cancellations of Capacity Orders made during or after the relevant Advanced Capacity Order period, but does include any Capacity Order cancelled as a result of the inability of the Dominant Provider to secure consents for CSH links.

17. Where a Third Party places orders for Partial Private Circuits below 1 Mbit for the period corresponding to that of the Advanced Order Commitment, which total less than its Advance Order Commitment for the Partial Private Circuits below 1 Mbit, the Dominant Provider may levy a charge no more than a sum equal to:

[(80% of B) – C] x £52

Where B is the total Advance Order Commitment for Private Partial Circuits below 1 Mbit; and

Where C is the number of Partial Private Circuits below 1 Mbit ordered during the period to which the Advance Order Commitment relates, but does not include cancellations of orders for Partial Private Circuits made during or after the relevant Advanced Order Commitment period, but does include any order for a Partial Private Circuit cancelled as a result of the inability of the Dominant Provider to secure consents for Partial Private Circuits.

18. Where a Third Party places orders for Partial Private Circuits from 1 Mbit through to 2 Mbit/s for the period corresponding to that of the Advanced Order Commitment, which total less than its Advance Order Commitment for Partial Private Circuits from 1 Mbit through to 2 Mbit/s, the Dominant Provider may levy a charge no more than a sum equal to:

[(80% of B) – C] x £143

Where B is the total Advance Order Commitment for Private Partial Circuits from 1 Mbit through to 2 Mbit/s; and

Where C is the number of Partial Private Circuits from 1 Mbit through to 2 Mbit/s ordered during the period to which the Advance Order Commitment relates, but does not include cancellations of orders for Partial Private Circuits made during or after the relevant Advanced Order Commitment period, but does include any order for a Partial Private Circuit cancelled as a result of the inability of Dominant Provider to secure consents for Partial Private Circuits.

19. [Paragraph not used].

20. In calculating (80% of B) in paragraphs 16 to 18 inclusive of this Direction the outcome shall, if not an integer, be rounded down to the nearest integer.

## Service level agreements (SLAs)

## General

21. The Dominant Provider shall set a Committed Delivery Date for each Partial Private Circuit or Network Infrastructure ordered from it by a Third Party and shall be required to provide reasons to justify a Committed Delivery Date which is set beyond the relevant Requisite Period (RP) and that any extension of the Committed Delivery Date beyond the relevant Requisite Period (RP) shall be made subject to the consent of the Third Party concerned whose consent shall not be unreasonably withheld.

22. For each Partial Private Circuit or Network Infrastructure ordered from the Dominant Provider by a Third Party, the Dominant Provider shall provide to a Third Party Firm Offer Confirmation in the manner set out in the definition section of this Direction.

23. The time scales and levels of fixed individual compensation payments to be payable under the service level agreement shall be those set out in paragraph 34 of this Direction, unless otherwise agreed between the Dominant Provider and a Third Party, or except to the extent that Ofcom otherwise consents.

24. Unless otherwise agreed between the Dominant Provider and a Third Party, any fixed individual compensation payment, or reimbursement pursuant to paragraph 28 of this Direction, payable by the Dominant Provider to a Third Party pursuant to the Directions shall be offset by the Dominant Provider against the money owed to it by the Third Party, on a quarterly basis. The Dominant Provider shall keep complete and accurate records of the amounts it has offset in accordance with this paragraph. Such records shall be made available by the Dominant Provider following a request by a Third Party.

25. The Dominant Provider shall not be liable to pay fixed individual compensation payments pursuant to the Directions for periods of delay which arise due to circumstances beyond its reasonable control. The Dominant Provider shall notify a Third Party as soon as reasonably practicable when such circumstances arise. All contractors or sub-contractors of whatever level, and their respective employees, servants and agents, shall for the purpose of this paragraph be treated as employees of the Dominant Provider. Major construction works shall not be considered circumstances beyond the Dominant Provider's reasonable control.

26. The Dominant Provider shall ensure that any time limits set out in this Direction shall not apply to a Third Party to the extent that periods of delay arise due to circumstances beyond its reasonable control. The Third Party shall notify the Dominant Provider as soon as reasonably practicable when such circumstances arise. All contractors or sub-contractors of whatever level, and their respective employees, servants and agents, shall for the purpose of this paragraph be treated as employees of the relevant Third Party.

27. The Dominant Provider shall, at the reasonable request of a Third Party, postpone the Committed Delivery Date of a Partial Private Circuit or Network Infrastructure if such postponement is technically and organisationally reasonable. In agreeing to such a postponement the Dominant Provider shall only charge for reasonable additional expenses it has directly incurred as a result of the postponement.

28. The Dominant Provider shall only postpone the Committed Delivery Date of a Partial Private Circuit or Network Infrastructure with the written agreement of the Third Party. The Dominant Provider shall inform the Third Party as soon as reasonably possible of any proposed postponement of the Committed Delivery Date. Where such a postponement takes place the Dominant Provider shall reimburse the Third Party for any reasonable additional cost incurred by the Third Party as a direct result of the postponement.

29. The FOC Receipt Interval shall be a maximum of:

- five working days for Partial Private Circuits of less than 2 Mbit/s; and
- eight working days for Partial Private Circuits of 2 Mbit/s and Network Infrastructure;

regardless of how many Partial Private Circuits are, or the amount of Network Infrastructure is, ordered at a particular site.

30. The Dominant Provider shall ensure that the FOC Acceptance Interval is a maximum of one working day for Partial Private Circuits of 2 Mbit/s or below and two working days for Network Infrastructure. Where a Third Party has not informed the Dominant Provider of its Acceptance of Terms or rejection of the order within five working days of the FOC Date, the Dominant Provider may cancel the Third Party's order.

31. The Dominant Provider shall keep complete and accurate records of the ordering, provision and repair of Partial Private Circuits and Network Infrastructure it provides to a Third Party.

32. Where any Partial Private Circuit or Network Infrastructure which is ordered by a Third Party is in excess of 110% (by volume), rounded up to the nearest integer where necessary, of its Advance Order Commitment or Advance Capacity Order, the applicable Requisite Period set out in the tables in paragraphs 41 and 51 of this Direction shall be extended by 50% and rounded up to the nearest working day, where necessary, for the purposes of calculating fixed individual compensation payments.

### Unliquidated damages

33. Nothing in the PPC Contract, as amended by the Direction, shall prevent a Third Party from bringing a claim against the Dominant Provider for unliquidated damages over and above the fixed individual compensation payments set out in the Direction.

## Service level guarantees (SLGs)

34. The Dominant Provider shall ensure the terms and conditions which govern the supply of Partial Private Circuits set out in the PPC Contract continue to provide the following:

#### Compensation per event and value of compensation

a) The Dominant Provider shall pay the Third Party compensation for each day or part day of delay in delivery of service beyond the Committed Delivery Date or the Third Party's Requirement Date (whichever is later).

b) The Dominant Provider shall pay the Third Party compensation for each and every fault which has not been restored:

- for Regular Care customers, in the first two days on a per day basis thereafter; and
- for Enhanced Care customers, in the first five hours on a per hour basis thereafter.

c) The compensation payable in event of the each late provision of the required Partial Private Circuit or Network Infrastructure service shall be set at 100% of one month's line rental (or Network Infrastructure rental) for every day or part day of delay beyond the Committed Delivery Date or Requirement Date (whichever is later), up to a maximum of 60 days.

d) The compensation payable in the event of each late fault repair in relation to a Partial Private Circuit or Network Infrastructure shall be:

- for Regular Care customers, 100% of one month's line rental for every fault which has not been restored in the first two days for every day thereafter until service is restored, up to a maximum of 30 days; and

- for Enhanced Care customers, 15% of one month's line rental for every fault which has not been restored in the first five hours for every hour thereafter until service is restored, up to a maximum of 200 hours.

e) Any limits on compensation payable as a result of a failure to satisfy the service guarantees shall be removed other than those set out in (c) and (d) above.

## Additional losses

f) Any compensation payable under the contract shall be without prejudice to any right of either party to claim for additional loss.

## Proactive payments

g) The Dominant Provider shall monitor its performance against the service guarantees for fault repair and provision and compensate Third Parties proactively should it fail to satisfy the service guarantees. Compensation payments shall be made as soon as possible after the event and not later than the billing cycle following the billing cycle after the event unless not practicable. For the avoidance of doubt, compensation shall be payable without the need for a Third Party to make a claim.

35. The terms and conditions amended as set out in paragraph 34 above shall take effect from the 90<sup>th</sup> day after publication of the Final Statement.

## Partial Private Circuits

## Quick quote and very high bandwidth quote on line

36. The Dominant Provider shall provide to a Third Party, upon written request, the necessary wholesale network and pricing information to enable the Third Party to obtain the same information for Partial Private Circuits that is available to the Dominant Provider's retail arm, for its "Quick Quote" quote facilities.

## Concurrency of Partial Private Circuit and ISH link and CSH link delivery times

37. Where a Third Party has ordered a Partial Private Circuit, and the operation of the circuit requires the provision of an ISH link or CSH link, the Dominant Provider shall ensure that the delivery dates of the Partial Private Circuit and the CSH link or ISH link are the same.

## Expedited orders

38. Upon a Third Party's written request, the Dominant Provider shall make reasonable endeavours to set a Committed Delivery Date for Partial Private Circuits within 50% of the relevant Requisite Period set out in the table in paragraph 41 of this Direction, rounded up to the nearest working day where necessary, for at least 15% (by volume) of a Third Party's previous month's order. The Third Party shall inform the Dominant Provider which particular Partial Private Circuits it shall endeavour to be expedited pursuant to this paragraph. This paragraph shall only apply to the delivery of Partial Private Circuits of 2 Mbit/s or less. This paragraph shall not apply to Partial Private Circuits which exceed 110% (by volume),

rounded up to the nearest integer where necessary, of a Third Party's Advance Order Commitment.

39. Paragraph 48 of this Direction does not apply to orders of Partial Private Circuits made pursuant to paragraph 38 of this Direction.

## Time scales for fixed individual compensation

40. Where the Committed Delivery Date for Partial Private Circuits is set by the Dominant Provider later than the relevant Requisite Period (as set out in the table in paragraph 41 of this Direction) without the agreement of a Third Party, the Dominant Provider shall be liable to pay the Third Party a fixed individual compensation payment in accordance with paragraph 34 of this Direction.

41. Where the Committed Delivery Date for Partial Private Circuits is set by the Dominant Provider either, later than the relevant Requisite Period (as set out in the table below) but with the agreement of a Third Party, or within the Requisite Period, the Dominant Provider shall be liable to pay the Third Party a fixed individual compensation payment in accordance with paragraph 34 of this Direction.

Bandwidth of Partial Private Circuit	Requisite Period
64 kbit/s	10 working days
128 kbit/s to 256 kbit/s delivered over copper	10 working days
128 kbit/s to 256 kbit/s delivered over fibre	30 working days
320 kbit/s to 960 kbit/s	30 working days
1 Mbit/s	30 working days
2 Mbit/s	30 working days
Subsequent Partial Private Circuit of 2 Mbit/s	10 working days

Third Party's ability to cancel order

42. Where the Provisioning Interval exceeds the relevant Requisite Period set out in the table in paragraph 41 of this Direction, a Third Party shall be allowed to cancel its order for a Partial Private Circuit after the Cancellation Threshold (as set out in the table below) has expired. The Cancellation Threshold shall commence upon the expiry of the relevant Requisite Period set out in the table in paragraph 41 of this Direction. The Requisite Periods in the table in paragraph 41 shall apply, for the purposes of this paragraph, regardless of whether there is a delay in delivery of a Partial Private Circuit which is due to circumstances beyond the Dominant Provider's reasonable control but not including delay by a Third Party.

Requisite Period set out in the table in paragraph 41 of this Direction	Cancellation Threshold
10 working days	10 working days
30 working days	20 working days

43. Where a Third Party cancels a Partial Private Circuit pursuant to paragraph 42 of this Direction, the Dominant Provider shall not charge the Third Party for the circuit and shall not charge for cancelling the circuit. The Dominant Provider shall also be liable to pay the Third

Party any fixed individual compensation payments accumulated pursuant to the PPC Contract as amended by the Directions.

## Reduced Requisite Periods for Partial Private Circuits

44. The Dominant Provider shall ensure that for at least 70% (by volume) of Partial Private Circuits of a particular bandwidth delivered by the Dominant Party to a Third Party within a three month period (such period not to be calculated on a rolling basis) the Committed Delivery Date is set within the relevant Reduced Requisite Period (as set out in the table below).

Bandwidth of Partial Private Circuit	Reduced Requisite Period
128 kbit/s to 256 kbit/s delivered over fibre	20 working days
320 kbit/s to 960 kbit/s	20 working days
1 Mbit/s	20 working days
2 Mbit/s	20 working days

45. In calculating the 70% (by volume) of Partial Private Circuits to which paragraph 44 of this Direction applies the following shall not be included:

- Partial Private Circuits of 64 kbit/s;
- Partial Private Circuits of 128 kbit/s to 256 kbit/s delivered over copper;
- Subsequent Private Partial Circuits of 2Mbit/s;
- Partial Private Circuit orders to which paragraph 38 of this Direction applies; and

- Partial Private Circuits which exceed 110% (by volume), rounded up to the nearest integer where necessary, of a Third Party's Advance Order Commitment.

46. The Reduced Requisite Periods set out in the table in paragraph 44 of this Direction apply only if, in the previous three month reporting period (such period not to be calculated on a rolling basis), a Third Party has ordered from the Dominant Provider at least ten Partial Private Circuits of the same bandwidth where such Partial Private Circuits are 2 Mbit/s or less.

47. For the purposes of this Direction, in determining whether 110% (by volume), rounded up to the nearest integer where necessary, of a Third Party's Advance Order Commitment has been exceeded, the calculation shall be at a national level for each individual Partial Private Circuit bandwidth category and applied in the order in which the Partial Private Circuits were ordered by the Third Party.

### Multiple orders

48. Where the Dominant Provider receives an order for more than 10 Partial Private Circuits at one site from a Third Party, the relevant Requisite Period applicable to determine whether the Dominant Provider shall pay fixed individual compensation as set out in paragraphs 40 and 41 of this Direction, shall be the relevant Requisite Period set out in the table in

paragraph 41 of this Direction increased by a maximum of 50%. The Dominant Provider shall inform the Third Party of the revised time scales as soon as reasonably practicable.

## Availability of service

49. When total loss of service (i.e. total loss of service for one minute or longer) occurs three or more times, within a 12 month period, to a Partial Private Circuit, the Third Party shall not be liable to the Dominant Provider for the monthly rental in any subsequent month where total loss of failure occurs to the Partial Private Circuit, until such time as 12 months have passed and the Partial Private Circuit has not suffered total loss of service. Occurrences of total loss of service which result in the Dominant Provider being liable to pay fixed individual compensation pursuant to paragraphs 62, 63 and 64 of this Direction, shall not be considered as an occurrence of a total loss of service for the purposes of this paragraph.

## Network Infrastructure

## Time scales for fixed individual compensation

50. Where the Committed Delivery Date for Network Infrastructure is set by the Dominant Provider later than the relevant Requisite Period (as set out in the table in paragraph 51 of this Direction) without the agreement of a Third Party, the Dominant Provider shall be liable to pay the Third Party a fixed individual compensation payment in accordance with paragraph 34 of this Direction.

51. Where the Committed Delivery Date for Network Infrastructure is set by the Dominant Provider either, later than the relevant Requisite Period (as set out in the table below) but with the agreement of a Third Party, or within the Requisite Period, the Dominant Provider shall be liable to pay the Third Party a fixed individual compensation payment in accordance with paragraph 34 of this Direction.

Network Infrastructure	Requisite Period (where the Dominant Provider needs to carry out Civil Works)	Requisite Period (where the Dominant Provider does not need to carry out Civil Works)
ISH links	110 working days	85 working days
CSH links	110 working days	85 working days
ISH links – provision of new multiplexor on an existing Point of Connection	Not applicable	60 working days
ISH links - provision of extra STM-1 interface on existing STM-1 ISH SMA4 multiplexor	Not applicable	60 working Days
CSH links - provision of new multiplexor on existing Point of Connection	Not applicable	60 working Days

CSH links requiring only provision of new tributary card on existing multiplexor

Not applicable

25 working Days

## Third Party's ability to cancel order

52. Where the Provisioning Interval exceeds the relevant Requisite Period set out in the table in paragraph 51 of this Direction, a Third Party shall be allowed to cancel its order for Network Infrastructure after the Cancellation Threshold (as set out in the table below) has expired. The Cancellation Threshold shall commence upon the expiry of the relevant Requisite Period set out in the table in paragraph 51 of this Direction. The Requisite Periods in the table in paragraph 51 shall apply, for the purposes of this paragraph, regardless of whether there is a delay in delivery of Network Infrastructure which is due to circumstances beyond the Dominant Provider's reasonable control but not including delay by a Third Party.

Requisite Period set out in the table in paragraph 51 of this Direction	Cancellation Threshold
21 to 40 working days	20 working days
41 to 60 working days	25 working days
61 to 90 working days	30 working days
Over 90 working days	40 working days

53. Where a Third Party cancels Network Infrastructure pursuant to paragraph 52 of this Direction, the Dominant Provider shall not charge the Third Party for the Network Infrastructure and shall not charge for cancelling the Network Infrastructure. The Dominant Provider shall also be liable to pay the Third Party any fixed compensation payments accumulated pursuant to the PPC Contract as amended by the Directions.

## Reduced Requisite periods for Network Infrastructure

54. The Dominant Provider shall ensure that for at least 70% (by volume) of the total VC4equivalents of Network Infrastructure delivered by it to a Third Party during a three month period (such period not to be calculated on a rolling basis) the Committed Delivery Date is set within the relevant Reduced Requisite Period (as set out in the table below).

Network Infrastructure	Reduced Requisite Period (where the Dominant Provider needs to carry out Civil Works)	Reduced Requisite Period where the Dominant Provider does not need to carry out Civil Works)
ISH links	75 working days	60 working days
CSH links	75 working days	60 working days
ISH links - provision of new multiplexor on an existing Point of Connection	Not applicable	40 working days
ISH links - provision of extra STM-1 interface on		

existing STM-1 ISH SMA4 multiplexor	Not applicable	40 working days
CSH links - provision of new multiplexor on existing Point of Connection	Not applicable	40 working days
CSH links requiring only provision of new tributary card on existing multiplexor	Not applicable	20 working days

55. In calculating the 70% (by volume) of the total VC4-equivalents of Network Infrastructure to which paragraph 54 of this Direction applies the following shall not be included:

- Network Infrastructure which exceeds 110% (by volume), rounded up to the nearest integer where necessary, of a Third Party's Advance Capacity Order.

56. The Reduced Requisite Periods set out in the table in paragraph 54 of this Direction only apply if, in the previous three month reporting period (such period not to be calculated on a rolling basis) a Third Party has ordered from the Dominant Provider at least 2 VC4-equivalents of Network Infrastructure. For the purposes of this paragraph the first reporting period of three months shall be the first such reporting period falling after 30 working days following the date of publication of this Direction.

57. For the purposes of this Direction, in determining whether 110% (by volume), rounded up to the nearest integer where necessary, of a Third Party's Advance Capacity Order has been exceeded, the calculation shall be made using VC4-equivalents at each Point of Connection applied in the order in which the Network Infrastructure was ordered by the Third Party.

## Repair of Partial Private Circuits and Network Infrastructure

58. Where the Dominant Provider offers to a Third Party Regular Care and Enhanced Care for Partial Private Circuits and Network Infrastructure it shall do so at a cost orientated price and as set out in the table below:

	Operational hours	Repair/response time	Extras
Regular Care	Normal working hours	Response within one working day of receipt of a fault report by a Third Party. Repair within two working days of receipt of a fault report by a Third Party.	If a fault is not remedied within two working days of receipt of a fault report by a Third Party, the Dominant Provider shall call the Third Party to report progress being made to remedy the fault.
Enhanced Care	24 hours per day, 7 days per week (including public and bank holidays).	Response within four hours of receipt of a fault report from a Third Party.	If a fault is not remedied within five hours of receipt of a fault report by a Third Party, the

Repair within five hours of receipt of a fault report by a Third Party.	Dominant Provider shall contact the Third Party to report progress being made to remedy the
	fault.

59. Receipt by the Dominant Provider from a Third Party of a report of a fault concerning a Partial Private Circuit or Network Infrastructure, shall be acknowledged by the Dominant Provider to the Third Party within one hour.

60. Where the Dominant Provider fails to repair a Partial Private Circuit within the time limits set out in the table in paragraph 58 of this Direction it shall pay to the Third Party a fixed individual compensation payment as set out in paragraphs 61 to 65 inclusive of this Direction in respect of the period commencing on the expiry of the applicable repair time set out in the table in paragraph 58 and expiring at the time the Partial Private Circuit or Network Infrastructure is repaired.

61. Where the Third Party has ordered the Dominant Provider's Regular Care for Partial Private Circuits, the Dominant Provider shall pay the Third Party an amount set in accordance with paragraph 34 of this Direction.

62. Where the Third Party has ordered the Dominant Provider's Regular Care for Network Infrastructure, the Dominant Provider shall pay the Third Party an amount set in accordance with paragraph 34 of this Direction.

63. Where the Third Party has ordered the Dominant Provider's Enhanced Care for Partial Private Circuits, the Dominant Provider shall pay the Third Party an amount set in accordance with paragraph 34 of this Direction.

64. Where the Third Party has ordered the Dominant Provider's Enhanced Care for Network Infrastructure, the Dominant Provider shall pay the Third Party an amount set in accordance with paragraph 34 of this Direction.

65. The Dominant Provider shall not be liable to pay fixed individual compensation pursuant to paragraphs 62 and 64 of this Direction where it is also liable for fixed individual compensation pursuant to paragraphs 61 and 63 of this Direction where the Partial Private Circuit is being provided using the Network Infrastructure which is being repaired.

66. The Dominant Provider shall attend, and invite Third Parties to regular meetings to review the level of service provided by it in relation to Partial Private Circuits and related Network Infrastructure.

## Change of speed or interface

67. The Dominant Provider shall offer to provide within a reasonable period of a Third Party's written request, the ability to alter the speed or interface of a Partial Private Circuit.

68. The Dominant Provider shall ensure that it provides to a Third Party a Partial Private Circuit variant for the services to which paragraph 67 of this Direction applies, which are equivalent to the services it currently provides on a retail basis for retail leased lines.

## STM-1, ISH and CSH handover

69. The Dominant Provider shall offer to provide within a reasonable period of a Third Party's written request for a Synchronous Transfer Mode–1 ("STM-1"), an interface using an ISH link or CSH link; and handover pursuant to paragraph 70 of this Direction. Such link or handover shall be provided by way of network connecting apparatus capable of providing no more than the STM-1 capacity ordered by the Third Party.

70. The Dominant Provider shall within a reasonable period of a Third Party's written request, handover in a footway jointing chamber for Partial Private Circuits at a reasonable point nominated by the Third Party. The footway jointing chamber shall be located in the same Dominant Provider local serving exchange area as the Dominant Provider Serving Node to which the Partial Private Circuits being handed over are connected.

## **Equipment re-use**

71. Paragraph 72 of this Direction shall only apply to the re-use of Plesiochronous Digital Hierarchy ("PDH") and Synchronous Digital Hierarchy ("SDH") equipment situated at a third party site ("Equipment").

72. The Dominant Provider may reject a request by a Third Party for re-use of PDH Equipment if such re-use would be incompatible with its network. Any such rejection by the Dominant Provider shall be made within 10 working days of a request by the Third Party and fully justified in writing to the requesting Third Party at the same time as the request is rejected.

## **Other Circuits**

73. Unless Ofcom otherwise agrees, the Dominant Provider shall offer to provide Partial Private Circuit with no single point of failure, within a reasonable period of a Third Party's request.

74. The Dominant Provider shall offer to provide, within a reasonable period of a Third Party's written request, a Partial Private Circuit which is dual pathed and diversely routed from a third party customer's premises to a Third Party's single Point of Connection.

## **RBS Backhaul**

75. The Dominant Provider shall offer to provide to a Third Party, within a reasonable period of the Third Party's written request, transparent transmission capacity at all bandwidths up to and including a bandwidth capacity of two megabits per second between a radio base station and a Point of Connection with a Third Party's electronic communications network connected to the nearest appropriate digital cross connection node.

### General

76. The Dominant Provider shall implement this Direction within 10 working days of its publication.

77. This Direction shall take effect on the day it is published.

M. Gibbs

**Competition Policy Director, Ofcom** 

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

28 March 2013

# Schedule 2

Pursuant to SMP services condition 1, Ofcom makes the following direction:

# The Dominant Provider shall provide Ethernet Services and shall do so in accordance with this direction.

## Service level guarantees (SLGs)

 The Dominant Provider shall ensure the terms and conditions which govern the supply of Ethernet Services in the wholesale markets of the provision of low bandwidth alternative interface symmetric broadband origination at bandwidths up to and including 1Gbit/s in: (i) the UK excluding the Hull Area and the WECLA: and (ii) the WECLA, provide the following<sup>203</sup>:

## Compensation per event and value of compensation

- a) The definition of "Contractual Delivery Date" as set out in the Dominant Provider's terms and conditions shall be amended to require BT to provide reasons to justify a Contractual Delivery Date which is set beyond the 57<sup>th</sup> day and that any extension of the Contractual Delivery Date beyond the 57<sup>th</sup> shall be made subject to the consent of the Third Party concerned whose consent shall not be unreasonably withheld;
- b) BT shall pay the Third Party compensation for each day or part day of delay in delivery of service beyond the Contractual Delivery Date or the "CP Requirement Date" (as set out in the Dominant Provider's terms and conditions), whichever is later;
- c) BT shall pay the Third Party compensation for each and every fault which has not been restored in the first five hours on a per hour basis thereafter;
- d) The compensation payable in event of the each late provision of the required Backhaul Extension Services, Wholesale Extension Services or Wholesale End-to-End Segments shall be set at 100% of one month's line rental for every day or part day of delay beyond the Contractual Delivery Date or CP Requirement Date (whichever is later), up to a maximum of 60 days;
- e) The compensation payable in the event of each late fault repair in relation to Backhaul Extension Services, Wholesale Extension Services or Wholesale End-to-End Segments shall be 15% of one month's line rental for every fault which has not been restored in the first five hours for every hour thereafter until service is restored, up to a maximum of 200 hours;

Limitations on compensation- removal of caps

 Any limits on compensation payable as a result of a failure to satisfy the service guarantees shall be removed other than those set out in d) and e); and

## Additional losses

g) Any compensation payable under the contract shall be without prejudice to any right of either party to claim for additional loss.

## Proactive payments

 b) BT shall monitor its performance against the service guarantees for fault repair and compensate Third Parties proactively should it fail to satisfy the service guarantees. Compensation payments shall be made on a monthly basis. For the avoidance of

<sup>&</sup>lt;sup>203</sup> In particular, the following contracts will require modification to reflect the requirements set out in the direction:(i) the Conditions for Backhaul Extensions Services; and (ii) the Conditions for Wholesale Extension Services.

doubt, compensation shall be payable without the need for a Third Party to make a claim.

## General

- 2. The Dominant Provider shall implement the direction within 10 working days of its publication.
- 3. This direction shall take effect on the day it is published

M. Cibbs

**Competition Policy Director** 

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

28 March 2013

## Annex 9

# Inclusion of some postcode sectors in Slough in the WECLA geographic market

# Introduction

- A9.1 In the June BCMR Consultation, we proposed to define a separate geographic market in the London area for some of the proposed wholesale product markets. As explained in Section 5, we called this area WECLA.
- A9.2 In light of stakeholders' comments and our subsequent market analysis, in the November BCMR Consultation we consulted on whether our proposed definition of the WECLA should also include some postcode sectors in Slough<sup>204</sup> (the 'Slough sectors').
- A9.3 In this Annex, we present our reasons for not requiring strict contiguity<sup>205</sup> between the WECLA and the Slough sectors, as set out in the November BCMR Consultation. We discuss stakeholders' comments on proposal to include the Slough sectors in the London area geographic market (and present our further analysis) in Section 5 (see paragraphs 5.332 to 5.376).

# **Contiguity between the WECLA and the Slough sectors**

- A9.4 The Slough sectors are in close geographic proximity to the WECLA, and our analysis classifies them as HNR. However, the Slough sectors are separated from the WECLA by a single postcode sector (SL3 0) where there is low network reach. In the November BCMR Consultation we looked specifically at whether the application of strict contiguity might be creating an artificial geographic market distinction to be drawn between the Slough sectors and the WECLA. For the reasons set out below, we have concluded that the lack of strict contiguity is not sufficient reason to separate the Slough sectors from the WECLA.
- A9.5 As explained in Section 5, we do not regard it as appropriate to consider individual postcode sectors or small groups of postcode sectors as separate markets, where these are surrounded by areas where there is low network reach.<sup>206</sup> Rather, we are looking for sufficiently sizeable clusters of contiguous postcode sectors in which an assessment of competitive conditions can be carried out which reflects the economic characteristics of the wholesale provision of leased line services within that area and in which the competitive conditions can be distinguished from those of neighbouring areas which are appreciably different. In this context, a general contiguity requirement is a sensible approach to defining geographic markets.
- A9.6 However, the case of Slough is unusual in that there is only a single postcode sector separating the Slough sectors from the WECLA and linkages between the Slough sectors and the WECLA appear to be strong. In this situation, our

<sup>&</sup>lt;sup>204</sup> The postcode sectors are: SL1 0, SL1 1, SL1 2, SL1 3, SL1 4, SL1 5, SL1 6, SL2 5, SL3 9, SL6 0, SL6 1, SL6 2, SL6 4 and SL6 8.

<sup>&</sup>lt;sup>205</sup> For a discussion of contiguity see paragraphs 5.63 to 5.66 and 5.153 to 5.189

<sup>&</sup>lt;sup>206</sup> See paragraphs 5.63 to 5.66, 5.153 to 5.189 and 5.415 to 5.430.

conclusion is that, if other evidence suggests that competitive conditions across the Slough sectors and the WECLA are broadly similar, applying strict contiguity as the only reason for not combining the two would result in placing too much weight on this requirement.

# The lack of HNR for postcode sector SL3 0 masks a high degree of connectivity running between Slough and the WECLA

A9.7 The reason why postcode sector SL3 0 is classified as having low network reach relates partly to specific geographic features. Our further analysis shows that SL3 0 is less built-up than most of the postcode sectors in the WECLA and the Slough sectors<sup>207</sup> and most of the large business sites in it are in the small town of Poyle between Heathrow airport and the Queen Mother reservoir (see Figure A9.1 below). Most OCPs have tended to build their network by taking a fairly direct route from the edge of the WECLA towards Slough - which we would expect if their objective was to link sites in Slough to sites in the WECLA.

<sup>&</sup>lt;sup>207</sup> The parish of Colnbrook and Poyle which represents the urban area in the sector had a population of 5,408 in the 2001 census, source http://www.ons.gov.uk/ons/rel/census/census-2001-key-statistics/urban-areas-in-england-and-wales-ks01-usual-resident-population.xls

## Figure A9.1 – Postcode sector SL3 0 and surrounding area

Key:



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A9.8 Our information shows that there are four OCPs with network flexibility points running through the sector which suggests that there are alternative providers to BT with continuous connectivity between the WECLA and the Slough sectors. While our analysis does not classify postcode sector SL3 0 as HNR overall, <sup>208</sup> there clearly is a high degree of connectivity between the WECLA and the Slough sectors.

## There are economic linkages between the Slough sectors and the WECLA

A9.9 We have considered whether there are economic linkages between the WECLA and the Slough sectors which might suggest a single geographic market. To provide

<sup>&</sup>lt;sup>208</sup> The flexibility points are not sufficiently close to the business sites to make the sector HNR.

an indication of the level of economic interaction between the WECLA and the Slough sectors, we have particularly looked at the proportion of retail leased lines provided by OCPs that connect the two areas. We have used retail circuit information because we were specifically interested in the end-to-end connectivity required by end-users.<sup>209</sup> Using information provided by OCPs, we looked at the number of OCP retail AISBO circuits and Wavelength Division Multiplexing (WDM) wavelengths with at least one end in the Slough sectors<sup>210</sup> and worked out the proportion that have the other end in the WECLA.<sup>211</sup> Of the circuits with at least one end in the Slough sectors, we have found that 39% connected to the WECLA.<sup>212</sup> (As a comparison, we calculated the equivalent proportion for Manchester and Birmingham where the results were 9% and 15% respectively.<sup>213</sup>) This level of connectivity is consistent with there being a relatively high degree of economic interaction between the WECLA and the Slough sectors.

A9.10 We have also looked at the limited information provided by OCPs on the retail customers purchasing AISBO circuits and WDM wavelengths in the Slough sectors and the WECLA. We have found that around 40% of the retail customers for which we had information and which were purchasing AISBO/WDM circuits/wavelengths in the Slough sectors also purchased circuits/wavelengths in the WECLA. We consider that this information provides some evidence that leased line customers purchase services across a wider market, including the Slough sectors and the WECLA. However, due to the limited information available, we do not consider that it is conclusive.

## Conclusion

A9.11 Overall, our further analysis shows that:

- there is close geographic proximity between the Slough sectors and the WECLA;<sup>214</sup>
- there is a number of competing networks with their own connectivity running through SL3 0 between the Slough sectors and the WECLA;
- there are economic linkages across the Slough sectors and the WECLA;
- there are specific geographic features of the postcode sector SL3 0 which contribute towards it being low network reach;
- there is a lack of any intrinsic economic significance that the postcode sector boundary *per se* has for the provision of business connectivity<sup>215</sup>;

<sup>&</sup>lt;sup>209</sup> Due to equivalence of inputs reporting, in estimating wholesale service shares, we did not need to obtain retail circuit information for AISBO products for BT. Therefore BT's retail AISBO circuits are not included in this analysis

<sup>&</sup>lt;sup>210</sup> Some of these circuits have both ends in the Slough sectors.

<sup>&</sup>lt;sup>211</sup> We have updated the figures presented in the November BCMR Consultation in light of changes to our data processing discussed in Annex 5.

<sup>&</sup>lt;sup>212</sup> In addition, 37% of the AISBO and WDM circuits had both ends in the Slough sectors.

<sup>&</sup>lt;sup>213</sup> For this exercise, we defined Manchester and Birmingham as the contiguous postcode sectors with HNR in the city centres.

<sup>&</sup>lt;sup>214</sup> i.e. the sectors with HNR in the Slough sectors are separated from the WECLA by a single postcode sector (SL3 0).

- there is HNR observed in the Slough sectors; and
- there is scale of leased line provision in the area.
- A9.12 We therefore consider that the absence of strict contiguity in and of itself should not prevent us from assessing whether the competitive conditions in the Slough sectors and the WECLA are sufficiently homogeneous, such that they may be considered to be in the same geographic market.

<sup>&</sup>lt;sup>215</sup> See paragraph 5.118 of the June BCMR Consultation.

## Annex 10

# Equality impact assessment

## Introduction

- A10.1 As mentioned in Section 2 of this Statement, we have statutory duties to assess the potential impact of all our functions, policies, projects and practices on race, disability and gender equality. Equality impact assessments (EIAs) also assist us in making sure that we are meeting our principal duty of furthering the interests of citizens and consumers regardless of their background or identity.
- A10.2 Unless we otherwise state in this Statement, it is not apparent to us that the outcome of our review is likely to have any particular impact on race, disability and gender equality. Specifically, we do not envisage the impact of any outcome to be to the detriment of any group of society.
- A10.3 Nor are we envisaging any need to carry out separate EIAs in relation to race or gender equality or equality schemes under the Northern Ireland and Disability Equality Schemes. This is because we anticipate that our regulatory intervention will not have a differential impact in relation to people of different gender or ethnicity, on consumers in Northern Ireland or on disabled consumers compared to consumers in general. Similarly, we are not envisaging making a distinction between consumers in different parts of the UK or between consumers on low incomes. Again, we believe that our intervention will not have a particular effect on one group of consumers over another.

# The aim of our Business Connectivity Market Review

A10.4 The aim of our Business Connectivity Market Review is to assess the state of competition in the retail and wholesale leased lines markets and, if any relevant is found not to be effectively competitive, to impose regulatory obligations designed to secure certain objectives, such as the promotion of competition.

## Equality impact assessment

- A10.5 We have considered whether the remedies we are implementing in the relevant markets we have identified will have an adverse impact on promoting equality. In particular we have considered whether the remedies will have a different or adverse effect on UK consumers and citizens with respect to: age, disability, gender reassignment, pregnancy and maternity, race, religion, sex and sexual orientation, and, in Northern Ireland, religious belief and dependents.
- A10.6 The intention behind our approach to regulating these markets is to impose a set of regulatory obligations on CPs with SMP that will, in particular, promote competition by requiring them to provide other CPs with access to their networks on regulated terms, and to protect consumers by preventing abusive conduct such as over-charging.
- A10.7 We do not have detailed sectoral information on the businesses that purchase wholesale leased lines services or whether there is a correlation between the customers of their products or services and the defined equality groups. We also do

not have information any correlation between retail leased lines services and the defined equality groups.

- A10.8 However, we do not have any reason to suspect that the benefit of remedies we have imposed would not be the same for all consumers and businesses, nor that there would be a correlation between the affected consumers and businesses and any of the above defined equality groups. On that basis, we believe that it would be disproportionate to commission further research in relation to any impact on equality.
- A10.9 We also have not found any reason to suspect that there would be potential for negative impacts against the defined equality groups.

## Annex 11

# Voluntary undertakings

A11.1 In this Annex, we reproduce the undertakings given to Ofcom by KCOM about wholesale leased line prices in Hull.



KCOM Group PLC

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Marina Gibbs Ofcom **Riverside House** 2A Southwark Bridge Road London SE1 9HA

5 February 2013

Desimarina,

## KCOM wholesale leased line pricing – voluntary undertakings

Further to our recent discussions, I am writing to set out voluntary undertakings with respect to the provision of wholesale leased line services in the Hull area.

KCOM commits to annual reductions for wholesale leased line pricing over a 3 year term commencing 1 April 2013, with subsequent price changes taking place on 1 April 2014 and 1 April 2015. The services to which these reductions will apply and the level of the reductions are as follows:

		Connection	Rental
		RPI -	RPI -
	2Mb	0%	8%
Inter -	10Mb	0%	9%
connect	100Mb	0%	11%
	1000Mb	15%	20%
	2Mb	0%	8%
2 Ends	10Mb	0%	21%
Exchange	100Mb	0%	29%
Excitatingo	1000Mb	15%	28%
	2Mb	0%	15%
2 Ends Different Exchange	10Mb	0%	15%
	100Mb	0%	23%
	1000Mb	15%	24%





KCOM Group PLC

We note the following:

- In setting prices we will apply an RPI- calculation using the RPI figure published for the period ending 31 December each year, which will be applied in calculating pricing to take effect from the immediately following April.
- With respect to Kiloline, Kiloline N products (bandwidth below 1Mb) and 34Mbit/s and 155Mbit/s services in our proposals we intend to maintain the pricing of these services at current levels for the period until 31 March 2016.

We note that these commitments are voluntary and that we reserve the right to vary or terminate them. In particular, given the significant investment in and transformation of our network in the Hull area over the next few years it is likely we will undertake a review of our network costing methodology prior to the next market review. If we do so and believe that adjustments are necessary to the commitments set out in this letter, we undertake to discuss any changes we believe necessary with Ofcom with a view to agreeing mutually acceptable adjustments to these undertakings.

Yours sincerely

Sean Royce

Commercial and Finance Director



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# Annex 12

# Ofcom's forecasting model

## Introduction

- A12.1 We have developed a cost forecasting model (the 'LLCC model') in order to calculate a value of X for the main baskets in the charge control. For each basket, we have decided that BT will be required to ensure that its charges for the services in question do not increase by more than RPI plus or minus the value of X. In Section 18 of this Statement, we discuss our approach to designing the charge control framework, which provides background to the more detailed aspects covered by this Annex.
- A12.2 This Annex:
  - provides an overview of the LLCC model;
  - details our base case cost adjustments;
  - shows our volume forecasts;
  - explains how we have applied the MEA approach;
  - explains our cost forecasting approach;
  - explains how we calculated the reallocation between the TI and Ethernet baskets; and
  - shows our values of X.

## **Overview of model structure**

A12.3 The objective of the LLCC model is to estimate how the costs of providing the relevant services will change over the period of the charge control. In doing so, we have structured the LLCC model as illustrated in Figure A12.1 below.



#### Figure A12.1: The LLCC model structure

- A12.4 In summary, as shown by the structure illustrated by Figure A12.1, we firstly calculate the respective base year costs for the TI and Ethernet baskets. The base year cost data comes from BT's RFS, as well as data supplied by BT in response to our information requests. We make adjustments to such data to reflect our proposed structure of the baskets, as well as to reflect forward looking efficient costs.
- A12.5 Secondly, we forecast the costs in the final year of the charge control. Total costs are forecast based on how different types of costs vary with respect to the underlying volume changes, subject to assumptions such as efficiency, asset price changes and the WACC.
- A12.6 Thirdly, we determine what the revenues would be at the end of the charge control by multiplying service volumes by their respective prices. In effect, this is what revenues would be in the absence of any price changes from current levels.
- A12.7 Finally, we calculate the value of X for the basket in question such that forecast total revenues within each basket are equal to forecast total costs in the final year of the charge control. We calculate the value of X as follows:

 $X = (Costs_T / [Price_0 * Volumes_T])^{1/3} - 1$ 

Where:

 $Costs_T = Forecast costs at the end of the charge control (2015/16)$ 

 $Price_0 = Service prices at the start of the charge control (2012/13)$ 

Volumes<sub>T</sub> = Service volumes at the end of the charge control.

A12.8 We further describe below in detail how we adjust base year cost data.

# Main adjustments to BT's base year costs in 2011/12

- A12.9 The starting point for the base year costs data is BT's RFS for 2011/12. The data supplied both by BT Wholesale and Openreach in response to our information requests have provided us with detailed disaggregation of costs that have been prepared on the same basis as those in the RFS. The 2011/12 RFS are the latest fully audited set of regulatory accounts that we had at our disposal for the purpose of carrying out the charge control modelling.
- A12.10 BT has provided disaggregated financial data for 2011/12 on a component basis for the leased line services at the same level of aggregation as those reported in the RFS.<sup>216</sup> For example, costs for WES services are available for some bandwidths (10Mbit/s, 100Mbit/s and 1Gbit/s) but aggregated across others (2Mbit/s, 155Mbit/s and 622Mbit/s).<sup>217</sup>
- A12.11 We adjust the cost data to ensure that these are representative of the relevant level of costs for the respective baskets on a forward looking basis for setting this charge control. We also consider whether to make one-off adjustments to starting charges, which requires reliable cost data matched to revenues.
- A12.12 We implement two main types of adjustments, described in detail in Figure A12.2 below, namely:
  - adjustments to reflect the composition of the basket; and
  - adjustments to base year costs to reflect forward looking efficient costs for the purposes of forecasting costs to 2015/16.
- A12.13 In their response to the LLCC Consultation, one stakeholder referred to a decision by the Valuation Office Agency [×].<sup>218</sup>
- A12.14 The stakeholder referred to Ofcom's assessment of BT's cumulo bill in the context of Ofcom's Statement on the WLR LLU CC<sup>219</sup> and submitted that by the same or similar method Ofcom has to calculate the cumulo charge on fibre and its movement as a component of the LRIC as part of determining costs. Cumulo is included as a part of BT's land and building costs, an input to our model.
- A12.15 In the light of these submissions, we have considered whether this approach remains appropriate. For the purposes of this charge control, we are seeking to constrain BT's pricing in a way which appropriately addresses (alongside other remedies being imposed) the competition concerns we have identified as relevant

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

<sup>217</sup> See the RFS for more details of the services reported: p.42 to p.50 for PPC terminating segments, p.51 to p.54 for Ethernet services, and p.71 to p.72 for PPC trunk segments: http://www.btplc.com/Thegroup/RegulatoryandPublicaffairs/Financialstatements/2012/RFS\_2012.pdf

<sup>218</sup> [×]

<sup>&</sup>lt;sup>216</sup> Network components are the underlying pieces of infrastructure/activities that make up each service. Every service reported by BT uses one or more components. For example, PPC 64kbit/s - link uses the following components: PC rental 64kbit link, SG&A partial private circuits and SG&A private circuits. Network access provided by BT Wholesale for downstream services was based on components that were common to PPCs sold externally. BT's total network costs were disaggregated into these network components. Costs of a service is then dependent on the amount of costs attributed to these components, which are described in BT's Detailed Attribution Methodology document:

<sup>&</sup>lt;sup>219</sup> See WLR LLU CC Statement

to our market power determinations in respect of BT. As part of this process, Ofcom is not seeking to replicate or question the Valuation Office Agency's ratings process. We do not therefore think it would be appropriate to make an adjustment to our approach to BT's land and building costs to take account of the cumulo bill of a third party.

#	Question	Type of adjustment	Examples
1	Do BT's reported figures reflect the composition of our basket?	Inclusion or exclusion of service data to reflect composition of the basket	Exclusion of SDSL, POH, protected paths, resilience and other ancillary services
			Geographic adjustment
2	Are any adjustments needed to provide a more relevant view of BT's profitability for 2011/12?	Amendments to base year data	Mismatch of revenues and costs such as:
			<ul> <li>transmission equipment costs</li> </ul>
			payment terms
3	Does our adjusted accounting view provide a suitable basis for price controls in terms of:		
a Reflect or abno or reve	Reflecting one-off events or abnormal levels of cost	Smoothing of costs & revenues	Normalisation of current cost holding gains/losses
	or revenue?	i.e. adjustment to reflect expected levels of future costs or revenues	
b	How we expected BT to recover particular items of cost in future?	Implementation of our cost recovery methodologies through adjustments to costs and revenues	Adjustment to make cost recovery profile for duct consistent with BT's RAV

### Figure A12.2: Types of adjustments made to base year costs

## TI basket

A12.16 In Figure A12.3 below, we set out the different types of adjustments we have made to the 2011/12 data for the TI basket, our reasoning and the data used for each of these adjustments. In some cases, our approach to cost adjustments has changed compared to the LLCC Consultation. We further discuss those changes and our reasons in Section 19 of this Statement.

# Figure A12.3: Adjustments to reported 2011/12 costs, revenues & volumes for the traditional interface (TI) basket

#### # Description of adjustment

Mechanics / source data used

#### Non-core services

#### 1 Ancillary services and Points of Handover

We have modelled only core services for determining the value of X to be applied to the TI basket. BT charges customers for other services used in the provision of the core TI services, known as 'ancillary services'. We have not modelled these services, because there would be a significant amount of data and number of assumptions required in order to forecast the volume of ancillary services. Figure A12.4 below shows that, in terms of revenues, ancillary services (other than POH and ECCs) account for around 4% of all TI services and therefore would only have a small impact on the value of X if they were included in the modelling analysis.

For POH services, we have analysed these charges on a different basis.

# 2 Protected paths and separation & diversity costs

BT's RFS separately identify the revenues and an estimate of the costs for protected path variants and separation and diversity circuits. We have eliminated them from our modelling analysis, because our value of X is based on the costs and revenues of the core TI basket services.

Our forecasts assume that the volumes for the core TI basket services do not include protected path variant or separation and diversity circuit volumes.

#### Services out of scope of TI basket

#### 3 SDSL

BT includes SDSL within the reporting for TI services. SDSL is a legacy product that BT Wholesale does not intend to support beyond spring 2014. We have excluded SDSL from the basket.

We have excluded POH services and ancillary services from our modelling. Ancillary services data is not included in the RFS.

POH revenues and costs are separately identified in the RFS and we have excluded revenues and costs consistent with these services from our modelling analysis for setting the overall basket cap.

BT's estimate of costs in the RFS does not include all resilience and separation costs, as some of the costs have been included within other services.

BT has provided an estimate of additional resilience and protected path costs that are included within other services in the RFS. We have eliminated these additional costs against reported services. We have excluded the impact on holding gains and other CCA adjustments as we model those separately.

We have removed SDSL costs and revenues from our analysis based on the reporting in the RFS.

#### # **Description of adjustment** Mechanics / source data used 4 BT has analysed the costs for TI services that Geographic disaggregation vary by geography and has provided to us As explained in Section 7 of this Statement, we calculations of the extent of the difference have concluded that no operator has SMP in between the WECLA and the rest of the UK. BT the markets for medium bandwidth TISBO in Wholesale's methodology<sup>220</sup> can be summarised the WECLA and high bandwidth TISBO in the as follows: WECLA. We have therefore excluded the costs • BT Wholesale categorised costs into access and revenues associated with the WECLA from related costs, equipment related costs and other our modelling. costs. It then calculated how costs of access and equipment related costs varied by geography. Based on these estimates, it applied the unit cost differentials to the overall share of these costs categories on a per circuit basis. • BT Wholesale's analysis found that aggregate unit costs for main links in the WECLA were lower than the national average as follows: Links Differential 34/45Mbit/s [×] 140/155Mbit/s [×] • For local ends, BT found that aggregate unit costs were lower than the national average as follows: Local ends Differential 34/45Mbit/s [><] 140/155Mbit/s [×] We have also adjusted the total TI trunk volumes and costs to include only regional trunk, consistent with our position on market definitions and remedies as set out in Sections 6 and Section 7. Trunk charges are applied on a per kilometre basis, and we do not believe that there should be differences in unit costs between regional and national trunk. We have estimated the proportion of regional and national trunk as follows: Regional National 24 % Trunk volumes at all 76% bandwidths 76% 24% Trunk costs at all bandwidths We have adjusted the nationally averaged cost data based on this geographic analysis when modelling TI services, as we consider that this adjusted data provides a more accurate reflection of the costs in the charge controlled

Our analysis suggested that, in 2011/12, the costs for medium and high bandwidth circuits were approximately 20-30% higher in the charge controlled area compared to the national average.

area than nationally averaged data.

#### # Description of adjustment

Mechanics / source data used

#### Adjustments to reflect forward looking efficient costs

#### 5 Current cost normalisation

BT prepares its RFS using CCA principles. These costs reflect the actual level of asset prices changes experienced and the impact of any changes to the methodologies used to value assets. Therefore, one period's CCA adjustments are unlikely to provide a robust forecast for future years.

We have therefore substituted BT's numbers with our own estimate of future asset price changes and eliminated the impact of any one off methodology changes. We have adjusted asset price change forecast assumptions in our model, substituting the values provided by BT for 'holding (gain)/loss' and 'other CCA adjustments' with our own forecasts.

We have calculated our forecast holding gain by multiplying asset values by the geometric mean of the past five years' asset price change figures as supplied by BT excluding one off changes. We have assumed that forecast price changes for duct will be equal to RPI. This is consistent with our approach to RAV.

The explanation of the source of our asset inflation assumptions is in A12.131 – A12.136.

## 6 **21CN**

TI basket services include an element of the cost of BT's investment in its 21CN network, which are allocated on a future benefit basis to TI services. We consider that these costs should be recovered against services delivered over the 21CN network, and not against current services which do not use this network.

However, BT uses 21CN costs to repair the current network that is used to deliver TI services. We consider that BT is allowed to recover this element of 21CN costs.

We have therefore eliminated an estimate of 21CN costs allocated on a future benefit basis and allowed an estimate of 21CN costs that is reflective of the current use of 21CN for TI services.

BT's use of the term '21CN' in the RFS includes its next generation backhaul network as well as its core.

In 2011/12, BT identified components which it attributed to certain services in the TI basket.

Components, in the same way as BT's plant groups, comprise not just direct costs such as for equipment but also indirect costs such as accommodation & security as well as corporate costs.

#### Avoidable versus unavoidable element

We asked BT to provide us with an analysis for 2011/12 of the 21CN costs identifying which costs were truly specific to 21CN (e.g. equipment and software), including overheads that would not have been included in the service costs had the MCE of 21CN components been excluded from the services.

BT provided us with the analysis of these costs allocated on a future benefit basis.

Based on this analysis, we have eliminated costs and MCE specific to 21CN network.

We also asked BT to estimate 21CN costs that are currently utilised by the TI network. We have allowed these costs in the base year calculations. The allowed costs are  $[><]^{221}$  of the total 21CN cost allocated to TI as identified by BT.

<sup>220</sup> BT Wholesale response to S135 Notice of 26 March 2012 [×]

<sup>221</sup> BT Wholesale response to S135 Notice of 28 September 2012 [×]

#### # Description of adjustment

#### Mechanics / source data used

## 7 Payment terms

Part of the relevant capital employed includes the cost to BT of financing the payment terms it offers. BT reflects this cost as notional debtors.

We have calculated its value using the number of days between when BT (on average) provides the service and when it expects to be paid. We have then multiplied this number of days over 365 days by its annual revenues to arrive at the value to include in MCE.

BT's value for notional debtors reflects 28 days of revenues across all services, which differs from the terms actually offered on individual services.

We have therefore adjusted notional debtors to reflect BT's actual payment terms for each service.

We have also identified in 2011/12 that some cash items have been recorded in the external debtors and creditors categories. We have removed the cash and short-term investments elements from our modelling. We have substituted the internal and external debtor figures, which reflect 28/365'ths of internal and external revenues, with a revised calculation based on 16/365 days and 47/365 days for rental and connection services respectively.

#### Rentals

16 days represents the average interval for services billed monthly in advance. This includes a day for bill preparation.

#### Connections

47 days represents the average interval between a new connection and when payment falls due. BT invoices connections on a monthly billing cycle, rather than billing for the service the day after connection. This period includes two days for bill preparation.

BT has provided a breakdown of data that showed that both internal and external notional debtors are recorded in the 'internal debtors' category in the accounts. We have therefore only removed that category for the adjustment.

We have removed cash, short-term investments and short-term borrowings recorded in the external debtors and creditors categories.
#	Description of adjustment	Mechanics / source data used		
8	Regulatory asset value (RAV)	The RAV adjustment is made of two parts.		
	We have adjusted BT's current cost depreciation and asset values for access duct. This is to ensure full and fair cost recovery over the life of these assets across all the services that use these assets.	<ol> <li>We have adjusted pre-1997 access duct in 2011/12 in accordance with our 2005 Copper Statement.<sup>222</sup> The adjustment only applies to local ends, both copper and fibre. Because copper is nearing the end of its book life, the adjustment to copper is immaterial.</li> </ol>		
		We have calculated the adjustment for duct by taking the difference between pre-97 duct depreciation and MCE based on CCA and RAV valuations and multiplying the difference by the percentage of duct that is used by TI local ends. The relevant percentage was identified by BT as 1.8%. <sup>223</sup>		
		2. We have also adjusted post-1997 duct from the absolute valuation to indexed capital expenditure consistent with the WLR LLU CC. <sup>224</sup>		
		We have calculated the adjustment by taking the difference between post-97 absolute valuation and indexed capex valuations and multiplying it by the percentage of duct used by TI services. The relevant percentage was identified by BT as approximately 8%. <sup>225</sup>		

- A12.17 We are imposing a separate control of ECCs and they therefore fall outside the basket X. We originally made an adjustment to remove ECC costs and MCE in the LLCC Consultation because BT included the cost of providing ECCs within the base data for TI basket services.
- A12.18 We no longer make the adjustment to remove ECC costs and MCE from the modelling base. As BT has now made an adjustment that removes an estimate of MCE and depreciation associated with ECCs for the last 10 years from the 2011/12 cost base and we do not consider that a further adjustment is necessary.
- A12.19 Figure A12.4 below shows the impact of the described adjustments on the reported 2011/12 data. We note, in particular, that:
  - for the adjustments made in order to reflect forward-looking efficient costs, the figures shown in Figure A12.4 below reflect the impact to the basket only, rather than to the TI market as a whole;
  - these adjustments are made in the base year and rolled forward using the same assumptions as applied to the base year costs. As such, the ROCE figures

<sup>&</sup>lt;sup>222</sup> http://stakeholders.ofcom.org.uk/consultations/copper/value2/statement/

<sup>&</sup>lt;sup>223</sup> BT Group response to S135 Notice of 28 September [×]

<sup>&</sup>lt;sup>224</sup> http://stakeholders.ofcom.org.uk/consultations/llu-wlr-further-consultation/statement

<sup>&</sup>lt;sup>225</sup> See BT response to the LLCC Consultation, paragraphs 10-12, pp. 16-17.

shown are for illustrative purposes only and do not reflect actual profitability achieved in 2011/12; and

 the figures shown in Figure A12.4 reproduce RFS data with a 99.5% accuracy. Where limited discrepancies arise, they are due to cross effect of rounding and adjustments.

Adjustment	Revenues (£m)	Operating costs (£m)	Capital costs <sup>227</sup> (£m)	Mean capital employed (£m)	ROCE (%)
RFS 2011/12 All TISBO and TI trunk markets	738	278	201	1231	21.0%
Ancillary services					
Points of handover <sup>228</sup>	-6	-4	-3	-11	
Resilience circuits, separation & diversity, ECCs and third party infrastructure costs	-37	-3	-35	-59	
Additional protected paths costs	-	-1	-1	-4	
Additional separation & diversity costs	-	-2	-1	-5	
TISBO and TI trunk core services	695	269	162	1,152	23.0%
SDSL	-8	-1	-0	-4	
TISBO and TI trunk core services excluding SDSL	687	268	161	1,147	22.4%
Geographic disaggregation					
Exclude services delivered within the WECLA	-25	-5	-4	-43	
TISBO and TI trunk core services outside the WECLA	662	263	157	1,104	21.9%
Ofcom cost adjustments					
Current cost normalisation	-	-	13	-	
Exclusion of 21CN costs	-	-0	-14	-42	
Payment terms	-	-	-	-30	
Regulatory asset value (RAV) adjustment to duct assets	-	-	-2	-25	
Total TI basket in 2011/12	662	263	153	1,007	24.4%

#### Figure A12.4: Impact of adjustments on the TI basket<sup>226</sup>

Source: Ofcom modelling.

#### Ethernet basket

A12.20 In Figure A12.5 below, we set out the different types of adjustments we have made to the 2011/12 data for the Ethernet basket, our reasoning and the data used for each of these adjustments. In some cases, our approach to cost adjustments has

<sup>&</sup>lt;sup>226</sup> We note that not all columns may total correctly as numbers have been rounded. Furthermore, there are differences between the size of adjustments presented in the table and the size of the adjustment discussed in this Annex and Sections 19 and 20 due to the geographic disaggregation and the scope of the basket that reduce the size of the initial adjustment.

<sup>&</sup>lt;sup>227</sup> Capital costs include depreciation and holding losses (gains).

<sup>&</sup>lt;sup>228</sup> The amount of POH costs excluded from the TI basket is equal to the amount of POH revenues, as POH charges are assumed to be set at the LRIC level.

changed compared to the LLCC Consultation. We further discuss those and our reasons in Section 20 of this Statement.

## Figure A12.5: Adjustments to reported 2011/12 costs and revenues for the Ethernet basket

#### # Adjustment

Mechanics / source data used

#### Services in and out of scope of the basket

#### 1 Non-core ancillary services

Similar to the approach adopted for the TI basket, we have modelled only core services. There would be a significant amount of additional data and assumptions required in order to forecast the volume of ancillary services. As illustrated by Figure A12.6 below, they make up a small proportion of the Ethernet services.

We have excluded revenues and costs associated with ancillary services from base year costs.

#### 2 Services not reported in RFS

We have included Ethernet services not reported in the RFS including internal ONBS and EBD up to 1Gbit/s and their associated main link distances and above 1Gbit/s Ethernet services and their associated main link distances. BT does not report volumes, revenues and costs of these services in its RFS. We therefore requested this information from BT and we have included this data in our modelling.

#### 3 Other services

We have excluded Cablelink, Broadcast Access, CCTV circuits and Street Access as we have concluded that it is inappropriate to include them in the AISBO markets we have identified: see further Section 4 of this Statement. We have excluded costs, revenues and volumes of these services from base year data.

#### 4 Geographic disaggregation

For reasons discussed in Section 7 of this Statement, we have found that the competitive conditions in the market for low bandwidth AISBO in the WECLA are different to those outside the WECLA and we have therefore decided to impose separate controls on relevant services: see Section 21 of this Statement.

We have excluded the costs and revenues associated with those services from our modelling. We consider that, if costs differ between the geographical markets of the UK (excluding the Hull area and the WECLA) and the WECLA, we should use geographically disaggregated costs so that we more accurately model the costs outside the WECLA.

#### Mechanics / source data used

Openreach has provided us with data on the proportion of Ethernet circuits in the WECLA, and the cost differential with respect to the rest of the UK (excluding Hull). Openreach's methodology can be summarised as follows:

• Openreach categorised the costs for low bandwidth AISBO services into fibre cable, backhaul cable and duct. It then calculated how costs of access and duct related costs varied by geography.<sup>229</sup> Based on these estimates, it applied the unit cost differentials to the overall share of these cost categories on a per circuit basis.

• Openreach's analysis found that the unit costs for the main service types in the Ethernet basket were lower than the national average as follows:

Service type	Differential
WES	[×]
BES	[×]
EAD	[×]
EBD	[×]
Other	[×]
Main Links	[×]

We have adjusted the nationally averaged cost data based on this geographic analysis when modelling low bandwidth AISBO services. We consider that this adjusted data provides a more accurate reflection of the costs we model than nationally averaged data.

#### Adjustments to reflect forward looking efficient costs

#### 5 Current cost normalisation

As already noted, BT prepares its statements using CCA principles. These costs reflect the actual level of asset price changes experienced and the impact of any changes to the methodologies used to value assets. Therefore, one period's CCA adjustments are unlikely to provide a robust forecast for future years.

We have therefore substituted our own estimate of future asset price changes and eliminated the impact of any methodology changes. We have adjusted asset price change forecast assumptions in our model, substituting the values provided by BT for 'holding (gain)/loss' and 'other CCA adjustments' with our own forecasts.

We have calculated our forecast holding gain by multiplying asset values by the geometric mean of the past five years' asset price change figures as supplied by BT excluding one-off changes.

<sup>&</sup>lt;sup>229</sup> For a description of the methodology Openreach used to estimate how the costs of fibre cable, backhaul cable and duct vary by geography, see Section 20 of this Statement.

#### 6 Transmission equipment costs

Up to 2010/11, BT recovered the cost of the transmission equipment deployed at either end of an Ethernet circuit and which is wholly dedicated to that service, through the local end connection charges. BT also capitalised and depreciated this equipment over its useful economic life.

In the LLCC 2009, we made an adjustment to match costs and revenues by eliminating MCE and depreciation of the assets and replacing them with a measure of fully expensed cost of the equipment on connection.

In 2010/11, BT changed its accounting policy to recover the cost of transmission equipment through rentals. We have therefore removed the costs associated with transmission equipment assets capitalised before 2010/11. Since BT's policy change occurred in 2010, the adjustment correctly relates only to assets capitalised prior to 2010/11 and not 2011/12.

#### Mechanics / source data used

BT provided a breakdown of transmission equipment capitalised before and after 2010/11.

We have eliminated HCA and MCE related to transmission equipment capitalised before 2010/11 from our cost base.

#### 7 21CN costs

Some 21CN costs are allocated to Ethernet services on a future benefit basis. We do not consider that these costs should be recovered from existing customers. This is because the costs are going to either enable provision of a future service that is outside the charge control or a more efficient delivery of an existing service in the future. In 2011/12, BT identified components which it attributed to certain services in the Ethernet basket.

Components, in the same way as BT's plant groups, comprise not just direct costs such as for equipment but also indirect costs such as accommodation & security as well as corporate costs.

Avoidable versus unavoidable elements

We asked BT to provide us with an analysis for 2011/12 of the 21CN costs identifying which costs were truly specific to 21CN (e.g. equipment and software) including overheads that would not have been included in the service costs had the MCE of 21CN components been excluded from the services.

Based on this analysis, we have removed the costs associated with two components that are allocated on a future benefit basis – namely high bandwidth data cards and Ethernet switches.<sup>230</sup>

<sup>&</sup>lt;sup>230</sup> Openreach response to S135 of 28 September [×]

#### Mechanics / source data used

#### 8 Payment terms

Part of the relevant capital employed includes the cost to BT of financing the payment terms it offers. BT reflects this cost as notional debtors.

We have calculated its value using the number of days between when BT (on average) provides the service and when it expects to be paid. We have then multiplied this number of days over 365 days by its annual revenues to arrive at the value to include in MCE.

BT's value for notional debtors reflects 28 days of revenues across all services, which differs from the terms actually offered on individual services.

We have therefore adjusted notional debtors to reflect BT's actual payment terms for each service.

We have also identified in 2011/12 that some cash items have been recorded in the external debtors and creditors categories. We have removed the cash and short-term investments elements from our modelling. We have substituted the internal and external debtor figures, which reflect 28/365'ths of internal and external revenues, with a revised calculation based on 16/365 days and 47/365 days for rental and connection services respectively.

#### Rentals

16 days represent the average interval for services billed monthly in advance. This includes a day for bill preparation.

#### Connections

47 days represent the average interval between a new connection and when payment falls due. BT invoices connections on a monthly billing cycle, rather than billing for the service the day after connection. This period includes two days for bill preparation.

BT has provided us with a breakdown of data that showed that both internal and external notional debtors are recorded in the 'internal debtors' category in the accounts. We have therefore only removed that category for the adjustment.

We have removed cash, short-term investments and short-term borrowings recorded in the external debtors and creditors categories.

#### 9 Regulatory asset value (RAV)

We have adjusted BT's current cost depreciation and asset values for access duct. This is to ensure full and fair cost recovery over the life of these assets across all the services that use these assets.

#### Mechanics / source data used

The RAV adjustment is made of two parts.

1. We have adjusted first the pre-1997 access duct in 2011/12 in accordance with the 2005 Copper Statement. The adjustment only applies to local ends

We asked BT to estimate the percentage of duct that is used by Ethernet local ends. The relevant percentage was identified by BT as approximately 4%.<sup>231</sup>

We have calculated the adjustment for duct by taking the difference between pre-1997 duct depreciation and MCE based on CCA and RAV valuations and multiplying the difference by the percentage of duct identified by BT as referred to above.

 The second part of the adjustment is based on the value of duct calculated in accordance with the methodology described in the February 2012 WLR LLU CC Statement.<sup>232</sup> This reduces post-97 value of duct from the absolute valuation to a valuation based on indexed capital expenditure.

We have calculated the adjustment for duct by taking the difference between post-1997 duct depreciation and MCE based on absolute valuation and indexed capex and multiplying the difference by the relevant percentage of duct identified by BT. BT identified the relevant percentage to be approximately 8%.<sup>233</sup>

- A12.21 As with the TI basket, we no longer make an adjustment for ECC costs and MCE. This is because BT made an equivalent adjustment in its 2011/12 accounts, removing the need for our adjustment.
- A12.22 As with the TI basket, Figure A12.6 below shows the impact of the described adjustments on the reported 2011/12 data for the Ethernet basket.

<sup>&</sup>lt;sup>231</sup> Openreach response to S135 Notice of 14 February [%]

<sup>&</sup>lt;sup>232</sup> http://stakeholders.ofcom.org.uk/consultations/llu-wlr-further-consultation/statement

<sup>&</sup>lt;sup>233</sup> See BT response to the LLCC Consultation, paragraphs 10-12, pp. 16-17.

Adjustment	Revenues (£m)	Operating costs (£m)	Capital costs <sup>235</sup> (£m)	Mean capital employed (£m)	ROCE (%)
RFS 2011/12					
All Ethernet market (i.e. Ethernet services up to 1Gbit/s)	725	246	284	1,357	14.4%
Adjustments to the scope of the basket					
All services above 1Gbit/s	[≻]	[×]	[≻]	[≻]	
Exclusion of Cablelink, Street Access, CCTV Access, Broadcast Access and ancillary services	[⊁]	[⊁]	[⊁]	[⊁]	
Adjustments to costs and revenues					
Inclusion of internal EBD, ONBS and associated Mainlink services	[×]	[×]	[×]	[⊁]	
Adjustments to RFS costs to reflect the scope of the basket	[⊁]	[⊁]	[≻]	[⊁]	
Exclusion of ECC assets <sup>236</sup>	-57	n.a.	n.a.	n.a.	
Ethernet basket	733	252	299	1,365	1 <b>3.4</b> %
Geographic disaggregation					
Exclude services delivered within the WECLA	-99	-29	-34	-160	
Ethernet services outside the WECLA	634	223	265	1,205	12.1%
Ofcom cost adjustments Current cost normalisation	-	-	-54	-	
Exclusion of transmission equipment	-	-	-18	-32	
Exclusion of 21CN costs	-	-5	-5	-19	
Payment terms	-	-	-	-22	
Regulatory asset value (RAV) adjustment to duct assets	-	-	-5	-61	
Total Ethernet basket in 2011/12	634	218	183	1,071	21.7%

#### Figure A12.6: Impact of adjustments on the Ethernet basket<sup>234</sup>

Source: Ofcom modelling.

## **Volume forecasts**

- A12.23 Service volume forecasts are a key determinant of the values of X for the TI and Ethernet baskets. Revenues in the final year of the charge control are calculated as the current and prevailing service price multiplied by their respective final year volume forecasts.
- A12.24 The volume forecasts for the services in the TI and Ethernet baskets, respectively, are used to derive the total capital and operating costs that BT will need to recover by the end of the charge control period. The values of X are sensitive to these

<sup>&</sup>lt;sup>234</sup> Not all columns may total correctly as numbers have been rounded. Furthermore there are differences between the size of adjustments presented in the table and the size of the adjustment discussed in the section due to the geographic disaggregation and the scope of the basket that reduce the size of the initial adjustment.

<sup>&</sup>lt;sup>235</sup> Capital costs include depreciation and holding losses (gains).

<sup>&</sup>lt;sup>236</sup> The adjustment for ECC relates only to Revenues as BT submitted costs data that did not include ECCs.

forecasts due to the interaction between volumes and the asset volume elasticities and cost volume elasticities, which reflect economies of scale.

A12.25 We explain below how we arrived at the volume forecasts for the TI and Ethernet baskets used in the LLCC Consultation, and then how we adjusted them in reaching our decision in this Statement.

## **Volume forecasts for TI services**

# We arrived at our TI volume forecasts for the LLCC Consultation by taking into account forecasts from various sources

A12.26 We derived our forecasts set out in the LLCC Consultation from those of three operators. The trend forecasts of each of the three operators are shown in Figure A12.7 and Figure A12.8 below. In considering these forecasts, we noted that these comparisons did not take into account changes in market share, operators' strategies or general trends. Nonetheless, we considered that the trends demonstrated a broadly consistent view of the market.

# Figure A12.7: Comparison of TI volume forecasts, up to and including 2Mbit/s (number of circuits)

### [×]

A12.27 Figure A12.7 above sets out the forecasts we received for sub 2Mbit/s and 2Mbit/s services. We considered the forecasts of sub 2Mbit/s and 2Mbit/s services to be particularly important as these make up a considerable proportion of TI volumes (e.g. 98% of local ends in 2010/11).<sup>237</sup>

# Figure A12.8: Comparison of volume forecasts, above 2Mbit/s (number of circuits) [%]

A12.28 Figure A12.8 above shows the comparison of the forecasts for the above 2Mbit/s services. CP1 and CP2 forecast similar rates of decline for the 34/45Mbit/s services. CP1 forecast a more moderate decline in 140/155Mbit/s volumes than CP2. CP3 expected stronger decline in the above 2Mbit/s services and did not distinguish between 34/45Mbit/s and 140/155Mbit/s services.<sup>238</sup> We noted that these services make up a relatively small proportion of TI services.

# We have reassessed our TI volume forecast in light of the outturn for 2011/12 and new volume forecasts we have received

A12.29 Following the LLCC Consultation, we have been able to compare our forecast for 2011/12 (as set out in the LLCC Consultation) with the actual outturn. We have also received updated volume forecasts for TI services from BT Wholesale, other CPs and industry analysts. We have analysed all these sources when arriving at our decision on volume forecasts.

<sup>&</sup>lt;sup>237</sup> BT Group response to S135 Notice of 1 July 2011 [×]

<sup>&</sup>lt;sup>238</sup> We noted that CP3's data had been interpolated to ensure comparability between the other two data sets.

A12.30 First, we compared our forecast for 2011/12 with the outturn. In the LLCC Consultation, we forecast a sharp decline in TI volumes in 2011/12. As Figure A12.9 below shows, this decline has largely been realised, although the actual decline was slightly less than forecast (a 24% decline in local ends as opposed to the 27.5% forecast). We note that for 2011/12 BT had forecast a faster rate of decline than the outturn and, in contrast, that other CPs and an industry analyst had forecast a slower rate of decline.



## Figure A12.9: Comparison between consultation forecasts with actual volumes for 2011/12 local ends

- A12.31 Second, since the LLCC Consultation, both BT and CPs have provided new forecasts. We note that BT has forecast a faster decline than the rate we had forecast in the LLCC Consultation. BT explained that it forecast a faster rate of decline due [≫].<sup>239</sup>
- A12.32 In contrast, CPs and an industry analyst have forecast a lower rate of decline for subsequent years than we had forecast in the LLCC Consultation.
- A12.33 We have examined BT's explanations for its forecast of a faster decline in TI services. [≫]. We therefore consider that we do not have clear evidence to support BT's expectation that the decline will be faster than in the LLCC Consultation.
- A12.34 Figure A12.10 below shows a comparison of our LLCC Consultation volume forecasts for TI local ends (across all bandwidths) with the forecasts of [%], [%].

<sup>&</sup>lt;sup>239</sup> BT Wholesale response to S135 Notice of 28 September [X]

# Figure A12.10: Comparison of total local end volume forecasts [≫]

A12.35 Figure A12.10 above shows that all providers have forecast a decline in circuit numbers but that the rate of decline predicted varies between operators. [≫] and [≫] both forecast a lower rate of decline, whereas BT has forecast a higher rate of decline than our LLCC Consultation forecast.

#### **Conclusion on our TI volume forecasts**

- A12.36 Our analysis of 2011/12 data shows that our forecast of a sharp fall in 2011/12 was in line with the outturn. This gives us confidence in our previous forecasts. We also note that, although other CPs and an industry analyst forecast a slower rate of decline for the charge control period, they also underestimated the actual rate of decline in 2011/12. Furthermore, we note that BT overestimated the rate of decline in 2011/12 and yet its new forecasts assume an even faster rate of decline.
- A12.37 Given the relative accuracy of our 2011/12 forecasts and the differences in forecasts between stakeholders, we have decided to continue with our previous forecast rates of volume decline. We have therefore adapted the LLCC Consultation forecasts to the new base year and kept the same rate of change for each circuit type as was previously forecast in the LLCC Consultation.
- A12.38 Our final forecasts are shown in Figures A12.11 and A12.12 below. By the end of this charge control, we expect the total number of TI circuits to decline by over 60% compared to 2011/12. We predict a similar decline in total capacity delivered through TI circuits.



Figure A12.11: Ofcom forecasts of TI services to 2015/16 (number of local ends)

- A12.39 Figure A12.11 above shows that sub 2Mbit/s and 2Mbit/s circuits currently make up the vast majority of all TI circuits, and we forecast this to continue as the higher speed TI services (34/45Mbit/s and 140/155Mbit/s) and the mobile backhaul services migrate to higher bandwidth services.
- A12.40 BT intends to close the Digital Private Circuit Network (DPCN) used to carry low bandwidth (sub 2Mbit/s) PPCs by 2018 and has stated that its service level guarantee may reduce to 'best efforts' due to the very limited availability of replacement equipment.<sup>240</sup>
- A12.41 We expect an acceleration in the decline of all local ends from 2011/12 onwards, reaching a level in 2015/16 which is between 10% and 43% of current levels, depending on bandwidth. By 2015/16, we expect that the higher bandwidth TI services would have declined by a greater proportion than the low bandwidth TI services.
- A12.42 We use our volume forecasts to derive a view of the capacity delivered over TI services. By multiplying the local end volumes by the relevant bandwidths, we have forecast the capacity delivered over the TI network until 2015/16. This is set out below in Figure A12.12.

<sup>240</sup> See BT Wholesale PPC Sub-2Mbit/s Strategy Review Briefing <u>https://www.btwholesale.com/shared/document/News\_and\_Insights/Briefings/PPCs/Sub\_2Mb\_Review\_Briefing\_Revision\_Issue.pdf</u>.



Figure A12.12: Ofcom's forecast of TI services capacity (Gbit/s)

A12.43 As shown in Figure A12.12 above, our forecasts predict that capacity will decline rapidly from 2011/12 to 2013/14, but it is expected to decrease at a slower rate from 2013/14 onwards. In terms of circuits, over 50% of capacity was delivered by 2Mbit/s circuits in 2011/12. Our forecasts show that we expect that 2Mbit/s will continue to provide the majority of TI capacity over the forecasting period.

### **Volume forecasts for Ethernet services**

# We arrived at our LLCC Consultation Ethernet volume forecasts by taking into account forecasts from various sources

A12.44 Our volume forecasts set out in the LLCC Consultation anticipated significant volume growth in the market for Ethernet services. Those forecasts were derived from the forecasts obtained from three providers (CP1, CP2 and CP3) and an industry analyst Ovum (Analyst). These forecasts all showed a consistent pattern of market trends. Figure A12.13 below shows the comparison of the forecasts of these providers for individual circuit types.

# Figure A12.13: Comparison of Ethernet circuit forecasts, up to 1Gbit/s [%]

A12.45 By bandwidth, we considered that there was a degree of consistency between the trends forecast by CP1 and the Analyst. Although CP1 forecast a higher rate of growth in 10Mbit/s initially, both forecasts converged to similar rates of growth from 2012/13 onwards. CP3's forecast for 2012/13 was also consistent with the 10Mbit/s forecasts from the CP1 and the Analyst. CP2 forecast a gradual decline in the 10Mbit/s services from 2011/12 onwards, which was different to the other three sources. For 100Mbit/s services, we noted that CP2 expects a significantly higher growth rate than the other sources.

- A12.46 For the 1Gbit/s and above services, we noted that CP2's forecasts showed a similar trend to that of the Analyst's. In comparison, CP1 did not expect a significant growth in the 1Gbit/s services. Instead it expected a sharp increase initially in the above 1Gbit/s services, which then tapers off after 2013/14.
- A12.47 In order for us to compare the impact of the growth rates across the different sources, we calculated the total capacity delivered using Ethernet services. As Figure A12.14 shows, the three forecasts predicted a significant increase in capacity, and that, despite the differences in the growth rates of the underlying services by bandwidth, all three predicted similar rates of capacity growth. The growth rates shown were also consistent with the historical growth rates seen between 2007/08 and 2010/11.

# Figure A12.14: Comparison of capacity forecasts from CP1, CP2 and Analyst<sup>241</sup> [%]

# We have reassessed our Ethernet volume forecast in light of the outturn for 2011/12 and new volume forecasts we have received

- A12.48 Following the LLCC Consultation, we have been able to compare our forecast for 2011/12 (as set out in the LLCC Consultation) with the actual outturn. We have also received updated volume forecasts for Ethernet services from Openreach, other CPs and industry analysts. We have analysed all these sources when arriving at our decision on volume forecasts.
- A12.49 First, we have compared our Ethernet forecast for 2011/12 with the outturn. In the LLCC Consultation, we forecast considerable growth in EAD and EBD volumes and a steady decline in WES and BES volumes in 2011/12. Overall, the trends predicted were largely accurate. As shown in Figure A12.15 below, there was a slightly smaller decline in WES and BES than anticipated, and a slightly higher increase in EAD and EBD than forecast. The result is that the total number of Ethernet circuits in 2011/12 is just under 3% higher than predicted.

<sup>&</sup>lt;sup>241</sup> CP3 did not provide enough granularity in its forecasts to allow the calculation of its capacity forecast.



# Figure A12.15: Comparison of 2011/12 consultation forecasts and actual volumes (no. of circuits)

- A12.50 Second, since the LLCC Consultation, we have received updated volume forecasts for Ethernet services from various sources, including Openreach, CPs and an industry analyst. We note that the new Openreach forecasts received are only up to 2013/14. We also note that, although in its response to the LLCC Consultation BT stated that we may need to reduce our forecast growth in Ethernet volumes, this was not reflected in the forecasts it provided for 2012/13 and 2013/14.<sup>242</sup>
- A12.51 Figure A12.16 below sets out our LLCC Consultation forecasts of circuits alongside those of [ $\gg$ ], [ $\approx$ ], [ $\approx$ ], [ $\approx$ ] and [ $\approx$ ]. It shows that, overall, [ $\approx$ ], and [ $\approx$ ] have predicted similar growth rates to that of our forecasts set out in the LLCC Consultation. All three of these forecasts have predicted a markedly higher growth in the number of circuits than the Analysys Mason forecast cited in BT's response.<sup>243</sup> Figure A12.16 also shows that [ $\approx$ ] predicted a slightly higher rate of growth to our forecasts for 2012/13 set out in the LLCC Consultation, while [ $\approx$ ] has forecast slightly lower growth up to 2013/14 and higher growth between 2013/14 and 2015/16.

# Figure A12.16: Comparison of Ethernet volume forecasts of circuits (Up to and including 1Gbit/s)

[×]

A12.52 Our analysis of 2011/12 data shows that our forecast of an increase in EAD and EBD volumes and a fall in WES and BES volumes in 2011/12 was in line with the outturn. This gives us reassurance in the degree of accuracy of our forecasts set

<sup>&</sup>lt;sup>242</sup> See BT non-confidential response to the LLCC Consultation, paragraph 15, page 44.

<sup>&</sup>lt;sup>243</sup> See BT non-confidential response to the LLCC Consultation, paragraph 14, pages 43 and 44.

out in the LLCC Consultation. In addition, the growth in circuits predicted by our forecast is broadly in line with CPs' and analysts' forecasts. Our forecast of circuit growth set out in the LLCC Consultation lies approximately in the middle of the range of the other forecasts.

A12.53 Figure A12.17 below sets out our forecasts set out in the LLCC Consultation for capacity provided by up to and including 1Gbit/s circuits, in comparison with the forecasts submitted by [%], [%], [%], [%] and [%].

# Figure A12.17: Comparison of Ethernet volume forecasts of capacity (Up to and including 1Gbit/s)

#### [×]

A12.54 Overall, Figure A12.17 above indicates that, in terms of the trend in capacity growth predicted, our forecasts set out in the LLCC Consultation are consistent with the Ethernet forecasts we have received. It shows that Analysys Mason and Ovum predicted similar rates of capacity growth to that predicted in our forecast up to 2014/15 set out in the LLCC Consultation, while for 2015/16, Analysys Mason forecast slightly lower growth and Ovum forecast higher growth. Figure A12.17 also shows that our forecast of capacity growth set out in the LLCC Consultation falls roughly mid way between the capacity growth predicted by [≫] up to 2012/13 (at the lower bound) and the capacity growth predicted by [≫] up to 2013/14 (at the upper bound). We consider that [≫] of capacity growth is an outlier and likely to be more representative of its internal consumption of Ethernet services rather than the overall supply.<sup>244</sup>

#### **Conclusion on our Ethernet forecasts**

A12.55 Given the relative accuracy of our 2011/12 forecasts and, as noted above, our circuit growth forecast is broadly in line with CP's and analysts' forecasts, we have decided to continue with our previous forecast volume growth rates. We have therefore adapted the forecasts set out in the LLCC Consultation to the new base year and kept the same rate of change for each circuit type as was previously forecast in the LLCC Consultation.

#### Summary of our Ethernet volume forecasts

- A12.56 As with TI forecasts, we set out below a summary of our forecasts for Ethernet services. As an additional cross-check, we have compared the trends in capacity derived from our forecasts for Ethernet services and TI services. The decline in TI capacity is consistent with the growth in Ethernet capacity; although we note that the volume growth from Ethernet services more than compensates for the decline in TI capacity, in line with our expectation of overall capacity growth.
- A12.57 We also present in Figure A12.18 below the trends in rental volumes for two bandwidth categories (up to and including 1Gbit/s and above 1Gbit/s). In addition, we have derived a view of the trend in capacity delivered using Ethernet services from the volume forecasts (see Figure A12.19 below).
- A12.58 During the forecasting period (2012/13 to 2015/16), we expect to see significant migration from the legacy Ethernet services (WES and BES) to the newer

<sup>244 [&</sup>gt;>]

equivalents (EAD and EBD). We present the specific volume trends for WES, BES, EAD and EBD services in Figure A12.20 below.

#### We expect significant growth in demand for high bandwidth Ethernet services

A12.59 In our forecast of Ethernet service volumes, we expect significant growth in demand for higher bandwidth Ethernet services. Our forecast of total Ethernet circuit volumes is summarised in Figure A12.18 below. It shows that there has been significant growth over the period from 2007/08 to 2011/12, and we expect this trend to continue to 2015/16. Of the historical growth in overall circuits, the most pronounced came from up to and including 1Gbit/s circuits, while from 2011/12 onwards, above 1Gbit/s circuits are forecast to grow at a faster rate than lower bandwidth Ethernet circuits (albeit from a lower base).

## Figure A12.18: Ofcom historical and forecast volumes for Ethernet services (number of circuits)



- A12.60 This historical upwards trend in the demand for Ethernet services is expected to continue over the period of our analysis. We consider that rental volumes are likely to be driven by the increasing demand for higher bandwidth services and the migration of customers from the lower bandwidth TI services. In addition, we consider that the transition from legacy WES and BES services to the newer EAD and EBD services may provide a suitable opportunity for customers to upgrade to a higher bandwidth service.
- A12.61 With the increase in demand, we also expect to see a significant increase in the capacity delivered over BT's network, as shown in Figure A12.19. To analyse the trend of capacity provided by Ethernet services, we took our forecasts for individual service volumes and multiplied the rental volumes by the corresponding bandwidth. Figure A12.19 below demonstrates that capacity grew significantly and that we forecast it to continue.

#### Figure A12.19: Capacity delivered through Ethernet services

#### ℅

#### Modern Equivalent Asset (MEA) approach

- A12.62 The business connectivity services offered by BT are in a period of change. Volumes of services delivered using traditional interface are declining, whilst Ethernet services, capable of delivering higher bandwidths, are on the increase. In addition, we expect to see a transition from the legacy to newer Ethernet services used to provide the same functionality of current services.
- A12.63 As discussed in Section 20 of this Statement, we have adopted a MEA approach for the purposes of modelling the costs of the legacy WES and BES services. We have modelled these services using the costs of what we consider to be the modern equivalent. To this end, Openreach has supplied us with a mapping of the legacy WES and BES services over to the nearest equivalent EAD or EBD service. We note that this mapping is independent of actual decisions that customers may make when transitioning from legacy to new services and whether they take the opportunity to upgrade their bandwidth at the same time.
- A12.64 Figure A12.20 below shows the forecast decline of WES and BES, and the growth of EAD and EBD from 2007/08 through to 2015/16.



## Figure A12.20: Ofcom volume forecast for WES and BES migrations (number of circuits)

- A12.65 The forecasts show a significant increase in EAD volumes, of which only a proportion appears to be a consequence of WES migrations. This growth is also likely to capture the migration from legacy TI services to Ethernet. A similar pattern is observed for BES and EBD circuits. BES circuits are forecast to decline, whilst EBD circuits are forecast to rise.
- A12.66 Figure A12.21 below shows the mapping rules we have adopted for the purposes of estimating the costs of providing WES and BES services. For example, the cost of a WES 10Mbit/s service has been set with reference to an EAD 10Mbit/s service. The migration of BES services is possible either to EAD or EBD, depending on the specific demand characteristics at the location. We do not make the MEA assumption for the above 1Gbit/s WES and BES services, as we have not identified a different MEA for these services.

	MEA equivalent				
Legacy service	Standard service	Aggregation	Local access	Local reach	Extended reach
WES 2Mbit/s	EAD 10Mbit/s	N/A	N/A	N/A	N/A
WES 10Mbit/s	EAD 10Mbit/s	No MEA equivalent	EAD Local access 10Mbit/s	EAD 10Mbit/s	N/A
WES 100Mbit/s	EAD 100Mbit/s	No MEA equivalent	EAD Local access 100Mbit/s	N/A	N/A
WES 155Mbit/s	EAD 1Gbit/s	N/A	N/A	N/A	N/A
WES 622Mbit/s	EAD 1Gbit/s	N/A	N/A	N/A	N/A
WES 1Gbit/s	EAD 1Gbit/s	N/A	EAD Local access 1Gbit/s	N/A	EAD Extended reach 1Gbit/s
BES 100Mbit/s	EAD 100Mbit/s or EBD 1Gbit/s	N/A	N/A	N/A	N/A
BES 155Mbit/s	EAD 1Gbit/s or EBD 1Gbit/s	N/A	N/A	N/A	N/A
BES 622Mbit/s	EAD 1Gbit/s or EBD 1Gbit/s	N/A	N/A	N/A	N/A
BES 1Gbit/s	EAD 1Gbit/s or EBD 1Gbit/s	N/A	N/A	N/A	EAD Extended reach 1Gbit/s or EBD 1Gbit/s

#### Figure A12.21: Mapping of services between legacy and newer Ethernet services

## **Cost forecast assumptions**

- A12.67 The forecast of costs for charge control purposes relies on a number of assumptions. The following sections provide an overview of the main ones, which relate to:
  - efficiency;
  - return on capital;
  - asset and cost volume elasticities (AVEs/CVEs); and
  - asset price changes.

## Efficiency

#### What are efficiency gains?

- A12.68 In calculating the value of X for each charge control basket, we have taken into account an assumed efficiency gain that BT is expected to make over the next few years. Greater efficiency is achieved when a given level of output is produced with fewer input resources or when a greater level of output is produced with a given level of input resources. Our efficiency assumption is based on several sources of analysis which assess what BT can realistically achieve in terms of reducing its costs over the period of the charge control.
- A12.69 The efficiency rate used in the calculation of the RPI-X cap is the expected year-onyear savings in real unit costs that BT is expected to achieve in the normal course of its operations, abstracting from volume and price changes. It is possible to apply this efficiency assumption to both new capital expenditure and operating costs.

- A12.70 In our modelling of TI services, we have decided to apply the efficiency assumption only to opex. There are three main reasons supporting the decision not to apply an explicit efficiency assumption to new capex.
  - a) In our model, we have taken into account asset price changes. As these are negative in real terms, this is equivalent to a capex efficiency assumption.
  - b) The forecast decline in volumes for TI services means it is unlikely there will be significant new capital expenditure. The consequence of this is that any potential efficiency in procurement and investment is minor.
  - c) The other consequence of falling volumes is the associated negative capital expenditure (capex), which can be thought of as asset disposals. An efficient operator would be expected to dispose of its unused assets in an efficient manner. Given the type of assets employed in the TI market, it is unlikely that even an efficient operator could command a price for its unused assets higher than the expectations within our model.
- A12.71 For Ethernet services, we have modified our approach set out in the LLCC Consultation. Following consideration of the evidence on past and future capital cost efficiency, we have concluded that it is not appropriate to assume that the MEA approach and changes in asset prices capture Openreach's capital cost efficiency. We have therefore applied our efficiency assumption to both new capital and operating costs. For capital costs, the total efficiency assumption will include efficiency savings attributable to falls in real asset prices, as well as other reductions in capital costs.
- A12.72 We assume separate efficiency assumptions for the TI and the Ethernet baskets. This is due to the functional separation of BT Wholesale and Openreach, which supply TI and Ethernet services respectively. It should also be noted that TI and Ethernet services are based on different underlying technologies and use different equipment. In addition, they are at significantly different stages of life, with TI volumes in a state of decline and Ethernet volumes forecast to grow substantially.
- A12.73 Based on our assessment of the different sources of information set out in the following paragraphs, we have identified the following efficiency assumptions for TI opex and Ethernet total costs:
  - 1.5% per annum on opex for BT Wholesale's provision of TI services;
  - 4.5% per annum on opex and capex for Openreach's provision of Ethernet services.<sup>245</sup>
- A12.74 The detailed description of our approach to the identification of the above efficiency assumptions is provided in the main body of this Statement (see Sections 19 and 20 for TI and Ethernet services respectively).

#### Operating cost efficiency of 1.5% for TI services

A12.75 We have considered a range of indicators to estimate the efficiency improvement that could reasonably be expected from BT Wholesale. These can be categorised into three broad headings:

<sup>&</sup>lt;sup>245</sup> The 4.5% includes real asset price changes.

- TI-specific historical trend analysis;
- BT Wholesale internal efficiency targets; and
- external benchmarking studies.
- A12.76 Figure A12.22 below, which is also included in Section 19, summarises these efficiency improvements, including two sets of external benchmarking studies.

	TI specific historical trend analysis	BT Wholesale internal efficiency targets	2012 Deloitte Study <sup>246</sup>	Statistical analysis (NERA, Deloitte) <sup>247,248</sup>
Efficiency (%)	~1.5%	[≻]	2.25%	~2%
Comments	Ofcom analysis of BT Wholesale's historical TI cost data	Relates only to SG&A costs, which account for only a small proportion of total BT Wholesale costs	Benchmark against five other European operators	Benchmark against US LECs

Note: Other sources of evidence were considered. However for the reasons set out below we did not factor these into our final range.

### **TI-specific historical trend analysis**

- A12.77 The trends of reductions in real unit costs in the recent past for a given service offer a useful indicator for expected future efficiency gains. In its decision on the appeal of 'A new Pricing Framework for Openreach", the Competition Commission (CC) indicated that historical rates "should be reliable for at least the first year of the price control, and represent useful indicators for the whole period under review".<sup>249</sup>
- A12.78 We have calculated BT Wholesale's underlying rate of real unit cost reduction over the period from 2006/07 to 2010/11. Our approach has been set out in our publications about other charge controls (for example, the WBA CC 2011)<sup>250</sup>, and is based on total factor productivity (TFP) analysis. This requires the use of the Tornqvist index, which is a standard measure used in productivity analysis which takes into account the impact of changing cost weights over time. Our methodology is summarised below.
  - We calculate the output (volume) index change as the sum of all year-on-year volume changes across all cost components.

<sup>&</sup>lt;sup>246</sup> Deloitte, 'Analysis of the Efficiency of BT's Regulated Operations', A report for BT, dated 16 February 2012.

<sup>&</sup>lt;sup>247</sup> NERA, 17 March 2008, The comparative efficiency of BT Openreach. <u>http://stakeholders.ofcom.org.uk/binaries/consultations/llcc/annexes/efficiency.pdf</u>

<sup>&</sup>lt;sup>248</sup> Deloitte, 29 March 2011, 'WBA consultation response' <u>http://stakeholders.ofcom.org.uk/binaries/consultations/823069/responses/BT2.pdf</u>

<sup>&</sup>lt;sup>249</sup> See Paragraph 2.185 CC Determination <u>http://www.competition-</u> commission.org.uk/assets/competitioncommission/docs/appeals/carphone-warehousegroup-plc-local-loop-unbundling-appeals/llu\_determination.pdf

<sup>&</sup>lt;sup>250</sup> For further details regarding our approach please see Annex 7 of the WBA CC Consultation: <u>http://stakeholders.ofcom.org.uk/binaries/consultations/823069/summary/condoc.pdf</u>

- We calculate the input (labour and non-labour) index change as the sum of all year-on-year input changes across all cost components.<sup>251</sup>
- We derive the unit output index by dividing the input index by the output index.
- We adjust the unit output index for scale effects (using cost volume relationship assumption consistent with our cost forecasting approach) and any historical catch-up. The remainder represents the historical productivity growth which we assume is equal to future productivity growth.
- A12.79 Our approach produces an average of around 1.5% for the reduction in the real unit operating costs in the period from 2006/07 to 2010/11.

#### **BT Wholesale internal efficiency targets**

- A12.80 BT's Medium Term Plan (MTP) is an internal document used for planning purposes within BT. It sets out the financial outlook for BT for the next three years including efficiency targets set internally to BT Group.
- A12.81 In response to our information requests, BT supplied to us with its MTP which set a target annual efficiency saving for BT Wholesale of [≫] on Selling, General & Administrative Expense (SG&A) costs only.<sup>252</sup> We noted, however, that SG&A costs only made up a small proportion (approximately [≫]) of BT Wholesale's operating costs for the provision of TI services and were unlikely to be typical of the whole set of BT Wholesale costs, meaning that it may not have been appropriate to extrapolate from this to the whole of BT Wholesale.

#### **External benchmarking studies**

#### 2012 KPMG Study of BT Wholesale

- A12.82 We engaged with BT Wholesale to obtain the necessary data that would allow our adviser, KPMG, to perform an efficiency study similar to that undertaken on Openreach in 2009. In contrast to Openreach, where cost allocation is made at the entity level, cost allocation in BT Wholesale is made at the product and service level. This difference in the approach to cost allocation meant that it was not possible to undertake the planned efficiency study. We considered whether it would be appropriate to undertake a fuller study. However, we concluded that an assessment of whether those allocations were efficient would have required a review of a significant proportion of BT's costs more generally, to cover those groups of costs partially allocated to TI. In the context of this charge control, we considered that it was not proportionate to undertake such an extensive study.
- A12.83 As a result, we did not proceed with the study to assess BT Wholesale's efficiency.

<sup>&</sup>lt;sup>251</sup> To calculate the input index, historical nominal costs were converted into historical real costs using the Average Earnings Index (AEI) for labour costs and RPI for non-labour costs. As noted in our review of Openreach efficiency, we decided that the relationship between BT's pay costs and RPI in the historical period may not give an accurate reflection of the relationship going forward.

<sup>&</sup>lt;sup>252</sup> BT Wholesale response to S135 Notice of 1 July 2011 [X]

#### BT Wholesale Efficiency Study (2012 Deloitte Study) 253

- A12.84 The 2012 Deloitte Study was commissioned by BT Wholesale to assess its efficiency relative to five other European operators. Deloitte estimated the model using two different methods, stochastic frontier analysis (SFA) and corrected ordinary least squares (COLS). The estimated coefficients using SFA were found not be statistically different from those estimated using COLS.
- A12.85 To perform the analysis, Deloitte collected annual data from six European operators on total costs, switched lines, minutes and bandwidth for the period from 2005 to 2010. Deloitte also made certain adjustments to the data to ensure comparability. They modelled costs as a function of a number of explanatory variables, such as output factors (e.g. number of lines) and environmental variables (e.g. GDP, population density).
- A12.86 The results indicated that, of the six operators analysed, BT was the most efficient. In addition, Deloitte indicated that the results of the study suggested a suitable efficiency target for BT would be 2.25% per annum.

#### The NERA/Deloitte efficiency studies

- A12.87 Whereas the 2012 Deloitte study compared BT's efficiency with that of other European operators, earlier studies have compared BT's efficiency with US operators. The NERA efficiency study<sup>254</sup> was commissioned by Ofcom for the purposes of the WLR LLU CC. It was published in December 2008 and was based on stochastic frontier analysis of the Local Exchange Companies (LECs), the regional telephone network incumbents in the USA. NERA fitted a cost function using data from the LECs over time, summarising how costs changed according to different types of variables. It then assessed BT's efficiency on a network basis by comparing BT's actual costs to the expected costs by fitting BT's data on the modelled specification.
- A12.88 The midpoint of the wide range of possible results from the analysis put BT around the top decile of US LECs ranked by efficiency. NERA's report therefore indicated that BT was already operating at an efficient level when compared to the LECs, so that future cost reductions would come mainly from technical progress rather than by eliminating existing inefficiencies.
- A12.89 For the WBA CC, BT commissioned Deloitte to produce an updated version of the efficiency report (2011 Deloitte Study)<sup>255</sup>, which made use of additional data. Deloitte claimed that the results of their study suggested an appropriate efficiency range of 0.6% to 2.8%.

#### Evaluation of evidence and decision for efficiency assumption for TI services

A12.90 To arrive at an appropriate range of efficiency savings, we consider that most weight should have been placed on the sources of evidence which were specific to the TI market, i.e. the historical trend analysis. Our historical trend analysis suggests that an average of around 1.5% is appropriate.

<sup>&</sup>lt;sup>253</sup> Deloitte, "Analysis of the Efficiency of BT's Regulated Operations", A report for BT, 16 February 2012.

<sup>&</sup>lt;sup>254</sup> NERA, 17 March 2008, "The comparative efficiency of BT Openreach." <u>http://stakeholders.ofcom.org.uk/binaries/consultations/llcc/annexes/efficiency.pdf</u>

<sup>&</sup>lt;sup>255</sup> http://stakeholders.ofcom.org.uk/binaries/consultations/823069/responses/BT2.pdf

- A12.91 We have also considered BT's internal planning documents as a potential additional indicator of expected future efficiency savings. This source suggests efficiency savings of [≫] were achievable. However, that figure is based only on SG&A costs, which account for a small proportion of BT Wholesale's operating costs for the provision of TI services (approximately [≫]). We believe that this does not cover a sufficiently wide range of BT Wholesale's activities for it to be extrapolated and applied to BT Wholesale's provision of TI services. Therefore, we have chosen not to place significant weight on this source relative to the historical trend analysis.
- A12.92 The benchmarking studies conducted by Deloitte and NERA are not specific to the TI market, although they represent the scope for efficiency improvements for the organisation as a whole. We place relatively less weight on these results compared to the TI-specific analysis of historical data. Nevertheless, we note that the results from each of these benchmarking studies are consistent with our other sources of evidence.
- A12.93 Considering the 2012 Deloitte study, we have some concerns about the robustness of the results. The data set used contains very few cross-sectional observations with little variation over time, meaning the sample size is unlikely to be sufficient to produce reliable estimates. The set of 30 observations is considered a minimum sample size, although we note that the data used in this study does not consist of 30 independent observations but repeated observations of the same six operators over time. We believe that the very high R-squared (97%) produced by the results is consistent with our concern, as it suggests the model is over-fitted, i.e. the model includes too many explanatory variables relative to the number of independent observations.
- A12.94 In addition, the methodology 'pools' the data from the six operators together as if they are individual observations. Fitting an equation on this basis imposes a very strong requirement on the data. That is, any element of an operator's cost which is unique to that operator and fixed over time is unrelated to all the explanatory variables in the equation. We consider there are a number of reasons why this assumption may not hold, in particular the possibility that an operator's efficiency is relatively constant over the time period considered. Deloitte have not provided any justification to support their implied assumption using this methodology. The study also notes the high degree of collinearity between the explanatory variables. Whilst we agree that, in a purely statistical sense, collinearity does not bias an estimate, it is known to produce unreliable results, i.e. inflating variance and magnifying any bias in the model. For these reasons, we place little weight on this study for the purposes of determining a suitable efficiency assumption.
- A12.95 The original NERA study conducted in 2008 outlined some of the limitations of its analysis due to difficulties in comparing US LEC and BT's data directly. Further, we disagreed with some aspects of Deloitte's approach in their follow-up studies. Our considerations in that regard are set out in Annex 7 of the WBA CC Consultation.<sup>256</sup>
- A12.96 In light of the above considerations, we regard 1.5% as an appropriate efficiency figure for BT Wholesale's provision of TI services. We note that this may be considered a relatively low target for efficiency improvements compared to those used in other charge controls on BT. However, TI services are a mature and declining set of markets and we believe that the evidence does not justify making a stronger efficiency assumption. We consider that this reflects that there is still some scope for BT Wholesale to reduce operating inefficiency, but less than in other

<sup>&</sup>lt;sup>256</sup> See WBA CC Consultation, Annex 7.

services due to the declining nature of the service. This level of efficiency is also consistent with our analysis of past efficiency savings by BT Wholesale.

# Operating cost and new capital expenditure efficiency of 4.5% for Ethernet services

- A12.97 We have considered a range of indicators to estimate the efficiency improvement that may reasonably incentivise Openreach to bring its costs in line with those of an efficient operator. They can be categorised into three broad headings:
  - Openreach-specific trend analysis;
  - Openreach internal efficiency targets; and
  - external benchmarking studies.
- A12.98 Figure A12.23 below, which is also included in Section 20, summarises these indicators.

	Openreach- specific trend analysis <sup>257</sup>	Openreach internal efficiency targets <sup>258</sup>	2012 Deloitte Study <sup>259</sup>	Statistical analysis (NERA, Deloitte) 260261	KPMG study
Efficiency (% per annum)	~5%	[⊁]	2.25%	~2%	2.3-2.6%
Comments	Ofcom analysis of Openreach's historical cost data	Internal targets set for the subsequent 3 years	Benchmark against 5 other European operators	Benchmark against US LECs	Excludes fault rates and task times

#### Figure A12.23: Evidence for Ethernet efficiency assumption

#### Ethernet-specific trend analysis

- A12.99 We have attempted to conduct a similar analysis of trends of Ethernet services as was carried out for TI services. However, it was not possible to obtain meaningful or robust results for the following reasons.
  - The relationship between cost components and the underlying services has changed over the time period considered (2007/08 to 2011/12). This means that costs have not been allocated to the components on a consistent basis.

<sup>260</sup> NERA, 17 March 2008, "The comparative efficiency of BT Openreach." <u>http://stakeholders.ofcom.org.uk/binaries/consultations/llcc/annexes/efficiency.pdf</u>

<sup>261</sup> Deloitte, 29 March 2011, "WBA consultation response" <u>http://stakeholders.ofcom.org.uk/binaries/consultations/823069/responses/BT2.pdf</u>

 $<sup>^{257}</sup>$  Ofcom analysis of Openreach response to S.135 Notice of 1 July 2011 dated 12 August 2011 and Openreach response to S.135 Notice dated 14 February 2013 [>]

<sup>&</sup>lt;sup>258</sup> Openreach response to S.135 Notice of 1 July 2011 dated 12 August 2011 and Openreach response to S.135 Notice dated 14 February 2013 [X]

<sup>&</sup>lt;sup>259</sup> Deloitte, "Analysis of the Efficiency of BT's Regulated Operations", A report for BT, 16 February 2012.

- Cost and volume data for Ethernet services are available for five years from 2007/08 to 2011/12. As a result, trend data (differences between one year and the next) are only available for four years. This, coupled with the fact that there is only a limited number of components relating to Ethernet services, results in there being a low number of observations from which to extrapolate a trend.
- A12.100 As a result, we have focused on the historical trend analysis for Openreach as a whole. This is also consistent with other charge controls, such as WLR LLU, which also measure efficiency across Openreach as a whole.

#### Openreach-specific trend analysis

- A12.101 We have conducted an analysis of Openreach's historical efficiency savings in total costs. The rationale for considering total cost efficiency rather than opex efficiency is set out in Section 20. We estimate that Openreach delivered the following real efficiency savings:
- A12.102 Openreach reported that in the three years from 2009/10 to 2011/12, its total cash cost efficiency ranged from [≫]. This gives an average efficiency of approximately [≫].<sup>262</sup> In 2011/12, Openreach's actual cash cost efficiency saving was [≫].<sup>263</sup>

#### Figure A12.24: Evidence for Openreach Total Cost efficiency assumption

	2009/10	2010/11	2011/12
Ofcom estimate of Openreach total cost efficiency (TCE)	[⊁]	[⊁]	[×]

- A12.103 Some of these efficiency savings relate to one-off efficiency improvements. We have included these one-off efficiency savings as similar one-off savings may be achievable in future. The only one-off change we have excluded relates to BT's cumulo bill in 2010/11 as this was a step change from the previous ratings.<sup>264</sup> The step change in cumulo liability arose due to the switch from the 2005 ratings assessment to the 2010 assessment. This ratings assessment is due to be in place until 2015. We consider that, as this ratings assessment is due to be in place for most of the charge control and the difficulties in predicting similar outcome at the next review, this one-off reduction should be excluded. In contrast to other one-off reductions, we do not consider it reasonable to expect BT to find reductions of a similar magnitude in future. On this basis, we have calculated that over the period from 2008/09 to 2011/12 BT achieved annual efficiency savings averaging around 5%.
- A12.104 These efficiency figures are in real terms, i.e. after inflation. The inflation measure that Openreach has used is the level of inflation actually experienced by its business and reported in its management accounts. In the period in question, this level of inflation was lower than RPI.
- A12.105 Our forecasting model calculates an RPI-X control, and as such requires inputs to be expressed on a basis relative to RPI. In principle, if we were to take BT's

 $<sup>^{262}</sup>$  We have also received data for 2007/08 and 2008/09. The average efficiency is also ~5% if a four or five year average were used instead.

<sup>&</sup>lt;sup>263</sup> Openreach response to S135 Notice of 28 September 2012 [X]

<sup>&</sup>lt;sup>264</sup> Cumulo rates are the business rates paid by BT Group on its network business. These relate to the use of public land for assets such as poles, duct, street cabinets and the equipment in exchange buildings.

historical efficiency improvement as the forecast efficiency gain over the modelled period, we would need to express the historical performance as a change in cost compared with the movement in RPI. As during the historical period RPI was greater than the BT specific inflation figure with which BT's gain in efficiency was compared, the real unit cost reduction achieved against RPI (i.e. the efficiency gain figure relevant to our model) would be higher than the numbers reported by BT.

- A12.106 However, we do not believe that it would be appropriate to use BT's historical performance against RPI as our forecast of future performance. This is for two reasons.
  - First, in the period between March 2009 and March 2012, the average RPI was 4.5%.<sup>265</sup> Although this was above the cost inflation facing BT, during that time RPI was elevated due to a number of factors that were of limited relevance to BT. These factors included the increase in VAT and the devaluation of sterling leading to higher costs of imported goods.<sup>266</sup>
  - Second, while BT's pay costs have historically increased either at or above RPI,<sup>267</sup> during the period 2009/10 to 2011/12 due to an exceptional wage freeze in 2009/10 and due to RPI being higher than expected in the subsequent years, pay costs increased by less than RPI. Thus, if we took as our forecast of efficiency BT's past reductions in real unit costs, as measured relative to RPI, we would be forecasting that BT's wages would in the future lag behind RPI. This would be contrary to our expectation that, over the medium term, the linkage between BT's pay inflation and RPI would be restored, such that pay would no longer be expected to fall in real terms.
- A12.107 Since we believe that BT's efficiency gains versus RPI in this period were distorted because of these effects, we have concluded that we should not use BT's past performance compared with RPI as the forecast efficiency improvement in our model. We have considered whether we could make an adjustment which would adjust for the temporary factors affecting RPI which we would not expect to persist going forward. However, we consider that this would be fraught with difficulty as the Bank of England acknowledge:

"the impact of these factors on inflation is hard to calibrate, and small differences in assumptions can affect the explanation for the strength in inflation."<sup>268</sup>

A12.108 A further consideration is how BT's past efficiency performance relative to RPI would compare with figures derived from other sources. In particular, while the rebasing of BT's historical performance on an RPI basis would lead to a higher efficiency estimate than 5% p.a., other studies suggested the potential for real efficiency improvements (i.e. annual reduction in real unit costs) was less than 3% p.a. The NERA, Deloitte and KPMG studies suggested that BT was relatively

<sup>&</sup>lt;sup>265</sup> Office of National Statistics.

<sup>&</sup>lt;sup>266</sup> For an explanation of the factors which impacted inflation during that period see the letter from the Governor of the Bank of England to the Chancellor, 15 November 2010, Available at: http://www.bankofengland.co.uk/monetarypolicy/Documents/pdf/cpiletter101116.pdf

<sup>&</sup>lt;sup>267</sup> See BT's response to the LLCC Consultation, footnote 18.

<sup>&</sup>lt;sup>268</sup> See : <u>http://www.bankofengland.co.uk/monetarypolicy/Documents/pdf/cpiletter101116.pdf</u>

efficient and that the scope for catch-up gains in efficiency (as opposed to frontier shift gains) was limited.<sup>269</sup>

- A12.109 Although we consider these studies less directly relevant than Openreach's historical efficiency, we do believe that the forecast for real unit cost savings to be used in the model should be capable of being decomposed into frontier shift and catch up in a way which is consistent with other data on the potential for improvements each of these types of efficiency. If we were to adjust BT's historical efficiency in order to express it on an RPI basis, we would arrive at a number which does not satisfy this requirement. That is, the figure would imply either that there is significant catch-up efficiency or that there is a high level of frontier shift efficiency. We would therefore be highly likely to overstate the potential efficiency gains BT could achieve.
- A12.110 On balance, taking account of the past evidence from Openreach's past performance, the particular factors affecting the way that performance in cost reduction compares to RPI and the need for corroboration with other sources, we consider that an average efficiency in the region of 5% p.a. provides the most useful estimate of past trends in order to inform our decision on Openreach's future performance.

#### **Openreach-specific internal efficiency targets**

- A12.111 As noted above, Openreach's MTP is an internal document used for planning purposes within BT. It sets out the financial outlook for the company for the next three years and sets efficiency targets for each line of business.
- A12.112 Using Openreach's break-down of their efficiency targets, we have calculated a figure based on total cost efficiency savings as a proportion of total costs, as shown in Figure A12.25 below.<sup>270</sup>

#### Figure A12.25: Openreach Medium Term Plan targets

	2012/13	2013/14	2014/15
Total cost Efficiency target	[×]	[≻]	[≻]

A12.113 Openreach's MTP shows that Openreach has targets of between [ $\gg$ ] and [ $\approx$ ] reductions in total costs over the period from 2011/12 to 2014/15.

#### Other external benchmarking studies

#### 2012 Deloitte Study

A12.114 The 2012 Deloitte Study was carried out using data for BT as a whole, not specific to BT Wholesale or Openreach. A brief summary of the study is set out in paragraphs A12.84-A12.86 above.

<sup>&</sup>lt;sup>269</sup> 'Catch-up' efficiency refers to the efficiency gains an inefficient firm needs to make to achieve industry best practice i.e. to be at the efficiency frontier. 'Frontier shift' refers to efficiency gains made due to technological progress.

<sup>&</sup>lt;sup>270</sup> Openreach response to S135 Notice of 28 September 2012 [X]

### KPMG Study

- A12.115 For the purposes of the WLR LLU CC Consultation, KPMG undertook an analysis for Ofcom which estimated the efficiency gains that could be achieved by Openreach until 2012/13 through benchmarking operating cost components.<sup>271</sup> This was subsequently updated and is explained further in Annex 3 of the WLR LLU CC Statement.
- A12.116 KPMG concluded from the updated analysis that Openreach could deliver average efficiency gains of 2.3-2.6% per annum between 2010 and 2014 on its operating cost. As explained in the full report, KPMG has looked specifically at benchmarking operating cost categories; therefore these percentages represent the potential reduction in costs before any changes in fault rates and task times. A decrease in fault rates or task times is likely to increase the scope for BT to deliver efficiency improvements. In contrast, a reduction in these would tend to increase BT's ability to deliver efficiency improvements.

#### NERA Study and Deloitte 2010 Study

A12.117 A brief summary of these studies is set out in paragraphs A12.87-A12.89 above.

# Evaluation of evidence and decision for efficiency assumption for Ethernet services

- A12.118 As with TI, we consider that it is appropriate to place most weight on the sources of evidence which are most relevant to Ethernet services. In the absence of historical trend analysis specific to Ethernet services, we have placed most weight on the past and projected efficiency savings achieved by Openreach. Over the three years from 2009/10 to 2011/12, we have calculated that Openreach achieved efficiency savings averaging around 5%. We note that, for the purposes of the charge control, we need to extrapolate significantly into the future. Although forecasting further into the future reduces the predictive power of this past trend, it forms a useful starting point.
- A12.119 We have placed less weight on BT's internal planning documents and an extrapolation of their latest rolling forecast. These contained targets for efficiency savings of [≫] per year from 2012/13 to 2014/15. [≫]. We note that the actual efficiency figure for 2011/12 was lower than forecast, which suggests that Openreach does not consistently underestimate actual efficiency improvements.
- A12.120 We consider that the benchmarking studies conducted by NERA and Deloitte are less specific to Ethernet services and therefore have attributed very little weight to these. In addition, the NERA study and the 2008 and 2011 Deloitte studies which made use of the US LEC data were problematic due to data not being directly comparable. We also have concerns over the 2012 Deloitte study due to a limited number of observations in the sample, and minimal variation in the output variables. Nevertheless, we note that these suggest efficiency savings in the region of up to 3% per annum.
- A12.121 From our consideration of the available evidence, we have concluded that Openreach should be able to reduce its cash payments by 5% per annum. This places most weight on the historical evidence of efficiency gains made by

<sup>&</sup>lt;sup>271</sup> KPMG "Efficiency Review of BT Openreach" March 2010.

http://stakeholders.ofcom.org.uk/binaries/consultations/wlr-cc-2011/annexes/Efficiency\_Review\_Report.PDF

Openreach. They show that Openreach has been able to achieve an efficiency saving averaging 5% for the period 2009/10 to 2011/12. We note that Openreach's forecasts suggest that this level should also be achievable in the future.

- A12.122 This efficiency rate is a gross efficiency rate and excludes the offsetting costs of achieving those gains (e.g. the costs of staff leaving the business). We note that the WLR LLU CC found that a gross efficiency rate of 5% corresponds to a net efficiency rate of 4.5% once the costs of leavers were excluded.
- A12.123 We have therefore applied a net efficiency rate of 4.5% to both Openreach's operating costs and new capital expenditures.

## **Return on Capital**

- A12.124 We have included in BT's cost base a return on capital equal to its WACC. The WACC is the minimum return required on BT's investments.
- A12.125 As discussed in Section 19 and 20, we have applied a pre-tax real cost of capital equal to 6.9% for both the TI and Ethernet services. The methodology on which we have based our conclusion is explained in Annex 14 to this Statement.

### Asset and cost volume elasticities (AVEs/CVEs)

- A12.126 The impact of forecast changes in volumes on forecast costs in our model (before taking into account efficiency improvements) is determined by asset volume elasticities (AVEs) and cost volume elasticities (CVEs).
  - **AVEs** are used to determine the level of capital costs needed in response to changes in demand (an AVE is defined as the percentage change in assets, valued at gross replacement costs, for a 1% change in volumes).
  - **CVEs** are used to determine the level of operating costs needed in response to changes in demand (a CVE is defined as the percentage change in operating costs for a 1% change in volumes).
- A12.127 An elasticity of one would indicate that costs change proportionately with volumes (resulting in constant unit costs) whilst an elasticity of zero indicates that total costs are fixed (and therefore unit costs will have an inversely proportional relationship with volumes).
- A12.128 We received submissions from BT Wholesale and from Openreach on AVEs and CVEs in response to our information requests. Both BT Wholesale and Openreach submitted data based on BT's 'LRIC model'. We have decided to model costs on the basis of this set of elasticities, which is presented in Figure A12.26 below (AVEs) and Figure A12.27 below (CVEs). The CVEs reported in Figure A12.27 can be analysed distinguishing between Pay and Non-pay, with a weighted average CVE of 0.52 and 0.65 respectively. The reasoning supporting this choice is set out in Section 19 of this Statement.

	Cost category	BT Wholesale LRIC model AVE <sup>272</sup>
	Cable	0.32
	Duct	0.08
	Local Exchange	0.51
	Main Exchange	0.47
	Transmission	0.83
	Other Network Equipment	0.92
AVES	Motor Transport	0.65
	Land & Buildings	0.73
	Computers and OM	0.72
	Other	0.92
	Other Intangibles	0.92
	Access Fibre	0.80

#### Figure A12.26: AVEs assumed in Ofcom's cost forecasts

# Figure A12.27: CVEs assumed in Ofcom's cost forecasts <sup>273</sup> <sup>274</sup> [≫]

A12.129 For completeness, we note that BT Wholesale also provided 'End of life' AVEs and CVEs. However, we have rejected this set of elasticities for the reasons set out in Section 19 of this Statement.

A12.130 We have used BT's submitted AVEs and CVEs in our charge control modelling.

## **Asset price changes**

A12.131 Asset price changes have offsetting effects on the cost base, namely:

- the first effect relates to the existence of a holding gain as a result of the asset price increases such a gain reduces costs in the year that it occurs. The reverse is true for holding losses; and
- the second effect is the impact on the real return. An asset price rise increases the value of the asset base, and therefore increases the required return in the cost base. Similarly, a fall in the asset price would reduce the value of the asset base and in turn reduce the cost base to be recovered through the charges in the charge control basket.
- A12.132 As a result, the impact of real price changes depends on which effect dominates and it is not known a priori whether it will increase or decrease the overall cost base.

<sup>&</sup>lt;sup>272</sup> Openreach response to S135 Notice of 28 September 2012 [X]

<sup>&</sup>lt;sup>273</sup> For the sake of clarification, figures reported in this table are those submitted by BT and no further adjustments have been made (e.g. weighting of CVEs by AVEs).

<sup>&</sup>lt;sup>274</sup> BT Group response to S135 Notice of 28 September 2012 [X]

A12.133 Real holding gains or losses are created where asset prices change at rates other than RPI. Forecasting asset price changes is clearly a challenging task. In the LLCC model, we have taken an average of asset price changes over the past five years updated for 2011/12 prices, as supplied by BT (as shown in Figure A12.28 below). We have assumed that the real asset price changes apply over the period from 2012/13 to 2015/16.

Asset	5 year average nominal price change between 2007/08 and 2011/12	Real price change
Duct	3.6%	0.0%
Local Exchange	-0.3%	-3.8%
Main Exchange	0.0%	-3.4%
Transmission	0.1%	-3.4%
Other Network Equipment	0.0%	-3.5%
Motor Transport	0.0%	-3.5%
Land & Buildings	0.0%	-3.5%
Computers & OM	0.0%	-3.5%
Other intangibles	0.0%	-3.5%
Other	-0.6%	-4.0%
Cable – Copper*	2.0%	-2.1%
Cable - Fibre	2.2%	-1.4%

#### Figure A12.28: Asset price changes assumed in Ofcom's cost forecasts

 $^{*}$  For copper cable we used the five year average from 2006/07 to 2011/12 excluding 2009/10 due to one off events in 2009/10

- A12.134 For copper cable, we used the five year average from 2006/07 to 2011/12 excluding 2009/10 data. This was because in the year 2009/10 there was a very significant increase in the price of copper driven by the recovery of the world economy. We considered that the 2009/10 increase was a one off and would distort the average if included.
- A12.135 As regards the cost categories of "Other network equipment", "Motor Transport", "Land & Buildings", "Computers & OM" and "Other Intangibles", we considered that they have zero holding gain or loss. This was because these assets were valued at historical cost, and they were therefore to be consistent with the accounting treatment of these assets. Consequently, they did not have a holding gain/loss. This meant their values reduced in real terms over the duration of the charge control.<sup>275</sup>
- A12.136 To forecast the value of duct, we assume that the nominal changes in the price of duct in the future will equal RPI. A five year average is not representative of future duct values given a large one off holding gain on duct in 2009/10 and holding losses in 2010/11 and 2011/12 that occurred for reasons that did not involve changes to the underlying asset. The use of RPI to forecast the value of duct was consistent with Ofcom's view of the RAV approach.<sup>276</sup>

<sup>&</sup>lt;sup>275</sup> The 'Other' category also includes 21CN assets that were revalued for the first time in 2010/11. As we removed 21CN assets from modelling for TI as a result of anchor pricing approach, the historical asset price change applies. In any case, the revaluation effect is small and does not change the 5 year average.

<sup>&</sup>lt;sup>276</sup> A detailed description of the approach is available in the WLR LLU CC.

# We do not apply any start charge adjustments for TI or Ethernet services

- A12.137 A key element in the value of X is the assumed starting level of prices. We use prices expected to be in effect on 31 March 2013. Under certain circumstances<sup>277</sup>, we may propose to make one-off adjustments to starting charges in order to bring about changes at the start of the charge control. The value of X would then be calculated to take this adjustment into account. Where such an approach is adopted, we need to balance the trade off between one-off changes versus implementing changes through the glide-path.
- A12.138 We consider that a glide path approach is appropriate for these proposed RPI-X controls. However, there may be circumstances under which we might consider one-off adjustments to BT's prices to be implemented at the start of the new charge control period. These might include, for example, scenarios where:
  - there are strong allocative efficiency arguments for bringing prices into line with cost sooner; and/or
  - the previous charges were unregulated or not subject to a charge control.

## Assessment of BT Wholesale charges for TI services

A12.139 The services we model for setting the value of X for the TI basket include all PPC services, Netstream, RBS backhaul and SiteConnect. Of those services, only PPCs are currently directly charge controlled, with the other services indirectly controlled through their use of the same underlying cost components.

#### Assessment of BT Wholesale's current charges

A12.140 For each of the PPC services, we have carried out the analysis as set out below.

- We have calculated the 2011/12 ratios of DSAC to FAC and DLRIC to FAC as reported in the RFS.
- Given our proposed cost adjustments and other assumptions, we have arrived at a different FAC compared to those reported in the RFS in 2011/12. Based on our forecasting assumptions, we have also calculated what these FACs might be at the start of the charge control in 2012/13.
- Assuming that DSACs also follow the general trend in FACs, we have estimated what these will be in 2012/13 by multiplying the forecast FACs by the 2011/12 ratios.
- We have compared BT's current prices in the model with the DSAC estimates for 2012/13 in order to assess if start charge adjustments are needed.
- A12.141 On the basis of this analysis, we have noted that all of BT's charges appear to be below DSAC in 2012/13. The model shows eight charges to be below DLRIC in 2012/13: PPC 140/155Mbit/s connection, PPC 64Kbit/s connection, RBS sub 2Mbit/s connection, PPC 2Mbit/s connection, PPC 140/155Mbit/s distribution, PPC

<sup>&</sup>lt;sup>277</sup> We further discuss the principles we have used when considering whether to make starting charges under Step 4 discussed in Section 18 of this Statement.

CELA 140/155Mbit/s trunk, PPC non-CELA 140/155Mbit/s trunk, and PPC 622Mbit/s trunk.

- A12.142 We have not identified any distortions to competition which could arise from these specific services. The main distortion which could arise from low pricing is that it would deter efficient entry. However, given the decline in the TI market, we considered that such entry would be unlikely in any case. We decided not to make start charge adjustments to these services.
- A12.143 We therefore have not applied any one off adjustments to TI charges at the start of the charge control.

#### Assessment of BT Wholesale's charging structure

- A12.144 CWW brought appeals against the LLCC 2009 and raised issues relating to the one-off adjustments proposed. As part of CWW's Notice of Appeal (NoA'), it identified a number of examples that it claimed demonstrated that the resulting structure of charges was "inefficient, discriminatory and distorts competition"<sup>278.</sup> The CC ruled that "C&W failed to demonstrate that Ofcom erred in adjusting some prices and not others within the TI basket" for the reasons it had set out.
- A12.145 Our assessment of current charges based on the RFS does not suggest the need for one-off adjustments to TI charges. We explain below our considerations as to whether the observations CWW made to LLCC 2009 still persist today and, if so, whether there is a case for making one-off adjustments to PPC charges.<sup>279</sup>

#### DPCN versus 2Mbit/s circuits

- A12.146 CWW observed that it was more expensive to use some DPCN circuits than 2Mbit/s circuits. Its assessment was based on average circuit distances for the different bandwidths, comparing average monthly rental prices and assuming a contribution to other charges from connection, POH and DPCN bearers<sup>280</sup>. CWW argued that, as CPs purchase more nx64kbit/s circuits<sup>281</sup>, they were charged more compared to a 2Mbit/s circuit.
- A12.147 BT Wholesale sells nx64kbit/s circuits as multiples of 64kbit/s circuits and this is reflected in BT Wholesale's current charges.<sup>282</sup> For example, a 256kbit/s circuit attracts twice the charge for main link, terminating and trunk segments compared to a 128kbit/s circuit. As more 64kbit/s circuits are bundled together, these charges can mount up and can result in higher per kilometre charges than a 2Mbit/s circuit.

<sup>282</sup> PPC charges are available at:

<sup>&</sup>lt;sup>278</sup> Cable & Wireless UK v Office of Communications (Leased Lines Charge Control), Case 1112/3/3/09, Notice of Appeal, <u>http://www.catribunal.org.uk/237-4334/1112-3-3-09-Cable--Wireless-UK.html</u>

<sup>&</sup>lt;sup>279</sup> See paragraph 3.218 of the Competition Commission's Determination, 30 June 2010, available at the above link.

<sup>&</sup>lt;sup>280</sup> These assumptions were presented as evidence in the LLCC appeal, and are now archived. We can obtain these if necessary.

<sup>&</sup>lt;sup>281</sup> A PPC operating at nx64kbit/s is a wholesale circuit from a Third Party Customer Link to a CP's Point of Handover. These circuits are available at bandwidths from 128kbit/s to 960kbit/s in increments of 64kbit/s.

https://www.btwholesale.com/pages/static/Library/Pricing\_and\_Contractual\_Information/carrier\_price\_ list/cpl\_sectionb8partialprivatecircuits.htm

A12.148 As part of Ofcom's response to CWW's observation<sup>283</sup>, we noted that the costs of providing DPCN circuits were higher than costs of providing a 2Mbit/s local end. BT's Statement of Intervention (SoI) further explained that the difference in technology is one of the reasons for this. The CC supported this and concluded that "it would appear difficult to make comparisons between DPCN and non-DPCN services as they are underpinned by different technologies". On this basis, we considered that the price differential between DPCN and 2Mbit/s circuits was not an anomaly and therefore that it is appropriate to allow BT the freedom to set its own pricing structure for them, subject to the constraints of the charge control conditions.

#### DPCN terminating versus trunk charges

- A12.149 CWW's second observation was that DPCN trunk charges were more than three times DPCN terminating charges. It argued that this was illogical because (i) there was little difference between trunk and terminating segments from an engineering perspective, and (ii) if there was a difference, trunk should be priced lower than terminating segments as economies of scale should make the costs of trunk lower than the costs of terminating segments. CWW also argued that there should be no difference between the relative prices of DPCN trunk and terminating segments and non-DPCN trunk and terminating segments.
- A12.150 We noted<sup>284</sup> that trunk charges were brought into the charge control for the first time as a result of the BCMR 2008.<sup>285</sup> BT's Sol argued that the new pricing structure proposed in LLCC 2009 "rebalanced the charges between trunk and terminating segments and aligned prices more closely with costs". The CC concluded that there was "not sufficient evidence to support the allegation that the structure of charges … is anti-competitive". Again, in relation to the relative trunk and terminating prices for DPCN and non-DPCN circuits, BT submitted that there was no correlation between the cost ratios at different bandwidths, and that the two types of services are delivered using different technologies.
- A12.151 For the purposes of this charge control, we carried out an assessment of current PPC charges. We have found that for nx64kbit/s circuits trunk charges (including main link, on a per kilometre basis) are lower than terminating segments for average circuit lengths. For higher bandwidth circuits, this holds true for average externally-purchased circuits, which are significantly shorter than average internally-consumed PPC circuits. Given these developments since the start of the existing charge control, we consider that it is appropriate to delegate pricing decisions on relative charges to BT, subject to the constraints of our proposed charge control.

#### Trunk charges at different bandwidths

- A12.152 CWW observed that the per kilometre charge for some DPCN trunk products were higher than the per kilometre charge of 2Mbit/s trunk.
- A12.153 Figure A12.29 below compares trunk charges by bandwidth based on BT Wholesale's Carrier Price List from 1 October 2009 (start of the existing charge controls) with the prices as at 1 October 2012. It shows that trunk charges in general have reduced during the three year period, and in particular, 64kbit/s trunk charges have reduced relative to 2Mbit/s charges. However, it is still the case that

<sup>&</sup>lt;sup>283</sup> See paragraph 3.236 of the Competition Commission's Determination, 30 June 2010.

<sup>&</sup>lt;sup>284</sup> See paragraph 3.230 of the Competition Commission's Determination, 30 June 2010.

<sup>&</sup>lt;sup>285</sup> http://stakeholders.ofcom.org.uk/binaries/consultations/bcmr08/summary/bcmr08.pdf

the per kilometre charge for some DPCN trunk products is more expensive than some 2Mbit/s charges.



#### Figure A12.29: Comparison of trunk charges by bandwidth

A12.154 BT's response to this point during the LLCC Appeal was that "DPCN technology does not utilise trunk. Direct comparison of transmission costs using different technologies was simply not possible".<sup>286</sup> We consider that the pricing difference does not warrant intervention as the two services are based on different technologies.

#### Terminating versus trunk charges for 2Mbit/s circuits

- A12.155 On the 2Mbit/s charges, CWW observed that trunk was 3.3% more expensive than 2Mbit/s terminating segments.<sup>287</sup> If the 2Mbit/s trunk price was being brought down to DSAC and 2Mbit/s terminating segments were below DSAC, then it was likely that terminating segments were more expensive than trunk. CWW argued that this should be reflected in the pricing structure.
- A12.156 We note that, since the LLCC 2009, PPC trunk charges and terminating segment charges had been charge controlled in the same basket. Figure A12.30 below sets out the 2Mbit/s trunk and terminating segment charges over three periods between 2009 and 2012. It shows that, since 2009, terminating segment charges have increased while trunk segment charges have decreased. The result is that terminating charges are now more expensive on a per km basis than trunk. We consider that the changes in the charges of trunk and terminating segments indicate that BT has rebalanced its pricing structure since the beginning of the last charge control and that the current trunk and terminating segment charges are likely to broadly reflect the underlying costs of providing them.

<sup>&</sup>lt;sup>286</sup> See paragraph 3.241 of the Competition Commission's Determination, 30 June 2010.

<sup>&</sup>lt;sup>287</sup> In 2009, the 2Mbit/s trunk charge was £46.83 per km, while the 2Mbit/s terminating charge was £45.34 per km.
# Figure A12.30: Comparison of 2Mbit/s charges between 2009 and 2012

Charge	1 October 2009	1 October 2011	1 October 2012
Terminating segment charge (per km per annum)	£45.34	£51.57	£58.32
Trunk segment charge (per km per annum)	£46.83	£42.61	£46.33

Source: BT Wholesale Carrier Price List

# Comparison of 34/45Mbit/s and 140/155Mbit/s trunk charges

- A12.157 CWW's last observation was that the price of 45Mbit/s trunk was over twice the price of 155Mbit/s trunk. CWW argued that from a technical perspective there was no reason why 34Mbit/s or 45Mbit/s circuit could not be routed over a 155Mbit/s bearer and therefore no reason why there should be such a price differential. CWW pointed out that within the PPC product portfolio there was no product option for customers to route 45Mbit/s circuits over 155Mbit/s and that there was no obvious reason why the efficiently incurred costs of 45Mbit/s trunk should be greater than those for 155Mbit/s.
- A12.158 Figure A12.30 above shows that the per kilometre charge for a 34/45Mbit/s circuit was just over twice the charge for a 155Mbit/s circuit in 2009 and that this margin has since reduced. In Ofcom's response to CWW during the appeal, we noted that one reason for this is that the costs of trunk circuits are not geographically uniform in that they vary depending on location. This, in turn, may reflect the density of trunk circuits on particular routes. So, if a higher proportion of 45Mbit/s circuits were in "high cost" areas or on low-density routes, the result might be that the average cost of 45Mbit/s trunk was higher than that of 155Mbit/s.
- A12.159 In its assessment, the CC was not persuaded by CWW's view on the pricing differential and how this would have led to inefficient and discriminatory pricing. In particular, the CC argued that that "in an industry with large common costs, the 'correct' cost of each product is very difficult to know", which was the basis of CWW's argument.

# We have not made any start charge adjustments to TI services

A12.160 Based on our assessment of the current level of charges and the charging structure, we do not believe there is sufficient evidence to make one-off adjustments to BT Wholesale's current prices. As per the CC's findings, we do not believe that some of the pricing anomalies as put forward by CWW "were indeed anomalies". For other areas, we believe that our decision provides BT with the flexibility to price on a cost-reflective basis, subject to the sub-caps. Indeed, the CC believed that this was "a sensible division of powers... and reflected a considered judgement by Ofcom consonant with the purposes of the 2003 Act".

# **Assessment of Openreach charges for Ethernet services**

A12.161 As with TI services, we have also evaluated the case for any one-off adjustments to Ethernet services. Ethernet services above 1Gbit/s were not previously subject to SMP regulation, hence no DSACs or DLRICs were provided in the 2010/11 RFS. DSACs and DLRICs are available for WES services up to 1Gbit/s disaggregated by bandwidth (10Mbit/s, 100Mbit/s and 1000Mbit/s rentals), for BES services (1000Mbit/s rentals), for EAD services up to 1Gbit/s disaggregated by bandwidth and for EBD services aggregated across bandwidths.

# Assessment of Openreach current charges

- A12.162 We have updated our analysis with the 2011/12 base year data, to see if any charges fall outside the DSAC and DLRIC cost orientation benchmarks. The analysis showed that in 2012/13 no charges are expected to be above DSAC or below DLRIC. Therefore, we have decided not to make start charge adjustments.
- A12.163 We have also extrapolated DLRIC floors and DSAC ceilings forward on the basis of the movement in FAC costs to 2015/16, in order to see whether it is likely that the charges will exceed DSAC ceilings by the end of the charge control.
- A12.164 The results of our model show that all Ethernet services for which DSAC is reported will be below forecast DSAC in 2015/16. Given that all reported charges for Ethernet services are below forecast DSAC in the first year of the control as well, we consider that the sub caps we are imposing are sufficient to prevent prices becoming excessive during the duration of the control.

# Assessment of Openreach charging structure

A12.165 Within Ethernet services, the total price paid for a circuit increases depending on the capacity of the circuit. This increase in price as capacity increases is sometimes referred to as the 'bandwidth gradient' in pricing. We have considered whether Openreach might be in a position to produce such a bandwidth gradient with potentially anti-competitive effects. Our analysis is set out below.

#### Ethernet service prices and costs by bandwidth

A12.166 Figure A12.31 below shows that the rental prices of basic WES, BES and EAD circuits increase as bandwidth increases. For example, the step increase in price between 10Mbit/s and 100Mbit/s is 8% for EAD, 12% for BES and 33% for WES. However, the step increase between 100Mbit/s and 1Gbit/s is substantially greater: more than 100% increase for all three services.

Service	Total price per circuit per annum	Average price per Mbit/s (£/circuit/annum)	
WES			
10Mbit/s	3,202	320.16	
100Mbit/s	4,260	42.60	
1Gbit/s	9,060	9.06	
2.5Gbit/s	[×]	[×]	
10Gbit/s	[×]	[×]	
BES			
10Mbit/s	3,110	311.00	
100Mbit/s	3,476	34.76	
1Gbit/s	7,529	7.53	
2.5Gbit/s	[⊁]	[×]	
10Gbit/s	[⊁]	[×]	
EAD			
10Mbit/s	3,353	335.26	
100Mbit/s	3,629	36.29	
1Gbit/s	7,779	7.78	

# Figure A12.31: Ethernet services rental charges as at 1 October 2012

Source: Ofcom analysis of BT Group data submitted in response to S135 Notice of 28 September 2012<sup>288</sup>

- A12.167 However, although total prices increase with bandwidth, the increases are less than the corresponding increases in capacity for these circuits. Figure A12.31 shows that for each circuit type, the average price per Mbit/s falls as bandwidth increases, i.e. customers benefit from lower average prices per Mbit/s as they purchase more bandwidth. For example, the price of an EAD 1Gbit/s circuit is £7.78 per Mbit/s compared to £335.26 per Mbit/s for the 10Mbit/s variant.
- A12.168 We note that the bandwidth gradient in pricing is unlikely to be driven by differences in marginal costs.
- A12.169 To illustrate this, we consider the FAC profile of WES services up to 1Gbit/s. Figure A12.32 below shows that the FACs of WES rental services increase by only a small proportion as bandwidth increased. This suggests that there is little difference in the marginal costs of WES services across different bandwidths and is likely to reflect the fact that the technology and equipment used to deliver WES services is largely the same regardless of the bandwidth that is being provided. In the case of the WES services depicted below, the difference in FACs is mainly due to the higher proportion of admin-related costs (i.e. common costs) allocated to the higher bandwidth services.

<sup>&</sup>lt;sup>288</sup> BT Group response to S135 Notice of 28 September 2012 [X]



# Figure A12.32: WES rental fully allocated costs (FACs) in 2011/12 (per circuit)

Source: Appendix 1.2.1, p. 106 of BT's 2011/12 Regulatory Financial Statements

# Incentives regarding the bandwidth gradient

- A12.170 As the pricing gradient does not appear to reflect differences in marginal costs, this suggests that Openreach earns a higher gross margin on high bandwidth circuits than on low bandwidth circuits. High bandwidth circuits therefore make a greater contribution to the recovery of fixed and common costs.
- A12.171 We have examined whether Openreach could have an incentive to price the different bandwidth products in an unduly discriminatory and/or anti-competitive way. Such an incentive could arise if the higher capacity circuits were purchased disproportionately by other CPs rather than BT itself. We note that Openreach is required to set the same prices, use the same processes and the same timescales for all their customers, internal or external. Figure A12.33 below sets out the split of volumes of WES, BES and EAD circuits sold internally and externally.

Figure A12.33: Ethernet internal re	tal volumes by	v customer type in	2011/12
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WES         10Mbit/s       [X]       [X]         100Mbit/s       [X]       [X]         100Mbit/s       [X]       [X]         1Gbit/s       [X]       [X]         2.5Gbit/s       [X]       [X]         10Gbit/s       [X]       [X]         10Gbit/s       [X]       [X]         10Mbit/s       [X]       [X]         10Gbit/s       [X]       [X]         10Mbit/s       [X]       [X]         100Mbit/s       [X]       [X]         100Mbit/s       [X]       [X]	Service	2011/12	2015/16
10Mbit/s     [×]     [×]       100Mbit/s     [×]     [×]       1Gbit/s     [×]     [×]       2.5Gbit/s     [×]     [×]       10Gbit/s     [×]     [×]       10Gbit/s     [×]     [×]       10Gbit/s     [×]     [×]       10Gbit/s     [×]     [×]       10Mbit/s     [×]     [×]       10Mbit/s     [×]     [×]       10Gbit/s     [×]     [×]       10Mbit/s     [×]     [×]       100Mbit/s     [×]     [×]       100Mbit/s     [×]     [×]	WES		
100Mbit/s     [×]     [×]       1Gbit/s     [×]     [×]       2.5Gbit/s     [×]     [×]       10Gbit/s     [×]     [×]       10Gbit/s     [×]     [×]       10Gbit/s     [×]     [×]       10Gbit/s     [×]     [×]       10Mbit/s     [×]     [×]       100Mbit/s     [×]     [×]       1Gbit/s     [×]     [×]       1Gbit/s     [×]     [×]       10Gbit/s     [×]     [×]       10Mbit/s     [×]     [×]       100Mbit/s     [×]     [×]       100Mbit/s     [×]     [×]       100Mbit/s     [×]     [×]	10Mbit/s	[×]	[×]
1Gbit/s     [×]     [×]       2.5Gbit/s     [×]     [×]       10Gbit/s     [×]     [×]       BES     [×]     [×]       10Mbit/s     [×]     [×]       100Mbit/s     [×]     [×]       100Mbit/s     [×]     [×]       100Mbit/s     [×]     [×]       100Mbit/s     [×]     [×]       100bit/s     [×]     [×]       10Gbit/s     [×]     [×]       10Bbit/s     [×]     [×]       100Mbit/s     [×]     [×]	100Mbit/s	[×]	[×]
2.5Gbit/s     [×]     [×]       10Gbit/s     [×]     [×]       BES     [×]     [×]       10Mbit/s     [×]     [×]       100Mbit/s     [×]     [×]       100Mbit/s     [×]     [×]       100Mbit/s     [×]     [×]       100Mbit/s     [×]     [×]       10bit/s     [×]     [×]       10Gbit/s     [×]     [×]       10Mbit/s     [×]     [×]       100Mbit/s     [×]     [×]       10Gbit/s     [×]     [×]	1Gbit/s	[×]	[×]
10Gbit/s     [×]     [×]       BES     [×]     [×]       10Mbit/s     [×]     [×]       100Mbit/s     [×]     [×]       100Mbit/s     [×]     [×]       100Mbit/s     [×]     [×]       100Mbit/s     [×]     [×]       10bit/s     [×]     [×]       10Gbit/s     [×]     [×]       10Mbit/s     [×]     [×]       10Mbit/s     [×]     [×]       10Dhit/s     [×]     [×]	2.5Gbit/s	[×]	[×]
BES         10Mbit/s       [X]       [X]         100Mbit/s       [X]       [X]         100Mbit/s       [X]       [X]         1Gbit/s       [X]       [X]         2.5Gbit/s       [X]       [X]         10Gbit/s       [X]       [X]         10Gbit/s       [X]       [X]         10Gbit/s       [X]       [X]         10Mbit/s       [X]       [X]         100Mbit/s       [X]       [X]         1Gbit/s       [X]       [X]	10Gbit/s	[×]	[×]
10Mbit/s     [×]     [×]       100Mbit/s     [×]     [×]       1Gbit/s     [×]     [×]       2.5Gbit/s     [×]     [×]       10Gbit/s     [×]     [×]       10Gbit/s     [×]     [×]       10Gbit/s     [×]     [×]       10Mbit/s     [×]     [×]       10Mbit/s     [×]     [×]       100Mbit/s     [×]     [×]	BES		
100Mbit/s     [×]     [×]       1Gbit/s     [×]     [×]       2.5Gbit/s     [×]     [×]       10Gbit/s     [×]     [×]       10Gbit/s     [×]     [×]       10Mbit/s     [×]     [×]       100Mbit/s     [×]     [×]       100Mbit/s     [×]     [×]       100Mbit/s     [×]     [×]	10Mbit/s	[×]	[×]
1Gbit/s     [×]     [×]       2.5Gbit/s     [×]     [×]       10Gbit/s     [×]     [×]       10Gbit/s     [×]     [×]       10Mbit/s     [×]     [×]       100Mbit/s     [×]     [×]       1Gbit/s     [×]     [×]	100Mbit/s	[×]	[×]
2.5Gbit/s       [×]       [×]         10Gbit/s       [×]       [×]         EAD       [×]       [×]         10Mbit/s       [×]       [×]         100Mbit/s       [×]       [×]         100Mbit/s       [×]       [×]	1Gbit/s	[×]	[×]
10Gbit/s       [×]       [×]         EAD       [×]       [×]         10Mbit/s       [×]       [×]         100Mbit/s       [×]       [×]         1Gbit/s       [×]       [×]	2.5Gbit/s	[×]	[×]
EAD         10Mbit/s       [%]       [%]         100Mbit/s       [%]       [%]         16bit/s       [%]       [%]	10Gbit/s	[×]	[×]
10Mbit/s       [×]       [×]         100Mbit/s       [×]       [×]         1Gbit/s       [×]       [×]	EAD		
100Mbit/s       [×]       [×]         1Gbit/s       [×]       [×]	10Mbit/s	[×]	[×]
1Gbit/s [ <b>X</b> ] [ <b>X</b> ]	100Mbit/s	[×]	[×]
	1Gbit/s	[×]	[×]

Source: BT's 2012 RFS and BT Group response to S135 Notice of 28 September 2012<sup>289</sup>.

A12.172 Figure A12.33 above shows that in 2011/12 the majority of WES and EAD circuits were purchased [ $\gg$ ] migration [ $\approx$ ].

A12.173[**℅**].

A12.174 [**×**].<sup>290</sup>

A12.175 By the end of the charge control, most circuits are forecast to be EAD as a result of migration, particularly as new supply of WES and BES up to and including 1Gbit/s has been withdrawn since 31 May 2011. Therefore, we expect internal volumes to continue to make up a significant proportion of the overall total in 2015/16.<sup>291</sup>

# Bandwidth gradients and economic efficiency

- A12.176 Allowing for an upward-sloping bandwidth gradient (i.e. higher costs for more capacity) may be an efficient way to recover fixed and common costs, particularly if this is accompanied by decreasing average costs, as observed in Openreach's current charging structure in Figure A12.31.
- A12.177 The services that make up the Ethernet basket are characterised by high fixed and common costs and low marginal costs largely because much of the underlying network infrastructure that Openreach uses to deliver these services is common

<sup>&</sup>lt;sup>289</sup> BT Group response to S135 Notice of 28 September 2012 [X]

<sup>&</sup>lt;sup>290</sup> Ofcom volume forecasts.

<sup>&</sup>lt;sup>291</sup> See Openreach announcement at:

http://www.openreach.co.uk/orpg/home/updates/briefings/ethernetservicesbriefings/ethernetservice

across different bandwidths and services. For example, all of these services use elements of the same assets like duct, fibre, equipment, while many location-related costs (e.g. accommodation or air-conditioning) and management systems are common across all bandwidths and services. This view was supported by the CC in the CWW appeal.

A12.178 Finally, since the demand for Ethernet services is changing rapidly over the next few years, this approach also allows Openreach the ability to re-optimise prices and respond to new patterns of demand quickly.

### We have not made any start charge adjustments to Ethernet services

- A12.179 We have not identified any particular strategic incentives on Openreach in relation to the bandwidth gradient. We therefore consider it appropriate to allow Openreach some flexibility to determine the most appropriate structure of prices, subject to meeting the charge control conditions.
- A12.180 This flexibility is not unlimited. As described in Section 18 of this Statement, we use DSAC and DLRIC benchmarks to assess whether individual charges are at a level which may give rise to competitive distortions. As described in Section 20, we have assessed whether any charges for Ethernet services fall outside the DSAC and DLRIC cost orientation benchmarks. The analysis showed that in 2012/13 no charges for which we have DSAC and DLRIC data, are expected to be above DSAC or below DLRIC. Therefore, we have decided not to make start charge adjustments.
- A12.181 We have also forecast DSAC ceilings forward on the basis of the movement in FAC costs to 2015/16, in order to see whether it is likely that the charges will exceed DSAC ceilings by the end of the charge control. As described in Section 20, as a result of this analysis, we have decided to impose a sub-basket for EAD 1 Gbit/s services to keep the charge for these services below forecast DSAC throughout the charge control period.

# **Cost forecasting approach**

A12.182 We have forecast capital costs and operating costs separately.

# **Forecasting of capital costs**

- A12.183 We split the cost forecasts into two parts. The 'steady state' element is the forecast of what would happen to costs if there was no change in volumes during the charge control period. The 'additional' element is the change in cost induced by changing volumes. If volumes increase this will be positive, if volumes fall this will be negative.
- A12.184 The steady state and additional elements are summed together to generate a total capital cost forecast.
- A12.185 Figure A12.34 explains the terminology used in this section.

Name	Description
Gross Replacement Cost (GRC)	The current cost accounting equivalent of Gross Book Value, i.e. the cost of BT replacing its assets now.
Net Replacement Cost (NRC)	The current cost accounting equivalent of Net Book Value, i.e. depreciated replacement cost of BT's assets.
Operating capability maintenance (OCM)	A Current Cost Accounting (CCA) convention, where the depreciation charge to the profit and loss account relates to the current replacement cost of the firm's assets, taking account of specific and general price inflation.
Financial capital maintenance (FCM)	A CCA accounting convention, where the depreciation charge to the profit and loss account includes holding gains or losses due to changes in asset prices, in addition to the OCM depreciation charge. This is in real terms, relative to RPI.
Mean capital employed (MCE)	BT's definition of Mean Capital Employed is total assets less current liabilities, excluding corporate taxes and dividends payable, and provisions other than those for deferred taxation. The mean is computed from the start and end values for the period, except in the case of short-term investments and borrowings, where daily averages are used in their place.
Fully allocated costs (FAC)	An accounting approach under which all the costs of the firm are distributed between its various services. The fully allocated costs of a service may therefore include some common costs that are not directly attributable to the service.
Inflation	The general change in prices across the economy. We have used RPI data obtained from the Office of National Statistics (ONS) and HM Treasury.
Real asset price change (APC)	Changes in valuation of underlying assets over and above RPI.
WACC	BT's weighted average cost of capital.
Return on capital employed (ROCE)	The ratio of accounting profit to capital employed. The measure of capital employed can be either HCA or CCA.
Asset lives	Asset lives of each component are calculated by dividing the GRC by the depreciation charge in the base year assuming straight line depreciation.

# Figure A12.34: Explanation of accounting terms

# A12.186 Figure A12.35 below sets out the abbreviations used in the cost forecasting calculations.

# Figure A12.35: Abbreviations used in cost forecasts

Abbreviation	Description
GRC(t)	The value of Gross Replacement Cost (GRC) in year t (taken as a year-end figure)
GRC(t-1)	The value of GRC previous year (taken as a year-end figure)
NRC (t)	Net Replacement Cost in year t
Capex (t)	Capital expenditure in year t
OCM dep (t)	Operating Capability Maintenance depreciation in year t
HGL (t)	Holding gains or losses in year t
NCA (t)	Net Current Assets in year t
eff	Percentage reduction in costs arising from efficiency gains at constant volumes

# Forecasting of 'steady state' capital costs

A12.187 The 'steady state' element is the forecast of what would happen to costs if there was no change in volumes during the charge control period. Figure A12.36 below presents the steady state calculations used by Ofcom's forecasting model.

Calculation	Description
Gross Replacement Cost (GRC)	Base year GRC is taken from BT's response to our information request. Subsequent years are calculated as: GRC(t) = GRC(t-1) * [1 + APC(t)]
OCM depreciation (OCM dep)	Base year OCM depreciation is taken from BT's response to our information request and is the sum of HCA depreciation and CCA depreciation. In subsequent years we assume straight line depreciation, calculated as: OCM dep(t) = GRC(t) / asset life Where asset life is equal to the ratio GRC/OCM dep in the base year.
Capital expenditure (Capex)	Base year capital expenditure is assumed to be equal to OCM dep. Subsequent years are calculated as: Capex(t) = Capex(t-1) * $[1 + APC(t)] * (1 - eff)^{292}$
Net replacement cost (NRC)	Base year NRC is taken from BT's response to our information request. Subsequent years are calculated as: NRC(t) = NRC(t-1) * [1 + APC (t)] + Steady state capex (t) - Steady state OCM dep (t) We assume in the Steady state capex (t) = OCM dep (t), hence $NRC(t) = NRC(t-1) * [1 + APC (t)]$
Holding gains or losses (HGL)	HGL(t) = - Steady state NRC(t) * APC(t)

Figure A12.36: Approach to forecasting steady state capital costs

# Forecasting of 'additional' capital costs

- A12.188 The 'additional' element is the change in cost induced by changing volumes of services relative to the steady state. If volumes increase this will be positive, if volumes fall this will be negative.
- A12.189 Figure A12.37 below presents the additional calculations used by Ofcom's forecasting model. All changes are forecast relative to the base year. As with the steady state capital and depreciation costs, additional costs are also forecast as year-end values.

Calculation	Description
Additional GRC	GRC(t) = GRC(t-1) * [1 + APC(t)] + steady state capex(t) + additional capex(t)
Additional OCM dep	OCM dep(t) = ad GRC(t) / asset life
Additional capex	Capex(t) = Total GRC(t-1) * [1 + APC(t)] * (1-eff) * AVE * volume change %(t)
Additional NRC	NRC(t) = NRC(t-1) * [1 + APC (t)] * AVE * volume change %(t)
Holding gains or losses (HGL)	HGL(t) = - Additional NRC(t) * APC(t)

Figure A12.37: Approach to forecasting additional capital costs

# Forecasting of total capital costs

A12.190 As mentioned above, we have forecast the total capital cost as the sum of the steady state and additional elements for each cost category discussed in Figure A12.36 and Figure A12.37. For GRC, capex and OCM depreciation we forecast the

<sup>&</sup>lt;sup>292</sup> The assumption on the efficiency for Ethernet capex is calculated such that the real asset price trend and the efficiency assumption total the total efficiency assumed for Openreach (4.5%).

total cost including the RAV adjustment mentioned in Figure A12.3 and Figure A12.5.

A12.191 We have calculated the total return on capital and the net current asset at the service level, according to the calculations presented in Figure A12.38.

Figure A12.38: Approach to forecasting return on capital

Calculation	Description
Net Current Asset (NCA)	NCA(t) = NCA(t-1) * (1+ volume change %)
Return on capital	Return on capital (t) = $[NRC(t) + NCA(t)]^*$ pre tax real WACC

# Forecasting of operating costs

A12.192 Figure A12.39 below presents the operating cost calculations used by our forecasting model.

# Figure A12.39: Approach to forecasting operating costs

Calculation	Description
Pay	Base year pay is taken from BT's response to our information request. Subsequent years are calculated as: <sup>293</sup> Pay(t) = Pay(t-1) *(1 - eff) * [1 + volume change %(t) * CVE]
Non-pay	Base year non-pay is taken from BT's response to our information request. Subsequent years are calculated as: Non-pay(t) = Non-pay(t-1) * (1 – eff) * [1 + volume change %(t)* CVE]

A12.193 In its response to the LLCC Consultation, Openreach claimed that Pay costs should be forecast to increase faster than RPI, namely by RPI+1%, on the basis of ONS data on real average wage increases over the last 21 years.<sup>294</sup> We have considered this, and note that whilst this may be true over a longer term period, more recent evidence we have gathered does not support BT's position.<sup>295</sup> Given this, our best forecast is for Pay to increase with RPI.

# Forecasting of service costs and the value of X

- A12.194 We have calculated total component costs on a component-by-component basis as the sum of operating and capital costs. For a service that uses a number of different components, the total costs of service *y* is calculated using the following steps:
  - Unit component costs(t) = Total component costs(t) / Component volumes(t);
  - Unit service costs(t) = Matrix multiplication of Unit component costs(t) and Usage factor by service y for each of the components; and

<sup>&</sup>lt;sup>293</sup> We have now amended the description of the formula used in the model to forecast operating costs, which in the LLCC Consultation included the asset price trend.

<sup>&</sup>lt;sup>294</sup> BT Group response to the LLCC Consultation [×]

<sup>&</sup>lt;sup>295</sup> Openreach response to S.135 Notice of 1 July 2011 dated 12 August 2011 and Openreach response to S.135 Notice dated 14 February 2013 [**X**]

- Total service costs(t) = Unit service costs(t) \* Service volumes(t)
- A12.195 Having selected the appropriate services to include in a basket, the model then calculated total basket costs and total basket revenues:
  - Total basket costs(t) = Sum of individual service costs(t); and
  - Total basket revenues(t) in the absence of a charge control = Prices(0) \* Service volumes(t), where Price(0) is the start charge for each service.
- A12.196 To determine the value of X for each basket, the model compares the total costs and revenues in the last year of the charge control. We solve the value of X for this basket such that the two were equal in the final year.
- A12.197 The value of X is effectively the weighted average real annual price change for the services in the basket. That is, assuming that with the introduction of the charge control, the value of X is applied equally for all services within a basket, the value of X could be solved as:

 $X = (Costs_T / [Price_0 * Volumes_T])^{1/3} - 1$ 

Where:

 $Costs_T$  = Forecast costs at the end of the charge control (2015/16)

 $Price_0 = Service prices at the start of the charge control (2012/13)$ 

Volumes<sub>T</sub> = Service volumes at the end of the charge control

# Key quantitative issues

- A12.198 We discuss below how the model approached a number of modelling challenges concerning the:
  - services disclosed in the regulatory accounts compared to those on the Openreach price list;
  - usage factors and the conversion between component-level costs to servicelevel costs;
  - Ethernet basket migration credit;
  - calculation of administrative and other costs; and
  - reallocation of costs between TI and Ethernet baskets.

# **Service prices**

A12.199 We note that the rental volumes reported are all year average volumes<sup>296</sup> such that the average prices shown in the RFS reflect largely what is available on the BT

<sup>&</sup>lt;sup>296</sup> Section 8.6, "A study of BT's Regulatory Financial Statements for business connectivity markets", 25 November 2008, Analysys Mason.

http://stakeholders.ofcom.org.uk/binaries/consultations/llcc/annexes/analysysmason.pdf

Wholesale and Openreach<sup>297</sup> price lists. They may differ slightly due to both price changes during the year and volume changes. For connection volumes, they are reported as the total year volume due to the one-off nature of these charges.

- A12.200 For the base year analysis shown in Figure A12.4 and Figure A12.6, the prices used are, in effect, the average revenues by service type reported by BT Wholesale and Openreach. Both parties provided us with their respective revenue reconciliation statements for the year 2011/12.
- A12.201 As explained above, the start charges we use for the purposes of proposing the values of X for the TI and Ethernet baskets are from BT Wholesale and Openreach price lists. We describe below in detail service products where this is not the case.
- A12.202 We note that the figures in the RPI-X model are quoted in 2011/12 prices. Therefore, any service price we use for the start of the charge control in 2012/13 has to be rebased. We use the RPI inflation figures as reported by the (ONS)<sup>298</sup> for this conversion.

# Service prices for TI services

A12.203 For the PPC services, the rental charges for each constituent of the circuit (i.e. local end, main link, distribution and trunk) is separately identified and charged. For those services we use BT Wholesale's charges as set out in its Carrier Price List (CPL) B8.03, applicable from 1 October 2012. The connection charge for each circuit is also identified separately. The charges are set out in CPL B8.02 and apply from 1 October 2012 onwards.

# Radio Base Station (RBS) backhaul

A12.204 RBS backhaul service charges can be found in B11.02 for connection charges and B11.03 for rental charges. The charges have been effective from 1 December 2011 onwards and there were no announced changes to these charges.

### Figure A12.40: Published connection charges for new RBS backhaul circuits

Provision charge per circuit	Single charge	Effective Date	Single charge	Effective Date
128Kbit/s – 960Kbit/s	£550.43	1/11/10 – 30/11/11	£603.27	1/12/11
2Mbit/s	£1886.24	1/11/10 – 30/11/11	£2,045.40	1/12/11
2Mbit/s Subsequent (note 11)			£1050.00	01/06/07

Source: BT Wholesale carrier price list B11.02

A12.205 BT Wholesale noted that the published price in the RFS was slightly different to the average price calculation based on the prices in Figure A12.40 because of the volume mix. BT Wholesale also noted that for the 2Mbit/s circuits, many of the volumes are from subsequent connections which were charged at £1050. We have estimated subsequent volumes to represent 76% of all volumes, based on a

<sup>&</sup>lt;sup>297</sup> BT Wholesale carrier price list is available at

https://www.btwholesale.com/pages/static/Library/Pricing\_and\_Contractual\_Information/carrier\_price\_ list/cpl\_sectionb8partialprivatecircuits.htm. Openreach Ethernet service pricing is available at http://www.openreach.co.uk/orpg/home/products/pricing/loadPricing.do

<sup>&</sup>lt;sup>298</sup> The dataset is available at <u>http://www.ons.gov.uk/ons/datasets-and-tables/data-selector.html?dataset=mm23</u>.

comparison of the 2011/12 average price in the RFS with the average prices in the price list.

- A12.206 For the purposes of the start charges, we use £603.27 for the sub 2Mbit/s circuits and £1804.85<sup>299</sup> for the 2Mbit/s circuits.
- A12.207 Although RBS Backhaul circuits use the same underlying inputs as PPCs (i.e. these circuits have a certain number of links, local ends etc), the rental charges are simplified so that there is a simple charge based on bandwidth and distance. These are listed in B11.03 of the CPL. However, the volumes and costs are disaggregated into the individual constituents of the RBS circuit. For the purposes of comparing costs and revenues, BT Wholesale matched rental revenues against the RBS local end services. Given this assumption, we have used this average revenue as the start charge for RBS local ends.

### **SiteConnect**

- A12.208 For SiteConnect, BT Wholesale's price list (B12.01) shows that as of 1 June 2012, this service was no longer available to new customers. This has been reflected in BT Wholesale's service volume forecasts. The connection charge is therefore not relevant for our analysis.
- A12.209 As with RBS backhaul, SiteConnect charges are based on bandwidth and distance only, even though it also uses the same underlying components as PPCs. The revenues have also been matched against the main link part of the SiteConnect service. When BT Wholesale's price list does not provide prices disaggregated at the same level as costs, we have used the average revenues as the start charges. This is the approach we have adopted for SiteConnect charges since these have not changed since 2 March 2007.

### Netstream 16 Longline

A12.210 Netstream 16 Longline is a special option of the Netstream service. It is used by mobile operators for connections between small satellite sites and major sites and is available for 2Mbit/s. As with SiteConnect services, we have used the average revenue as the start charge for Netstream 16 Longline services.

# Service prices for Ethernet services

A12.211 Openreach also provided us with the reconciliation statement for the 2011/12 financial year. The information provided is in greater detail than is available in the RFS, as shown in the examples below:

<sup>&</sup>lt;sup>299</sup> £1804.85 = 24% \* £2045.40 + 76% \* £1050.00.

Aggregation within service bandwidth categories	Aggregation across bandwidths	Aggregation across services
"Wholesale extension services (WES) 10Mbit/s rental" includes:	"WES other bandwidths rental" includes:	"Other Ethernet rentals" includes:
WES 10Mbit/s Local reach	WES 2Mbit/s	Street access
WES 10Mbit/s Local access managed	WES 155Mbit/s	Broadcast access
WES 10Mbit/s	WES 622Mbit/s	Optical spectrum services
WES 10Mbit/s Managed	WES Aggregation ML VLAN	Bulk Transport Link (BTL)
WES Aggregation 10Mbit/s Access	WES Aggregation ML RJ45	Cablelink
	Ethernet resilience option 2	Openreach Network Backhaul Services (ONBS)
		ONBS resilience option 2

### Figure A12.41: Level of aggregation in the RFS

Source: BT Group response to S135 Notice of 28 September 2012<sup>300</sup>

- A12.212 As with the BT Wholesale submissions, the average prices in the RFS differ to those in the price list due to price and volume changes during the year. For the purposes of reconciliation of base year revenues with those in the RFS, we have used the average revenues as submitted by Openreach.
- A12.213 As explained below, for our cost modelling, we have been provided with usage factors at a service group level (i.e. we have an average usage factor for EAD 10Mbit/s rather than separate usage factors for EAD 10 Local Access and EAD 10 Extended Reach). This means that on the cost side, we are assuming that within a service group, the relative proportions of different variants (e.g. local access, extended reach and standard product) does not change over time. In order to be consistent with our cost modelling, we have also kept the proportions of variants constant when forecasting revenues.
- A12.214 For the start charges, Openreach has provided us with detailed volume forecasts prior to the aggregation shown in the RFS. Openreach has also provided us with the corresponding prices (including the 'Terms on Application' charges for the above 1Gbit/s services) for each of the products. These are the ones we used as the start charges.

# Ethernet Backhaul Direct (EBD)

A12.215 EBD services are available at 1Gbit/s or 10Gbit/s and the pricing is distance independent. Instead, the rental charges differ by band:

<sup>&</sup>lt;sup>300</sup> BT Group response to S135 Notice of 28 September 2012 [X]

Feature	Band A	Band B	Band C	Weighted average
1Gbit/s	7,782	9,227	13,450	8,086
1Gbit/s Extended reach	15,564	17,009	21,232	15,691
10Gbit/s	[≻]	[⊁]	[×]	[×]
10Gbit/s Extended reach	[×]	[×]	[×]	[ <b>X</b> ]

### Figure A12.42: Ethernet Backhaul Direct (EBD) rental charges (£ excluding VAT)

Source: Openreach price list, BT Group response to S135 Notice of 28 September 2012<sup>301</sup>

A12.216 The EBD volumes provided are not split by band. We have obtained information from the BCMR Consultation analysis that suggests that the majority of the circuits are in Band A. We have used the split between the different bands to arrive at a weighted average price as our start charge for EBD services.

# **Discounts**

A12.217 In the base year revenue reconciliation analysis Openreach submitted<sup>302</sup>, it showed that, while no Metro offer discount has been applied to services, some EAD services have been offered with a minimum term discount. Such discounts are offered only to a very limited extent in the Ethernet market and accounted for a very small percentage of Ethernet revenues in 2011/12.<sup>303</sup> Hence, given that their amount is not significant, we have decided not to take any discount into account for the purpose of setting start charges.

# **Usage factors**

- A12.218 We received base year data from BT in the form of service level costs, split by component. We also received from BT the matrix of usage factors that allow us to convert from unit component costs to unit service cost for the network component costs. Usage factors describe how much components are used in the provision of TI and Ethernet services.
- A12.219 We have calculated the costs allocated to each service by multiplying the usage factors by the amount applied to relevant components. The matrix of component-to-service usage factors and the individual values of the usage factors incorporate BT's cost allocation methodologies as set out in its Detailed Attribution Methods (DAM).<sup>304</sup> We have identified the following two main types of costs.<sup>305</sup>
  - Network component costs the calculation of the cost of service provision represents the utilisation of one or more network components, and its cost is therefore determined by an attribution of component costs.
  - Administrative and other costs typically these were costs that were allocated on a top-down basis, for example, on a pro rata basis using full-time equivalents

<sup>&</sup>lt;sup>301</sup> BT Group response to S135 Notice of 28 September 2012 [X]

<sup>&</sup>lt;sup>302</sup> BT Group response to S135 Notice of 28 September 2012 [X]

<sup>&</sup>lt;sup>303</sup> BT Group response to S135 Notice of 28 September 2012 [X]

<sup>&</sup>lt;sup>304</sup><u>http://www.btplc.com/Thegroup/RegulatoryandPublicaffairs/Financialstatements/2012/RFS\_2012.p</u> <u>df</u>

<sup>&</sup>lt;sup>305</sup> See Appendix 1.2 of BT's RFS 2012:

http://www.btplc.com/Thegroup/RegulatoryandPublicaffairs/Financialstatements/2012/index.htm

(FTE). Component costs were allocated onwards to services based on volumes multiplied by usage factors for each product.<sup>306</sup>

A12.220 We have also used usage factors in order to convert the service volume forecasts provided by BT into corresponding component volumes. In turn, these component volumes are used to forecast total component costs in conjunction with other assumptions such as AVEs and CVEs. Usage factors are therefore an important part of the steps involved in our forecasting methodology. To check the accuracy of the usage factors submitted by BT, we reviewed the data received from BT Wholesale and Openreach relevant for the calculation of the network component and service costs as summarised below.

# Usage factors for TI services

- A12.221 BT Wholesale provided usage factors in greater detail than is available in Appendix 1.2 of the RFS. For example, BT Wholesale provided usage factors for RBS 2Mbit/s Local End and for 2Mbit/s local end for CLZ and non-CLZ areas separately. We carried out the following exercises to check the accuracy of the submitted TI usage factors.
  - We calculated component volumes by summing the product of the volumes of each service and the relevant service-to-component usage factors. The results of this calculation were compared to the component volumes reported in the Network Activity Statement (Appendix 1.1 of the 2011/12 RFS).
  - Using the 2011/12 cost and volume data BT Wholesale had provided, we calculated the matrix of unit component costs and unit service costs for all services in the TI basket using BT's CCA FAC methodology.<sup>307</sup> Cost usage factors were derived by dividing each service-to-component unit cost by the relevant total component unit cost. The service unit costs and component unit costs we calculated were checked against those reported in Appendix 1.2 of BT's 2011/12 RFS. We then compared the usage factors calculated using this method with those submitted by BT Wholesale.
- A12.222 We found that the usage factors for certain service-by-component combinations, including SDSL Rental to E side copper current and RBS Sub 2Mbit/s local end to PC rental 64Kbit/s link local end, were incorrect because the service volumes BT Wholesale used in its calculations were incorrect. As a result, we have decided to adjust the usage factors for these service-by-component combinations using information from the 2011/12 RFS and cost and volume data submitted by BT Wholesale. For the usage factors which reconciled to the 2011/12 RFS, we have used those submitted by BT Wholesale.

# **Usage factors for Ethernet services**

A12.223 Openreach provided us with usage factors to a similar level of detail as that provided in Appendix 1.2 of the RFS, which sets out usage factors mappings of super components to service groups in the low bandwidth AISBO market.

<sup>&</sup>lt;sup>306</sup> We model administrative and other costs on a service basis (i.e. rather than component). As a result, for this cost type we do not use usage factors to convert component costs into service costs.

<sup>&</sup>lt;sup>307</sup> This follows the same structure as Appendix 1.2 of BT's RFS – "Calculation of FAC based on component costs and usage factors".

- A12.224 There are eight super components used by Ethernet services, each of which are made up of more detailed "cost components".<sup>308</sup> The usage factors based on super components are weighted averages of the usage factors based on the underlying components. Our view is that it is more precise to use usage factors based on components and on this basis we requested usage factors based on components. We were informed by Openreach that it would not be possible for it to provide usage factors at the component level as it only performs usage factor mapping at the super component level and anything below this level would not be audited or checked.<sup>309</sup> We accepted Openreach's views on this and modelled costs on a super component level.
- A12.225 Similarly, the service groups reported in the RFS are made up of the individual service variants which are sold by Openreach.<sup>310</sup> The usage factors based on service groups are therefore a weighted average of the usage factors based on the individual service variants. Our view was that it is more precise to use usage factors based on individual service variants if the mix of individual service variants within a service group changes during the forecasting period then the service group usage factors (a weighted average) based on 2011/12 volumes might not be appropriate for forecasting costs in subsequent years. For this reason, we requested from Openreach usage factors for individual service variants (i.e. the same level of service disaggregation used in the volume and revenue data provided).
- A12.226 Openreach was unable to provide usage factors to the same level of service disaggregation as had been provided for volumes and revenues. We have therefore used the service group usage factors to model costs. This implicitly assumes that the proportions of service variants within service groups remain constant over the forecasting period.<sup>311</sup>
- A12.227 Openreach did not provide any usage factors for high bandwidth AISBO services (above 1Gbit/s) which fall within the Ethernet basket. Following discussions with Openreach's costing team, we decided to calculate usage factors for above 1Gbit/s ourselves using the 2011/12 cost and volume data which had been provided. To do this, we calculated the matrix of unit super component costs and unit service costs for all services in the Ethernet basket using BT's CCA FAC methodology.<sup>312</sup> Usage factors were derived by dividing each service-to-super component unit cost by the relevant total super component unit cost. We also used this exercise to assess the accuracy of the usage factors Openreach provided for up to and including 1Gbit/s services in the Ethernet basket by comparing our results with the submitted usage factors. We found that the usage factors Openreach had submitted reconciled with the cost data it had provided and Appendix 1.2 of the 2011/12 RFS.
- A12.228 As an additional check, we calculated super component volumes by summing the product of the volumes of each service and the relevant service-to-super component usage factors we had calculated. The results of this calculation were

<sup>&</sup>lt;sup>308</sup> For example, the "Wholesale & LAN extension services fibre etc" super component includes what used to be defined as "Wholesale & LAN extension services fibre etc" as well as "Ethernet Access Direct electronics", "Ethernet Access Direct fibre", "Ethernet Access Direct Rental", "Other Ethernet Rental" etc.

<sup>&</sup>lt;sup>309</sup> Ofcom meeting with Openreach on 3rd October 2011.

<sup>&</sup>lt;sup>310</sup> For example, the WES 100Mbit/s rentals service group includes standard WES 100Mbit/s rentals, WES Local Access 100Mbit/s rentals and WES Aggregation 100Mbit/s rentals.

<sup>&</sup>lt;sup>311</sup> As noted above, we have made a consistent assumption when modelling revenues.

<sup>&</sup>lt;sup>312</sup> This follows the same structure as Appendix 1.2 of BT's RFS – "Calculation of FAC based on component costs and usage factors".

compared to the component volumes reported in the Network Activity Statement (Appendix 1.1 of the 2011/12 RFS). We found that the usage factors we had calculated from the cost and volume data reconciled to those in the Network Activity Statement.

A12.229 Following these checks, we decided to use the usage factors Openreach submitted, and, for services not reported in the RFS, those we had calculated from the 2011/12 cost and volume information.

# Ethernet basket transition cost adjustment

- A12.230 During the course of the charge control period, customers are forecast to migrate from legacy to new Ethernet circuits.<sup>313</sup> Openreach has withdrawn certain bandwidths of WES/WEES and BES circuits from new supply<sup>314</sup> and is encouraging existing purchasers of legacy Ethernet circuits to migrate to the new Ethernet products.<sup>315</sup>
- A12.231 In Section 20 of this Statement, we explain that the adoption of the MEA approach needs to be consistent with the expectation that an efficient operator will recover its costs. We have also explained that it may not be possible for even an efficient operator to move seamlessly from one MEA to another, as there may be transition costs in moving from one technology to another.
- A12.232 We noted that the legacy Ethernet services had higher operating costs than the new Ethernet services. In order to migrate customers to the new Ethernet service, and so benefit from these lower costs, upfront costs needed to be incurred. The MEA approach we proposed to adopt does not take into account the transition costs in migrating from legacy to new Ethernet services. This poses a risk that even an efficient operator will not be able to seamlessly adopt the MEA at all points in time.
- A12.233 As explained in Section 20, following our assessment of responses to the consultation we have modified our methodology for calculating the transition cost adjustment. Our adjustment for transition costs will now be based on the transition costs associated with legacy customers who are not forecast to migrate over the charge control period. We have made no allowance for transition costs for customers who are forecast to migrate, as the connection costs to new services are already included in the cost base. As in the LLCC Consultation, we consider that an appropriate measure of the costs of migrating customers on legacy Ethernet services to new Ethernet services is the underlying cost of connecting these customers to the MEA services (EAD and EBD).
- A12.234 We have therefore calculated the transition cost adjustment that will be allowed to Openreach on the basis of (i) the volume of customers forecast to be renting WES, WEES and BES circuits in the final year of the charge control (2015/16) and (ii) the

<sup>&</sup>lt;sup>313</sup> By legacy Ethernet, we mean services such as WES, WEES and BES. By new Ethernet we mean services such as EAD, EBD and BTL.

<sup>&</sup>lt;sup>314</sup> Openreach announcement of 31 January 2011, available at: <u>https://www.openreach.co.uk/orpg/home/updates/briefings/ethernetservicesbriefings/ethernetservices</u> <u>briefingsarticles/eth00411.do</u>

<sup>&</sup>lt;sup>315</sup> For example, Openreach has offered reductions on EAD connection fees for CPs migrating from legacy Ethernet products. See:

http://www.openreach.co.uk/orpg/home/updates/briefings/ethernetservicesbriefings/ethernetservice

predicted average EAD connection unit costs over the charge control period. We have carried out the following steps to calculate the transition cost adjustment.

- Each of the WES, WEES and BES services that will need to be migrated to new Ethernet services were assigned a corresponding MEA service (i.e. an EAD/EBD service of the same / similar bandwidth).
- The forecast rental volumes of the relevant WES, WEES and BES services in the final year of the charge control were multiplied by the forecast average connection costs of the corresponding MEA services over the charge control period.
- A12.235 Using this methodology, we have calculated a transition cost adjustment equal to approximately £22m. In our cost forecasting, we have taken into account the transition cost adjustment by assuming that it is recovered over the course of the charge control. As a result, we have applied the transition cost adjustment in the model by adding one third of our estimated migration credit to the forecast cost stack at the end of the charge control in 2015/16.

# Administrative and other costs

A12.236 BT has a number of administrative cost components that do not have associated volumes, as shown in Figure A12.43 below. Usage factors for these components represent the proportion of total admin costs attributed to a particular service. Without volumes, we cannot use the AVE/CVE relationship to forecast how such costs change in the future. For some components, all the costs are allocated across the leased lines markets, whilst others are spread across other regulated wholesale markets as well as unregulated markets.

Cost component	Total costs allocated to all markets (£m)	Total costs allocated to PPCs (£m)	Total costs allocated to Ethernet services up to 1Gbit/s (£m)
Edge Ethernet ports	5	1	-
Core/Metro connectivity	66	9	-
MSAN-Metro connectivity link	29	14	3
Service centres - assurance	45	-	9
Sales product management	20	0	6
Service centres – provision	123	0	50
DSLAM capital/maintenance	214	0	-
SG&A partial private circuits	28	27	-
SG&A private circuits	7	6	-
Very High Tisbo Equipment Depn	0	0	-
High Tisbo Equipment Depn	4	4	-
Access Cards (other services)	45	3	37
AISBO Excess Construction	13	-	13

#### Figure A12.43: Administrative and other costs in 2011/12

Source: Appendix 1.3.1 of BT's 2011/12 Regulatory Financial Statements.

A12.237 Both BT Wholesale and Openreach provided detailed allocations for each of these components to the individual services. We have used this as the base year data.

This avoids the need for multiplying these components with their respective usage factors.

- A12.238 The approach adopted in LLCC 2009 for forecasting such costs was based on calculating AVEs and CVEs for the relevant components based on their GRC weightings, and then forecasting these costs according to service volume (rather than component volume) changes.
- A12.239 We do not believe this approach is appropriate for this charge control. The implied AVEs and CVEs are mostly between 0.5 and 0.75. With the dramatic changes in volumes, this implies significant changes in the unit costs at the service level. Total admin costs are also forecast to increase very significantly, at a rate which implies a cost volume relationship well above the weighted average CVE in the base year. Since these costs are allocated on a top-down basis, we believe that as volumes increase they would attract a higher allocation of these costs, and the reverse would apply when volumes decline. The AVEs and CVEs by service in the base year are in effect a snapshot based on current allocation methodologies.
- A12.240 We have adopted a modified approach whereby we aggregate these types of costs at the basket level (rather than at service level), and forecast them according to the total number of circuits in the basket. This results in changes to unit service costs which are more consistent with the expected change in admin costs. We have forecast admin costs according to the following formula:

Admin-cost<sub>t</sub> = Admin-cost<sub>t-1</sub> \* (% change circuit volumes in basket<sub>t</sub>\* CVE + 1) \* (1 – efficiency)

A12.241 For the purposes of the admin cost forecasts, we have used a CVE of 0.57, which is consistent with the overall weighted average pay and non-pay CVEs. We note that this formulation is consistent with our general approach to forecasting operating costs.

# **Reallocation of costs between TI and Ethernet baskets**

- A12.242 Volumes and revenues are expected to migrate significantly from TI services to Ethernet services over the charge control. The number of Ethernet circuits is expected to grow, while the number of TI circuits is expected to fall. These changes are going to largely offset each other, so that the overall impact on leased line revenues is relatively modest.<sup>316</sup>
- A12.243 Many of the costs incurred to deliver TI and Ethernet services are common. For example, assets (such as duct, land and buildings) as well as operational and administration costs that are used to support leased lines across the two markets. Consequently, many of the same costs incurred in supporting the SDH networks in place at the beginning of the period will still be incurred in operating the Ethernet infrastructure we expect to be in place by the end of the charge control period.
- A12.244 Cost components are defined in BT's system such that TI and Ethernet services do not share the same underlying cost components, even though these components use the same underlying assets. So, if TI volumes fall by 75%, the unit cost of the

<sup>&</sup>lt;sup>316</sup> Across the two markets, there will be a net decline in the number of circuits primarily due to the large volume of low bandwidth TI services not offset by growing Ethernet services. Before the impact of Ofcom's regulation, we expect that the total revenue from leased lines markets would change by less than 5% per annum across the two markets.

duct allocated to TI at the start of the period would increase significantly, to reflect the fact that fixed costs would then only be allocated over a quarter of the original volumes. Conversely, if Ethernet volumes rise by 50% the unit cost allocated to Ethernet would fall significantly. We consider that this is not an accurate prediction of the true cost evolution as we would expect BT to allocate costs to reflect the changing use of the assets. As a result, there is a need to explicitly reallocate some costs between the TI and Ethernet baskets.

- A12.245 We have decided to reallocate capital and operating costs from the TI basket to the Ethernet basket.
- A12.246 In the LLCC 2009, we addressed the issue through reallocation of some shared costs from the declining services to the growing services. We have made a similar adjustment for this charge control. Our approach for total costs in turn is described below.

# We have decided to reallocate a proportion of non-marginal total costs

- A12.247 Over the period, we expect BT to reallocate common costs to reflect the changing use of that network. This means that BT will allocate fewer costs to declining services, and more to growing services. Specifically, the share of total costs allocated to TI will fall reflecting the lower use of the network by TI circuits, and the share of costs allocated to Ethernet services will rise.
- A12.248 For both capital and operating costs, we have adopted a similar approach as set out in the LLCC 2009<sup>317</sup> in determining the amount of total costs to reallocate. In detail, we decided to reallocate from the TI to the Ethernet basket a share of non-marginal total costs. The LLCC 2009 outlined different approaches to reallocating fixed and common costs. These are summarised in Figure A12.44 below.

Method	Description	Applicable to LLCC?
Equi-proportional mark-up	Common costs attributed in proportion to direct and indirectly attributable cost of the service.	Yes. Can attribute non-marginal costs relative to marginal costs of the TI and Ethernet services.
Relative outputs	Common costs attributed in proportion to their share of total output.	Yes, by looking at changes in TI and Ethernet service volumes.
Revenue method	Common costs attributed in proportion of share of total revenue.	No, because cost allocation method was used to determine prices, which in turn determined revenues.
Activity-based costing	Common costs allocated based on activities undertaken to provide service.	No, because underlying cost components were not common across TI and Ethernet services.
Ramsey approach	Common costs allocated on basis of relative demand elasticities.	No, because of the burden of information required to estimate demand elasticities.

#### Figure A12.44: Common approaches to cost allocation

Source: "Annex I: Background to cost allocation", Office of Fair Trading, 2006. http://www.oft.gov.uk/OFTwork/markets-work/public-information

A12.249 Figure A12.44 above shows that of the five different approaches outlined, two – 'the Equi-proportional mark-up' and 'the Relative Output' – are applicable to our charge

<sup>&</sup>lt;sup>317</sup> See paragraphs A7.179 to A7.193 of the LLCC 2009 Statement.

control. Both of these approaches require the calculation of the proportion of marginal costs in total costs.

- A12.250 The equi-proportional mark-up approach requires the calculation of marginal costs for both the TI and Ethernet services in order to determine relative marginal costs. This involves a number of iterative steps that require the conversion of marginal component costs to service costs to determine the relative costs, applying this percentage to the non-marginal component costs, and then converting this to service costs.
- A12.251 The relative output method is more straightforward to apply. This takes the nonmarginal costs and reallocates these costs based on changes in relative output.
- A12.252 We consider that the most appropriate proportion of costs is given by the proportion of TI customers in the base year predicted to migrate to Ethernet services by the final year of the charge control.<sup>318</sup> This is the approach we adopted in the LLCC 2009, modified to take into account the expectation that not all TI customers will migrate to Ethernet services.
- A12.253 We have quantified the share of non-marginal costs on the basis of the rate of migration/volume decline in TI volumes that is likely to move towards Ethernet services. The BCMR market research indicates that 29% of TI customers are likely to move from TI to Ethernet services by the final year of the charge control.<sup>319</sup> Our reasons in support of this assumption are set out in Section 19 of this Statement.
- A12.254 We have followed these steps.
  - We have calculated total costs, including Admin costs, to be recovered based on the volume forecasts, AVEs, CVEs and efficiency based on the formulae set out in tables Figure A12.36, Figure A12.37, Figure A12.38 and Figure A12.39.
  - As with the LLCC 2009 approach, we have calculated the proportion of these total costs that are 'non-marginal', i.e. fixed with respect to volume changes. This is done by multiplying the capital and operating cost forecasts for each component with their respective AVEs and CVEs. For example, if a component has a CVE of 0.6, this implies that 40% of costs (i.e. 1-0.6) are non-marginal.
  - Of the non-marginal costs, we have allocated a proportion in line with the proportion of TI customers in the base year predicted to migrate to Ethernet services by the final year of the charge control. This proportion is based on our market research finding that 29% of TI customers are likely to move from TI to Ethernet services.<sup>320</sup> We have assumed that these non-marginal, or fixed, costs do not vary with volume and in practice these costs will be allocated on a top-down basis as the underlying volumes change.
- A12.255 The total amount of costs that we have reallocated to the Ethernet services is £46m, of which £39m is reallocated to those Ethernet services outside the WECLA which comprise the Ethernet basket.

<sup>&</sup>lt;sup>318</sup> See Section 19 of this Statement.

<sup>&</sup>lt;sup>319</sup> See Jigsaw Research, Business Connectivity Services Review, 11 October 2011, pp 62, (section 8.6 "Replacing leased lines with ADSL or Ethernet").

<sup>&</sup>lt;sup>320</sup> See Jigsaw Research, Business Connectivity Services Review, 11 October 2011, pp 62, (section 8.6 "Replacing leased lines with ADSL or Ethernet").

A12.256 Figure A12.45 below sets out the steps we have described above in calculating the amount to be reallocated.

Figure A12.45:	Approach to	reallocation	of total co	osts from <sup>·</sup>	TI to	Ethernet	basket
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Description of approach		Comments
Total costs in 2015/16 in TI basket	£300m	
Of which non-variable costs in 2015/16	£157m	This is the amount of total costs that does not vary with the volume of TI services. This amount is calculated by multiplying the cost forecasts for each component with their respective CVEs (for operating costs) and AVEs (for capital costs). For example, for operating costs if a component has a CVE of 0.6, this would imply that 40% of operating costs (i.e. 1-0.6) are non-variable.
Share of TI customers expected to migrate to Ethernet services.	29%	From Jigsaw Research market research
Reallocation to all Ethernet services	£46m	These costs are calculated as 29% * £157m and are reallocated to Ethernet services.
Reallocation to Ethernet services outside the WECLA	£39m	These costs are calculated in proportion to the number of Ethernet circuits in the WECLA.

### We have decided to reallocate £39m in total to the Ethernet basket

A12.257 We therefore have decided to reallocate £39m from TI to those Ethernet services outside the WECLA which comprise the Ethernet basket. This reallocation reduces the charge control for TI from RPI+8.25% to RPI+2.25%. This impact is offset by a change in the charge control for Ethernet basket from RPI-13.75% to RPI-11.50%. There is a neutral impact on BT's total revenues.

# **Results of our modelling**

- A12.258 From the information above, the model produces cost forecasts for each service for each year. These are compared against the service revenues, and the values of X are then calculated so that in the final year forecast revenues and costs are equal.
- A12.259 Sections 19 and 20 of this Statement set out our approach to the charge controls. Based on this analysis, we have set the following controls:
  - for the TI basket, a charge control of RPI+2.25%; and
  - for the Ethernet basket, charge control of RPI-11.50%.
- A12.260 The above values of X are the amount by which TI and Ethernet charges would need to reduce in real terms in order to bring them into line with forecast costs, including a return on capital, by the end of the charge control.

# Annex 13

# **PPC** Points of Handover

# Introduction

A13.1 In this Annex, we set out our conclusions on the charge controls for PPC POH services.

# Summary

- A13.2 Given that we recently set some of the PPC POH charges to LRIC (in the POH Statement published in September 2011<sup>321</sup>), our view is that these charges are already set at an efficient level. We have therefore decided not to make any starting charge adjustments to the services covered by the POH Statement.
- A13.3 For the PPC POH charges that were not part of the recent POH Statement, we have also decided not to make any starting charge adjustments for the following reasons:
  - with TI services in decline, the expected volumes of new connections are small and so is the corresponding revenue. We therefore consider that bottom-up modelling of these charges would not be proportionate, and
  - our analysis of the rental charges not covered by the POH Statement (Type I rental) shows that they are generally consistent with the LRIC estimates. As such, we consider that it would not be appropriate to have any starting charge adjustments.
- A13.4 As explained in Section 19 of this Statement, we have decided to place all of the current POH charges within the wider TI basket, with a sub-basket of RPI-0%. The POH charges will also be subject to the each and every charge control of RPI+10%.

# Background

- A13.5 A POH is an important component which enables infrastructure-based competition. Operators are often reliant on BT for PPCs to link end-user sites back to their own respective core networks. In essence, a POH is the link that connects BT's circuits to an operator's own network. Once it is set up, the operator can hand over as many individual circuits as the capacity of the link allows, at no extra cost.
- A13.6 Such a link comprises the physical infrastructure (fibre and duct) and terminating equipment. In the LLCC 2009, we characterised PPC POHs as being either a Type I or a Type II. Figure A13.1 below illustrates those two Types, which can be summarised as follows.
  - Type I PPC POHs are purchased by CPs on wholesale terms. There are 212 different charges within this category comprising 108 rental, 100 connection, three additional charges and a bearer charge; and

<sup>&</sup>lt;sup>321</sup> Ofcom's Statement entitled '*LLCC PPC Points of Handover pricing review*', 21 September 2011: <u>http://stakeholders.ofcom.org.uk/binaries/consultations/revision-points-handover-pricing/statement/final-statement.pdf</u>

 Type II PPC POHs are legacy products that were initially purchased by CPs from BT on retail terms but have subsequently been migrated onto wholesale PPC terms. There are four rental charges that apply to the existing installed base of Type II PPC POHs. Connection charges no longer apply since new Type II PPC POHs are no longer available.

# Figure A13.1: Types of POH

# Type I POH



- A13.7 BT recovers its costs through a combination of POH connection and rental charges. Customer specific capital costs are recovered through connection charges, which include any equipment that BT installs at either end of the link, and that element of the fibre pair between BT's exchange building and the CP's premises that it cannot re-use (i.e. the blown fibre element). Other costs include contractual maintenance charges from BT's equipment suppliers and are recovered through the rental charges.
- A13.8 BT also levies additional charges on all circuits delivered over a Type I POH, aimed at recovering that element of costs not recovered via the previous two charges. We refer to them as the 'Type I additional POH charges' (and comprise of the three additional POH charges and the bearer charge as described in Para A13.6).

# **Our proposals in the LLCC Consultation**

# We proposed no starting charge adjustments for Type II rental nor Type I additional POH charges, but we proposed to impose a charge control of RPI-0%

- A13.9 In the LLCC Consultation, we distinguished between Type I POH charges, Type I additional POH charges and Type II charges.
- A13.10 Figure A13.2 below showed a breakdown of the PPC POH revenues from BT's RFS.<sup>322</sup> The numbers included in Figure A13.2 are based on the 2010/11 RFS and therefore do not reflect the impact on revenues of the adjustments we mandated to Type I additional POH charges and Type II rental charges in the POH Statement. In

<sup>&</sup>lt;sup>322</sup> See page 75 of BT's 2011/12 RFS:

http://www.btplc.com/Thegroup/RegulatoryandPublicaffairs/Financialstatements/2012/RFS\_2012.pdf

2010/11, revenue from all PPC POH charges accounted for £8m out of BT's total TI revenue of £898m. This includes both connection and rental charges.

Type of POH	Charging category	Number of charges per category	2010/11 revenue
	Connection	100	£0.16m
Туре І	Rental	108	£3.78m
	Additional charges	4	
Type II Rental 4		4	£4.29m
	Total	£8.23m	

- A13.11 We noted that the current and expected future demand for new Type I connection charges was very low. In 2010/11, the total revenue for Type I connection charges was just £160k. BT Wholesale advised us that there were just three new PPC POH connections in 2010/11.<sup>323</sup> The figures for 2011/12 were expected to be similar.<sup>324</sup> This is because TI services were declining as customers gradually migrated to alternative services, resulting in an increase in spare capacity on existing POH and a consequent low requirement for new POH.<sup>325</sup>
- A13.12 As illustrated by Figure A13.2 above, the revenue for PPC POH rental charges was much more significant. In 2010/11, total PPC POH rental revenue was approximately £8m.
- A13.13 We noted that in the POH Statement we had developed a bottom-up LRIC model to set the charges for Type II rental and Type I additional POH charges. These eight charges covered over 50% of the total TI PPC POH revenue for 2010/11 (see Figure A13.2 above). We considered that these charges were already set at an efficient level, since they were based on the estimated LRIC for the relevant services in September 2011.
- A13.14 As a result, we proposed in the LLCC Consultation that no starting charge adjustments were needed for Type II rental nor Type I additional POH charges. We proposed to impose a charge control of RPI-0% on them.

# We proposed no starting charge adjustments for Type I connection and rental charges

A13.15 Type I connection and rental charges were not covered by our decision in the POH Statement. However, we concluded in the POH Statement that LRIC is more appropriate than a FAC approach for POH charges generally. We consider that this

<sup>&</sup>lt;sup>323</sup> Although the RFS reported 55 new connections (p.75 of the 2010/11 RFS), BT explained that there were three connections and the remaining reflected [ $\approx$ ], see BT Wholesale response to S135 Notice of 21 May 2012[ $\approx$ ].

<sup>&</sup>lt;sup>324</sup> On 1 October 2011, BT provided a spreadsheet detailing new POH connections for 08/09, 09/10, 10/11 and the first half of 2011/12 as 100, 51, 3 and 2 respectively.

<sup>325 [8]</sup> 

reasoning also applies to Type I connection and rental charges. However, in the LLCC Consultation, we reviewed whether there was a need to make any starting charge adjustments to those charges.

### Type I connection charges

A13.16 As noted above, there were just three new Type I connections in 2010/11, with total resulting revenues of less than £160k. Minimal new connections are expected in future. As there are 100 different connection charges, modelling the LRIC cost of each connection would be a time-consuming and costly task. We did not consider that it would be an appropriate use of regulatory resources to model charges for which there is limited demand, and where the impact on customers and competition would be minimal. We therefore proposed to make no starting charge adjustments to these charges.

### Type I rental charges

### LRIC approach

- A13.17 There were 108 Type I rental charges which were not covered by the POH Statement. In the POH Statement, we set the Type II rental charges and Type I additional POH charges to LRIC using a bottom-up LRIC model. We considered whether we could use the same approach for the Type I rental charges.
- A13.18 The Type I rental charges relate to maintenance costs. BT has 108 such charges. Modelling the exact cost of all of these 108 charges would entail significant resource. However, we were able to review a representative sample of these charges using the model we developed for the POH Statement.
- A13.19 We used the model developed for the POH Statement to calculate LRIC estimates for nine of these maintenance charges.<sup>326</sup> The nine maintenance charges that were reviewed covered each of the main groups of POH charges. These nine charges represented over 50% of Type I POH rental revenues.
- A13.20 Our calculations used data on failure rates and equipment costs which were published as part of the POH Statement. Where alternatives existed for POH configurations, we considered each combination of handover type (CSH, ISH extended and ISH) with each handover bandwidth (2.5Gbit/s, 622Mbit/s and 155Mbit/s). We then compared our estimates of LRIC, with BT's rental charge.
- A13.21 Our review showed that the average level of rental charges was consistent with our LRIC estimates. Specifically, we found that the weighted average price level was consistent with our weighted average LRIC estimate, although some individual charges varied from 15% above our LRIC estimate to 15% below our LRIC estimate.
- A13.22 We considered whether to make adjustments to bring the individual charges into line with our LRIC estimates. We considered that this would not be appropriate as our analysis found the overall price level was in line with LRIC, and increasing some charges while decreasing others would be disruptive to customers. We also noted that there was a margin for error in our LRIC estimates, which may make such finetuning of charges inappropriate. Finally, we considered that, as all POH are

<sup>&</sup>lt;sup>326</sup> The nine charges chosen are SMA-1, SMA-4 and SMA-16 dual fibre 1300nm each for ISH, ISH extension and CSH POH.

purchased by external customers, BT does not have a strategic incentive to increase some POH charges at the expense of others. Based on this analysis, we did not consider adjustments appropriate.

A13.23 We considered extending the model to include the rental charges for which we did not have detailed data. We considered that this would not be an appropriate use of regulatory resources. The charges reviewed covered each of the main groups of POH charges, and accounted for over 50% of revenues. We had no reason to believe that the sample used was unrepresentative.

# Summary of our proposals

- A13.24 In summary, we proposed not to make any starting charge adjustments for PPC POH. We considered this approach to be appropriate because:
  - the Type I additional POH charges covered in the POH Statement had recently been set to LRIC;
  - there are expected to be minimal new Type I POH connections in future, therefore modelling the costs of the 100 connection charges would have involved a disproportionate use of regulatory resources;
  - for the BT Type I rental charges, our bottom-up LRIC analysis of a sample of these charges was consistent with the LRIC approach applied to the Type I additional POH charges; and
  - the POH rental charges (excluding the additional POH charges set via the POH Statement) account for a small percentage of the total PPC cost.<sup>327</sup>
- A13.25 Consequently, as set out in Section 5 of the LLCC Consultation, we proposed to place these charges in the TI basket with a sub-cap of RPI-0%. We considered it to be appropriate to err on the side of ensuring lower rather than higher charges. This is because POH services are particularly important for promoting competition, as they are essential for infrastructure competition. We also considered that POHs may be less subject to economies of scale than TI circuits as a whole. This is because POH services are supported by a smaller equipment base than other TI services. Thus, as POH volumes fall, CPs can consolidate the remaining circuits more easily. Therefore, as volumes fall, the unit costs of providing these services may not increase in the same way as other TI services.

# **Consultation responses to the LLCC Consultation**

- A13.26 We received responses in relation to our above-mentioned proposals from only two respondents.
- A13.27 BT agreed with our proposals for the treatment of POH including the exclusion of POH costs from our base year costs, but it argued for two amendments.
  - BT considered we should remove POH on a LRIC basis, and not a FAC basis, when making an adjustment to the base year costs. This would then be consistent with our POH analysis.<sup>328</sup>

<sup>&</sup>lt;sup>327</sup> We estimated that these rental charges would account for a maximum of 3% of the charge for a 2Mbit/s PPC depending on the specific PPC and POH deployment.

- BT considered we should use the same cap on POH as on the TI basket because there is less opportunity for efficiency gains, and it is more challenging to achieve cost reductions if POH maintenance costs increase.<sup>329</sup>
- A13.28 CWW agreed with our proposals in general. However, it argued that, to prevent BT rebalancing POH charges between type I and type II, we should either place Type I and Type II POH in separate sub-baskets or; place a sub-cap of RPI+5% on individual POH charges. CWW noted that this was a particular concern given our proposal to use prior financial year weighting, as CWW expects to see a shift in volumes to Type 1 POH.<sup>330</sup>

# **Our response and conclusions**

- A13.29 The specific issues raised by these respondents relate to our basket design and to our base year cost adjustments. We have considered these responses in reaching our conclusions on these matters as set out in Section 19 of this Statement, which also sets out our views on these responses.
- A13.30 In relation to our assessment of POH charges, we received no stakeholder comments. For the reasons set out above (as per the LLCC Consultation), we have therefore decided not to make any starting charge adjustments for PPC POH charges and we have also decided to place them in a single TI basket with a sub-cap of RPI-0%.

<sup>&</sup>lt;sup>328</sup> See BT non-confidential response to the LLCC Consultation page 17.

<sup>&</sup>lt;sup>329</sup> See BT non-confidential response to the LLCC Consultation page 48.

<sup>&</sup>lt;sup>330</sup> See CWW non-confidential response to the LLCC Consultation page 72-73.

# Annex 14

# Cost of capital

# Introduction

- A14.1 In this Annex, we set out our estimate of BT's cost of capital used in imposing the charge controls covered by this Statement.
- A14.2 We estimate and apply different costs of capital for different parts of BT because the different parts of BT have different systematic risk profiles. We estimate the rate for BT Group plc (BT Group), this is then split into a rate for the copper access network (Openreach), and the rest of BT, which is not covered by the Openreach rate (the 'Rest of BT).
- A14.3 The cost of capital is important for setting charge controls, particularly as it makes up a significant proportion of the cost of most regulated telecommunications services. It is also particularly important to investors to provide them with a reasonable expectation that they can recover their investment and make a reasonable rate of return.
- A14.4 This means, in turn, that we attach weight to the objective of promoting regulatory predictability by ensuring a consistent regulatory approach over appropriate periods, provided that we are satisfied that the circumstances of a specific case do not warrant us taking a different approach.

# Summary

A14.5 We have estimated the pre-tax real cost of capital for the Rest of BT to be used in these charge controls to be 6.9%. This is set out in Figure A14.1 below, along with the estimates for BT Group and Openreach, respectively.

	Openreach	BT Group	Rest of BT
Real risk-free rate	1.3%	1.3%	1.3%
Inflation	2.8%	2.8%	2.8%
Nominal risk-free rate	4.1%	4.1%	4.1%
Equity beta (mid-point)	0.90	1.01	1.13
Asset beta (mid-point)	0.60	0.67	0.74
ERP	5%	5%	5%
Gearing <sup>331</sup>	40%	40%	40%
Debt premium	1.7%	1.7 – 2.3%	2.3%
Debt beta	0.15	0.15	0.15
Tax rate	20%	20%	20%
Pre-tax real WACC	5.9%	6.4%	6.9%
Pre-tax nominal WACC	8.8%	9.3%	9.9%

#### FigureA14.1: BT Cost of capital March 2013

A14.6 In the LLCC Consultation, we proposed to use a pre-tax real cost of capital estimate for the Rest of BT of 6.5% - as we estimated in the WBA CC Statement (along with

<sup>&</sup>lt;sup>331</sup> This is the 2 year average gearing which is used to de-lever the equity beta. We have used a current gearing level of 32% to re-lever the asset beta.

separate estimates of the cost of capital for BT Group and Openreach, respectively).<sup>332</sup> These estimates are reproduced in Figure A14.2 below.

# Figure A14.2: BT Cost of capital July 2011

	Openreach	BT Group	Rest of BT
Real risk-free rate	1.4%	1.4%	1.4%
Inflation	3%	3%	3%
Nominal risk-free rate	4.4%	4.4%	4.4%
Equity beta	0.67 – 0.94	0.77 – 1.04	0.87 – 1.14
Asset beta	0.41 – 0.55	0.46 – 0.59	0.51 – 0.65
ERP	5%	5%	5%
Gearing	50%	50%	50%
Debt premium	2%	2 – 2.5%	2.5%
Debt beta	0.15	0.15	0.15
Tax rate	24%	24%	24%
Pre-tax real WACC	5.6%	6.1%	6.5%
Pre-tax nominal WACC	8.8%	9.2%	9.7%

# Our approach to the cost of capital

### The LLCC Consultation proposals

- A14.7 In the LLCC Consultation, we proposed to use the WACC applicable to the Rest of BT for the leased lines services covered by our proposed charge controls. This was based on an assessment of the cyclicality of demand for leased lines services and, to a lesser extent, an analysis of the underlying asset base. We discussed this analysis in Section 4 of the LLCC Consultation.
- A14.8 We estimated the WACC for Openreach, BT Group and the Rest of BT, respectively, in detail in the WBA CC Statement.<sup>333</sup> In that Statement, we explained that we intended to use the WACC figures estimated in the WBA CC Statement for future relevant charge controls, provided that the estimates remain relevant. We noted that consistency is important, but that this needs to be balanced against the possible need for updating those cost of capital estimates. Specifically, we stated that:

"The cost of capital estimates for BT...have been calculated for the purposes of the WBA charge control which will apply to 2013/14. However, we intend to apply these rates to other relevant charge controls. In the case of the forthcoming WLR/LLU charge controls, for example, we note that the charge control statement is likely to be published towards the end of 2011.

We intend to apply the cost of capital estimates shown below to the relevant charge controls. However, we will review the evidence on the individual parameters at the time of the publication of these charge controls to ensure that the estimates remain relevant. If the

<sup>&</sup>lt;sup>332</sup> Table 6.3, page 97 of the WBA CC Statement:

http://stakeholders.ofcom.org.uk/binaries/consultations/823069/statement/statement.pdf

<sup>&</sup>lt;sup>333</sup> The cost of capital estimated in the WBA Statement was appealed by BT. This appeal has been concluded and the CAT upheld Ofcom's estimate for the purposes of that Statement. Full details are available at:

http://www.catribunal.org.uk/237-7278/1187-3-3-11-British-Telecommunications-plc-Wholesale-Broadband-Access-Charge-Control.html

evidence suggests that these cost of capital estimates are no longer appropriate, we will update the estimates. However, in deciding whether an update is necessary, we will have regard to the importance of maintaining a consistent approach.<sup>334</sup>"

- A14.9 That statement reflected two important considerations.
  - First, that consistency is important in order to provide investors with a reasonable expectation that they can recover their investment and make a reasonable rate of return. We believe that this creates a regulatory environment which encourages efficient investment.
  - Second, having regard to the desirability of a consistent approach, any decision would need to be appropriate in the context of any future charge control review. It would be inappropriate for us to fetter our discretion as to future charge control reviews.
- A14.10 In light of this position, we considered whether our estimate of BT's cost of capital calculated for the purposes of the WBA CC Statement remained appropriate in the subsequent WLR LLU CC Statement (which we published in March 2012).<sup>335</sup> In that Statement, we reviewed the most recent available evidence on the individual parameters to ensure that the estimates remained relevant. We concluded that they were appropriate.
- A14.11 In the LLCC Consultation, we explained that the cost of capital estimated in the WBA CC Statement remained appropriate for the proposed charge controls, without the need to update the estimate.
- A14.12 This was because our updated analysis was performed just a few months prior to the LLCC Consultation, as part of the WLR LLU CC Statement. In that Statement, we found that the WBA CC Statement estimates remained appropriate. We did not identify any reasons for a need to undertake additional analysis for the purposes of coming to a provisional view on the cost of capital to be used in the LLCC Consultation.
- A14.13 In reaching this view, we also took account of the recent CC Determination in respect of BT's appeal against our decisions in the WBA CC Statement concerning the cost of capital, as noted above. However, we explained that we would consider any movements in the cost of capital parameters prior to reaching a decision on the proposals set out in the LLCC Consultation in order to ensure that the proposed estimate of the WACC remained appropriate. We stated that, if the relevant parameters have changed materially, we would consider whether a change to our cost of capital estimates would be appropriate.
- A14.14 In the WLR LLU CC Statement, we set out why the cost of capital estimates in the WBA CC Statement remained appropriate, based on the following reasoning:
  - there had been no significant change in the majority of parameters to warrant a change in our estimates from those in July 2011;

<sup>&</sup>lt;sup>334</sup> See paragraph 6.7 to 6.8 of the WBA Statement.

<sup>&</sup>lt;sup>335</sup> See Annex 8 of the WLR LLU CC Statement

- we observed an increase in the two-year BT Group asset beta and a decrease in the risk free rate since July 2011. The exact magnitude of these opposing changes was uncertain, however we expected the net effect on the overall WACC to be small; and
- we also noted the principle set out in the WBA CC Statement that consistency is important in order to provide investors with a reasonable expectation that they can recover their investment and make a reasonable rate of return. We continue to believe that this creates a regulatory environment which encourages efficient investment.
- A14.15 In arriving at our proposal not to adjust the WACC set out in the WBA CC Statement for our provisional view on the cost of capital, we also had particular regard to:
  - the proximity of the LLCC Consultation to the WLR LLU CC Statement, including our updated analysis as published in March 2012; and
  - the small and uncertain likely impact on the overall WACC of the changes in parameter values observed since July 2011, as set out in the WLR LLU CC Statement.
- A14.16 We set out our conclusions on the cost of capital below. In particular, in relation to the parameters of the WACC, we:
  - i) explain what we said in the WLR LLU CC Statement, which we considered remained appropriate at the time of the LLCC Consultation;
  - ii) summarise the relevant consultation responses received;
  - iii) consider any new evidence which is available; and
  - iv) conclude on the appropriate estimate of each parameter value.

# Consultation responses

- A14.17 Most respondents did not comment in detail on our approach to the cost of capital. Those who did broadly agreed with our approach, however BT made specific comments in relation to some of the parameters of the WACC.
- A14.18 Most respondents who commented on our approach to the WACC agreed that Ofcom should use up-to-date information, as proposed in the LLCC Consultation. Reponses in relation to specific parameters are summarised below in relation to the relevant parameter.
- A14.19 In addition, some respondents commented on the use of the Rest of BT rate for the services covered by the current charge controls. BT and Virgin agreed that the Rest of BT WACC was the appropriate rate to use. However, TalkTalk stated that the "Rest of BT figure overstates the business risk and WACC for supplying Ethernet circuits".<sup>336</sup> We discuss this further below.
- A14.20 In light of stakeholder responses, we have set out below our considerations and conclusions on:

<sup>&</sup>lt;sup>336</sup>See TalkTalk non-confidential response to the LLCC Consultation, paragraphs 5.52 to 5.56, pages 46-47.

- i) whether we should update individual parameters values for our cost of capital calculation in the current charge controls;
- ii) whether the Rest of BT WACC is the appropriate rate to use; and
- iii) how these conclusions impact our estimate of the cost of capital to be used in the charge controls.

# Key parameter values

### The LLCC Consultation proposals

- A14.21 As set out in the WBA CC Statement, for reasons of consistency, we proposed to apply the rates, reproduced in Figure A14.2 above, in all relevant charge controls, provided that the estimates of the individual parameters would remain appropriate.<sup>337</sup>
- A14.22 We therefore considered, as part of the WLR LLU CC Statement, the individual parameters used to arrive at the cost of capital. In the LLCC Consultation, we set out the revised estimates of each of these parameters, as updated for the WLR LLU CC Statement. In summary, we did not consider that there had been a material change in the following parameters, from July 2011 to March 2012, to warrant a revised estimate:
  - debt premium;
  - inflation; and
  - equity risk premium (ERP).
- A14.23 We observed changes in the following parameters since our July 2011 estimates:
  - the risk-free rate; and
  - BT Group Beta.
- A14.24 We observed an increase in the two-year BT Group asset beta and a decrease in the risk free rate since July 2011.
- A14.25 In addition, we noted that the expected corporation tax rate for 2014/15 had fallen as a result of the March 2012 budget announcement.
- A14.26 We discuss each of these parameters in more detail below.

# Debt premium

#### The LLCC Consultation proposals

A14.27 We estimated the debt premium for BT Group to be within the range 2%-2.5% in the July 2011 WBA Statement.<sup>338</sup> This was consistent with the proposed estimate in the WBA CC Consultation.<sup>339</sup>

<sup>&</sup>lt;sup>337</sup> See paragraph 6.7-6.8 of the WBA CC.

<sup>&</sup>lt;sup>338</sup> See paragraph 6.54 to 6.78 of the WBA CC.

- A14.28 This was estimated by reference to the yield on BT's 2016 Sterling denominated bond, over and above benchmark gilt yields.<sup>340</sup> We updated our analysis to January 2012. Over the six month period (to January 2012), the spread on BT's 2016 bond, over the benchmark, remained broadly in this range. We noted that it fell below 2% in July 2011, and increased above 2.5% in November/December 2011, however it subsequently fell below 2.5%. We therefore believed that the range 2%-2.5% remained appropriate.
- A14.29 For the purposes of disaggregating the BT Group WACC, we estimated that 2% would be appropriate for Openreach and 2.5% would be appropriate for the rest of BT. This reflected the argument that a business with a lower perception of default risk (i.e. Openreach) may have a lower cost of debt than the Rest of BT. The assessment in the WBA Statement was based on comparing the debt premium for network utilities, which ranged from 1-1.5% and the BT Group debt premium which was 2-2.5% in July 2011.

#### Our conclusions

- A14.30 We received no specific consultation responses in relation to the debt premium, however we note that most stakeholders asked Ofcom to use the most recent data.
- A14.31 We have looked at the most recent spread over government bonds of BT's 2016 bond and note that the spread fell below 2% from July 2012. In December 2012, the spread was approximately 1.5%.
- A14.32 Over the 12 month period to December 2012, the average debt premium for BT's 2016 debt was 2.1% with more recent data below 2%, this suggests that the debt premium estimated for the WBA CC Statement may no longer be a reasonable proxy for the cost of BT's debt.

<sup>&</sup>lt;sup>339</sup> See paragraph 6.145 to 6.150 of the WBA CC Consultation.

<sup>&</sup>lt;sup>340</sup> We use BT's 2016 GBP bond for the purpose of estimating the debt premium for BT. This bond is the most suitable since it is the shortest-dated GBP bond in issuance by BT, and therefore is the closest match to the charge control period. We also note that GBP bonds of longer maturity exhibit similar premia above equivalent period gilts.





lune 2009 December 2009 June 2010 December 2010 June 2011 December 2011 June 2012 December 2012

Source: Bloomberg, Ofcom analysis at December 2012

- A14.33 We have also compared this to other sterling denominated BT bonds which exhibit a similar pattern, although BT's 2020 sterling denominated bond implied a debt premium of around 1.7% at December 2012.
- A14.34 The data for the year to December 2012 suggests a lower range would be more appropriate for the BT Group debt premium. Taking into account the recent fall in yields and the average spread on BT's 2016 debt, we have used a range of 1.7% to 2.3% as a proxy for the BT Group debt premium.

# Inflation

# The LLCC Consultation proposals

- A14.35 We noted in the WBA CC Statement that an inflation assumption of 3% reflected an appropriate estimate of market expectations of RPI for the purposes of estimating the WACC. The charge controls in the WBA CC Statement and the LLCC Consultation are modelled in real terms, therefore the real pre-tax WACC is used.
- A14.36 In the WBA CC Statement, we explained that we would ensure that the RPI forecast for modelling asset price changes and the RPI used to forecast the cost of capital would be consistent. We proposed to use an equivalent approach in future charge controls.
- A14.37 In the LLCC Consultation, we noted that, for the purposes of the proposed charge controls for leased lines services, we used a forecast RPI of 3% for 2015/16, where necessary. Therefore, we considered that the forecast inflation of 3% used to calculate the nominal WACC remained appropriate.

#### Our conclusions

A14.38 We received no specific consultation responses in relation to inflation used in the cost of capital, however we note that most stakeholders asked Ofcom to use the most recent data.

- A14.39 For the purposes of calculating the WACC, we have concluded that the appropriate RPI estimate is that for the final year of the charge controls. This is because it is the final year price which determines the X in the RPI + or X control. The 2015/16 RPI estimate is 2.8%.<sup>341</sup>
- A14.40 We consider that it is important that the inflation assumption used in the WACC estimate is consistent with the inflation index used by the charge controls covered by this Statement. For this reason, we are using an inflation assumption of 2.8% in our estimation of the WACC.

# Equity risk premium

### The LLCC Consultation proposals

- A14.41 We estimated the Equity Risk Premium (ERP) to be 5% in the WBA Statement. This reflected recent work by Professors Dimson, Marsh and Staunton (DMS)<sup>342</sup> from the London Business School, which tracks the average premium that investors have earned from equities (as opposed to bonds or gilts) over time.
- A14.42 In addition, we considered regulatory benchmarks, market commentary and academic/user surveys.
- A14.43 At the time of the LLCC Consultation, we did not consider that there was compelling evidence to suggest that an ERP of 5% was no longer appropriate, in particular as it was based on recent DMS evidence.
- A14.44 The latest historical ERP evidence reported by DMS, in the 2012 sourcebook, showed that the historical premium of equities over bonds for the UK was 5%. In addition, in the 2012 report, DMS suggested a long-run arithmetic mean premium for the world index of around 4.5%-5%.

# Our conclusions

- A14.45 We received no specific consultation responses in relation to the ERP, however we note that most stakeholders asked Ofcom to use the most recent data which we consider below.
- A14.46 As noted above, we cited the most recent historical ERP evidence reported by DMS in our LLCC Consultation. At the time of this Statement, the 2012 report remains the most recent report available.
- A14.47 We have also considered recent survey evidence which does not suggest that a rate of 5% is inappropriate.<sup>343</sup>
- A14.48 In addition, we have considered the latest evidence on volatility of the FTSE Allshare index. This suggests that volatility has fallen, and is closer to its long run mean. This does not support an increase in the ERP.

<sup>&</sup>lt;sup>341</sup> Inflation is calculated on the basis of the medium term RPI forecasts using annual average new forecasts from 'HM Treasury Forecasts for the UK economy: a comparison of independent forecasts' <u>http://www.hm-</u> <u>treasury.gov.uk/d/201208forcomp.pdf</u>. These forecasts were prorated to calculate forecast RPI for March.

<sup>&</sup>lt;sup>342</sup> Dimson, Marsh and Staunton "Credit Suisse Global Investment Returns Sourcebook 2011" Credit Suisse Research Institute. See paragraph 6.79-6.96 WBA Statement.

<sup>&</sup>lt;sup>343</sup> Fernandez, Aguirreamalloa and Corres, "Market Risk Premium used in 82 countries in 2012: a survey with 7,192 answers" June 2012; Graham and Harvey "The equity risk premium in 2012"
- A14.49 However, there is some evidence that the volatility itself has been more variable in recent years. That is to say, the uncertainty about market volatility has increased, and it may be that this increased uncertainty has led to higher expected returns on equities. In other words, the market may require a risk premium for the uncertainty with respect to market volatility. If this were the case, we might wish to reconsider the level at which we set the ERP.
- A14.50 It may be that this increased uncertainty is related to the financial crisis, and as this abates the uncertainty will decline. Including a risk premium for such uncertainty amounts to a departure from the underlying assumptions of the CAPM and therefore such an adjustment is not to be considered lightly.
- A14.51 We note that, although there is an interesting argument that an increase in the volatility of market volatility could result in investors demanding a higher premium above the ERP previously identified, we consider that the evidence about the persistence of such uncertainty in the future is not conclusive and the method by which we would incorporate any such risk premium into our existing methodology is also not clear.
- A14.52 We also place weight on consistency in our approach, and would be reluctant to introduce new datasets and a new methodology (i.e. consideration of the uncertainty of volatility on market returns) unless there was sufficient evidence to support its inclusion. In this instance, we do not consider that this is the case.
- A14.53 As a result, we continue to rely on the DMS report and indicators of market volatility. We therefore continue to believe that 5% remains an appropriate estimate of the ERP, in particular based on the latest (2012) DMS report.
- A14.54 We note below that the risk free rate and the ERP tend to move in opposite directions. Although we consider that the evidence suggests a fall in the risk free rate, we do not see compelling evidence to support an increase in the ERP. We discuss this further below.

# **Real risk-free rate**

# The LLCC Consultation proposals

A14.55 We noted in the WLR LLU CC Statement that the real risk-free rate had fallen further since the publication of the WBA CC Statement in July 2011. In the WBA CC Statement, our estimate of the real risk-free rate was 1.4%. In arriving at this estimate, we considered average yields on indexed linked gilts and implied forward rates. Figure A14.4 below shows the movements in these datasets from July 2011 to February 2012.

	WBA CC Statement July 2011, %	WLR LLU CC Statement Feb 2012, %
Average of last 5 years for 5 yr i-l gilts	1.2	0.8
Average of last 10 years for 5 yr i-l gilts	1.6	1.3
Average of last 5 years for 10 yr i-l gilts	1.3	1.0
Average of last 10 years for 10 yr i-l gilts	1.6	1.5
Implied forward rate on 5 yr i-l gilt at Feb 2014 <sup>344</sup>	c0.9	c(0.5)

### Figure A14.4: Changes in index-linked ("i-l") gilt evidence

Source: Bank of England, Ofcom analysis

- A14.56 We noted that the continued downward trend in gilt yields and forward rates implied a reduction in the real risk-free rate.
- A14.57 In the WBA CC Statement, we considered the implied forward rates on five year gilts. We noted that these had declined significantly and were out of line with the observed historical gilt yields. We updated our analysis and this continued to be the case. We noted that the implied forward rates on indexed linked gilts were below zero at the time of the WLR CC.
- A14.58 In the WLR CC Statement, we explained that implied forward rates continued to be volatile and therefore we were cautious about placing significant weight on these rates.
- A14.59 Calculating the risk-free rate using the five year averages of ten year and five year indexed linked gilts also suggested a reduction in the real risk-free rate from 1.4%. These averages are shown in Figure A14.5 below.

Figure A14.5: five and ter	year gilt yields av	verage rate (real) a	at 6 January 2012
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Average period	ten year gilts (%)	five year gilts (%)
6 January 2012	-0.7	-1.4
1 month	-0.5	-1.3
3 months	-0.3	-1.2
1 year	0.2	-0.8
2 years	0.4	-0.5
5 years	1.1	0.8
10 years	1.5	1.3

Source: Bank of England, Ofcom analysis

A14.60 The above Figure reflects a fall in real gilt yields over the year to January 2012. Only one data point (ten year average on a ten year gilt) was above our estimate of the risk-free rate, and this had fallen from 1.6% in July 2011. We noted in the LLCC Consultation that all other average rates remained below the risk free rate of 1.4% estimated in July 2011.

ILG made in Feb 2014 calculated using the following formula:  $f_{t,T} = \left[\frac{(1+r_T)^T}{(1+r_t)^t}\right]^{\frac{1}{T-t}} - 1.$ 

<sup>&</sup>lt;sup>344</sup> The estimates for Jan 2012 and July 2011 represent the implied future yield on an investment in a five year

# Consultation responses

- A14.61 BT noted the data presented by us in the LLCC Consultation, and it stated that it accepts "the direction of the movement in the data on gilt yields<sup>345</sup>". However, BT argues that the fall in gilt yields is not sufficient to result in no change to the overall WACC.
- A14.62 BT also noted that current UK gilt yields have been affected by the global macroeconomic climate which it suggests means "additional caution is required in estimating longer term rates".<sup>346</sup>

Our response and conclusions

A14.63 We have updated the analysis of gilt yields to December 2012, which shows a continued decline in the rates for both five and ten year gilts.

ten year gilts (%)	five year gilts (%)
-0.7	-1.4
-0.6	-1.4
-0.6	-1.4
-0.2	-1.0
0.1	-0.7
0.6	0.2
1.2	1.0
	ten year gilts (%) -0.7 -0.6 -0.6 -0.2 0.1 0.6 1.2

Source: Bank of England, Ofcom analysis

- A14.64 In addition, the implied forward rates have also decreased from those estimated in July 2011. The three-year forward rate on a five year gilt has fallen from 1.05% in July 2011 to approximately -0.5% in December 2012.
- A14.65 As BT notes, there has been a fall in gilt yields over the period from July 2011 to the time of the LLCC Consultation. In addition, more recent data to December 2012 suggests a further fall. The estimates of the real risk-free rate continue to be negative in the short term and remain low over the longer term.
- A14.66 We continue to believe that a degree of caution is required when interpreting the current data, this is because of the high level of uncertainty which has persisted. In addition, the effects of quantitative easing and a flight to safety still remain. We also note that the purposes of the charge controls are to set prices for 2015/16, therefore our forecast real risk free rate is one which is appropriate for the end of the charge control period.
- A14.67 Although we note that estimates of the real risk free rate have continued to fall, we have also considered the implications of this for the equity market premium. If we believe that the risk free rate has fallen because equities have become more risky or because investors are becoming more risk averse, then we would expect an increase in the ERP to reflect this.
- A14.68 We consider that there is a relationship between the risk free rate and the ERP. Therefore, we are reluctant to make a significant change in the risk-free rate without

<sup>&</sup>lt;sup>345</sup> See BT's non-confidential response to the LLCC Consultation, paragraph 9, page 50.

<sup>&</sup>lt;sup>346</sup> See BT's non-confidential response to the LLCC Consultation, paragraph 9, page 50.

considering an increase in the ERP, something which is not supported by current evidence.

A14.69 The CC noted the interaction between the ERP and the risk free rate, in the Mobile Call Termination appeal in 2011, in response to an argument by Dr Hird that Ofcom had not reflected the connection between the tendency of the risk free rate (RFR) to fall during a crisis, at the same time as the tendency of the ERP to increase. The CC noted that Ofcom did not err in this regard as:

"Ofcom was mindful of the tendency of the RFR and ERP to move in opposite directions".<sup>347</sup>

- A14.70 We have balanced the possibility of increasing the ERP, whilst decreasing the riskfree rate further. However, as noted above, we do not have sufficient evidence to support a further increase in the ERP. It may be that the ERP is higher as a result of an increase in the variability (or risk) associated with equity market volatility, however we do not have sufficient evidence of this to justify a change to our established methodology and well-understood evidence base.
- A14.71 We consider it is appropriate, however, to reflect the continued fall in estimates of the real risk free rate to some degree. We have therefore used a point estimate of 1.3% for the real risk-free rate.

# BT Group equity & asset beta

### The LLCC Consultation proposals

- A14.72 We set out our methodology for assessing the asset beta for BT Group in the WBA CC.<sup>348</sup> The asset beta for BT Group is calculated by de-levering the equity beta for a given time period at the average gearing observed over that same period.<sup>349</sup> In the WBA CC Statement, we estimated an asset beta range of 0.46-0.59 for BT Group.
- A14.73 We updated the estimate of the asset beta for BT Group, in the WLR LLU CC Statement, using revised data from Bloomberg which is set out in Figure A14.7 below. We noted that the mid-point of the two-year daily asset beta range increased from the WBA asset beta of 0.525 to approximately 0.64.

<sup>&</sup>lt;sup>347</sup> See paragraph 3.915 of the Competition Commission determination, 9 February 2012. In respect of the MCT appeal: cases 1180-1183/3/3/11.

<sup>&</sup>lt;sup>348</sup> See paragraph 6.97 to 6.154 of the WBA CC Statement.

<sup>&</sup>lt;sup>349</sup> We then re-lever the asset beta using an appropriate gearing level. In the WBA Statement, the gearing used to re-lever the asset beta was based on the historical average gearing level. In the WBA Statement, we noted that it may be appropriate to use a forward looking gearing for the purpose of re-levering, however the impact of using a different gearing on the overall WACC was negligible. As part of the WBA appeal, the Competition Commission considered that using a prospective gearing assumption is preferable to using a historical average. However, it found that Ofcom did not err in its calculation of the beta as the impact was negligible. As a result, in future, when re-levering the asset beta, we will use prospective gearing. In the consultation, we did not amend our re-levered beta estimate for the purposes of the charge control for leased lines as we considered it would have a negligible impact on the overall WACC. We noted that the CC upheld our decision to use the historical average gearing to de-lever the equity beta and we will therefore continue with this approach to estimating the asset beta.

A14.74 We noted that the one-year daily beta estimate also increased relative to that estimated in July 2011, however the five-year weekly beta remained within the range estimated in the WBA Statement (0.46 – 0.59).<sup>350</sup>

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	1 year daily data	2 year daily	data	5 year weekly data
Equity beta	1.06	1.04		0.86
Average Gearing	39%	44%		40%
Asset beta	0.70	0.64		0.57

# Figure A14.7: Revised BT Group asset beta estimates (9 January 2012)

Source: Bloomberg, Ofcom analysis

- A14.75 We explained that, all other things being equal, a change in the asset beta could potentially support a modest increase in the cost of capital for BT Group.
- A14.76 Although we noted that the asset beta may have increased over the six months to January 2012, we explained that this cannot be looked at in isolation. If we were to update the asset beta, we would also have to update the risk free rate, where we observed a downward trend in estimates.

### Consultation responses

- A14.77 BT was the only respondent to consider the beta specifically. It stated that using data to August 2012 (rather than March 2012) would show an increase in the asset beta which exceeds the decrease in the risk free rate and "would be unlikely to simply 'net off' overall"<sup>351</sup>. It argued that this would justify an increase in the overall WACC.
- A14.78 BT argued that the two-year data to March 2012 was distorted by the fall in BT's market capitalisation as a result of the global financial crisis. It therefore argued that more recent rolling averages (i.e. from August 2012 onwards) were more "in line with longer term trends and future market expectations".<sup>352</sup>

# Our response and conclusions

- A14.79 Following publication of the LLCC Consultation, we commissioned a report from Brattle Group in December 2012<sup>353</sup> which shows the most recent equity beta estimates for BT Group, along with revised gearing estimates.
- A14.80 The most recent data shows that the two-year BT Group equity beta has increased from a mid-point of 0.91 in June 2011 to a mid-point of 1.01 at December 2012 (within an equity beta range of 0.92-1.11).
- A14.81 In addition, the average gearing for BT Group over the same period has fallen from 50% in July 2011 to 40% at December 2012. This average two year gearing is used to de-lever the equity beta and arrive at the asset beta.
- A14.82 The revised estimate for BT's asset beta has therefore increased from a mid-point of 0.525 in July 2011 to 0.67 at December 2012.

<sup>&</sup>lt;sup>350</sup> As explained in the WBA Statement, we place greatest weight on the 2-year beta. However, the 5-year weekly beta provides a useful cross-check, particularly during periods of financial market volatility.

<sup>&</sup>lt;sup>351</sup> See BT's non-confidential response to the LLCC Consultation, paragraph 5, page 49.

<sup>&</sup>lt;sup>352</sup> See BT's non-confidential response to the LLCC Consultation, paragraph 6, page 49.

<sup>&</sup>lt;sup>353</sup> The Brattle report is published alongside this Statement.

# Figure A14.8: BT Group asset beta mid-point estimates (December 2012)

	1 year daily data	2 year daily	data	5 year weekly data <sup>354</sup>
Equity beta	0.99	1.01		0.85
Average Gearing	41%	40%		45%
Asset beta	0.64	0.67		0.54

Source: Brattle, Bloomberg, Ofcom analysis

- A14.83 For the purposes of re-levering the asset beta, the current gearing<sup>355</sup> is used. At the time of this Statement, the most recent estimate for BT Group's gearing was 32%<sup>356</sup>.
- A14.84 We note that the five year weekly equity beta is significantly lower than the one-year and two-year equity betas. However, we note that the five-year data covers an extended period of the global financial crisis.
- A14.85 The one-year asset beta is within the confidence interval for the two-year beta which suggests that the BT Group asset beta is more stable than we have observed during previous, recent cost of capital estimates.
- A14.86 The most recent one-year and two-year data shows an increase in the BT Group asset beta, as suggested by BT.
- A14.87 In conclusion, we have used the latest estimates of the BT Group two-year equity beta and two-year gearing to de-lever the beta (as shown in the Figure above) showing a mid-point estimate of the asset beta for BT Group of 0.67.
- A14.88 We have then used the current gearing of 32% to re-lever the asset beta for BT Group. This gives a forward-looking equity beta of 0.91 for BT Group.

# Tax rate

### The LLCC Consultation proposals

- A14.89 We updated the tax rate in July 2011 to take account of the acceleration of the corporate tax rate reduction, announced in the March 2011 Budget. The expected rate of UK corporation tax rate from 2013/14 was predicted to be 24% at the time of the WBA CC.
- A14.90 The March 2012 Budget set out plans for a further acceleration of the corporation tax rate reduction. At the time of the LLCC Consultation, the most recent expectation of the main rate of UK corporation tax for the year beginning 1 April 2013 was 23% and the expected rate for the year beginning 1 April 2014 was 22%.<sup>357</sup>
- A14.91 We did not propose to update the cost of capital to take account of the most recent movements in other parameters in the LLCC Consultation, therefore we did not update our estimate of the lower corporation tax rates announced. However, we

<sup>&</sup>lt;sup>354</sup> Five year weekly data is from Bloomberg.

<sup>&</sup>lt;sup>355</sup> This is consistent with the Competition Commission's determination in the WBA appeal.

<sup>&</sup>lt;sup>356</sup> Calculation as at 11 Jan 2013 using the latest net debt figure reported by BT of £9.04m in the September 2012 half year report and the market capitalisation value (taken from Bloomberg on 11 Jan) of £19.37bn.

<sup>&</sup>lt;sup>357</sup> <u>http://www.hm-treasury.gov.uk/budget2012\_fair\_efficient\_tax.htm</u>

explained that we would update our estimate of the corporation tax rate when we estimate the WACC at the time of this Statement.

- A14.92 As the proposed charge controls were expected to run to 2015/16, we proposed to use the expected corporation tax rate of 22% in calculating the Rest of BT WACC.
- A14.93 We noted that the reduction from 24% to 22% reduced the Rest of BT WACC by less than 0.2%.

# Consultation responses

A14.94 BT and TalkTalk both agreed with our proposal to take account of the latest tax rate in the WACC calculation.

# Our response and conclusions

- A14.95 Since publication of the LLCC Consultation and the Draft Statement, the Budget 2013 has been announced by the Chancellor. This set out the Government's proposal for a lower tax rate for 2015/16, of 20%, than that used in our Consultation. As explained in the LLCC Consultation, we proposed to use the latest available tax rate for this Statement.
- A14.96 We have therefore used the most recent estimate of the tax rate for the final year of the charge control (2015/16) of 20% in the WACC calculation. This has the effect of reducing the WACC by 0.1% points.

# Disaggregation of the BT Group WACC

# The LLCC Consultation proposals

- A14.97 In order to disaggregate the BT Group WACC into a separate WACC for Openreach and the Rest the BT, we have two parameters which are assessed separately for the Openreach and the Rest of BT. These are:
  - i) the asset beta; and
  - ii) the debt premium.

# Asset beta

- A14.98 In the LLCC Consultation, we proposed to use the same method for disaggregation of the BT Group asset beta as set out in the WBA Statement.
- A14.99 We estimated the Openreach asset beta by reference to the asset betas of network utilities, and the BT Group beta. We considered that Openreach sits above to the top end of the network utility range (estimated to be 0.26-0.37 in the WBA CC Statement). Considering where Openreach sits on the 'risk spectrum' we estimated an asset beta for Openreach which was approximately 10% or 0.05 below that of BT Group. We noted that this was a similar differential to that estimated in May 2009, the previous estimate of the cost of capital.<sup>358</sup>
- A14.100 We then considered the impact of this assumption on the Rest of BT asset beta. As we estimate that Openreach and the Rest of BT make up approximately half of the

<sup>&</sup>lt;sup>358</sup> WBA Statement paragraph 6.225.

MCE of BT Group each, we assume that the two parts of BT Group would contribute equally to the WACC. Therefore, by reducing the BT Group asset beta by 10% to estimate the Openreach asset beta, we would need to increase the BT Group asset beta by 10% to estimate the Rest of BT asset beta.

A14.101 We then performed a cross-check of the asset beta of the Rest of BT. Although it is difficult to get a like-for-like comparator, given the demand characteristics of the Rest of BT (and BT Retail in particular), we would be uncomfortable supporting the view that the Rest of BT would be perceived as more risky than operators such as TalkTalk or Colt. As our estimate of the Rest of BT asset beta was below these 'comparator' asset betas, we considered our estimate was reasonable.

### Debt premium

- A14.102 In the WBA CC Statement, we explained that we use a higher debt premium for the Rest of BT than Openreach. This is because we considered that a business with lower systematic risk would be likely to have a lower cost of debt.
- A14.103 We considered that Openreach was likely to have a lower cost of debt compared to the BT Group as a whole. The lower systematic risk means that Openreach may be able to target a higher credit rating which could in turn result in a lower cost of raising finance. This would suggest that a lower cost of debt assumption is appropriate for Openreach.
- A14.104 In the WBA CC Statement, we considered the range of debt premium observed for the network utilities which was around 1-1.5%. We also considered our range for the BT Group debt premium of 2-2.5%. We concluded that applying a debt premium of 2% for Openreach and 2.5% for the Rest of BT would be a reasonable approximation of relative risk in relation to the debt premium.
- A14.105 This was consistent with our view of where Openreach sits on the 'risk spectrum' relative to utilities and to the Rest of BT, which we applied in disaggregating the BT Group beta.

### Consultation responses

- A14.106 Respondents did not comment on either the disaggregation of the BT Group asset beta between Openreach and the Rest of BT.
- A14.107 We also received no responses on the different debt premium estimates for Openreach and the Rest of BT.

### Our conclusions

# Asset beta

- A14.108 The December 2012 Brattle report on BT's equity and asset beta provides estimates for comparable UK utilities. This report shows that the recent BT Group asset beta estimates remain higher than for those of other comparable UK utilities.
- A14.109 The difference between the BT Group estimate and that of the network utilities has increased, although the peer-group average asset beta estimate for network utilities remains similar to the estimate in July 2011. Therefore, it is the increase in the BT Group asset beta that has driven the increase in the gap between BT Group and the network utilities.

- A14.110 Although we note that it is also difficult to find a like-for-like comparator for the Rest of BT, we have also considered asset beta estimates for the closest comparators available. These are Colt Group and TalkTalk Group, the asset betas of which have fallen from our July 2011 estimates to below that of BT Group.<sup>359</sup>
- A14.111 As the Rest of BT and Openreach continue account for roughly half of BT Group's assets, the approach taken in July 2011 to increase and decrease the BT Group asset beta by equal amounts remains appropriate. Therefore, if we were to decrease the asset beta of Openreach by a greater amount than previously estimated (to reduce it closer to the top end of the network utility range), we would also need to increase the asset beta of the Rest of BT even further beyond those of its closest comparators.
- A14.112 As we consider that Openreach is closer to the Rest of BT than a network utility, we continue to believe that reducing the BT Group asset beta by 10%, which is the same differential used in May 2009 and July 2011, provides a suitable estimate for the Openreach asset beta. This results in an Openreach asset beta of 0.60 (0.07 lower than BT Group). In addition, increasing the BT Group asset beta by 0.07 to 0.74 provides a suitable estimate of the Rest of BT asset beta.

# Debt premium

- A14.113 As discussed above, we use a higher debt premium for the Rest of BT than Openreach. This is because we consider that a business with a lower risk of default would be likely to have a lower cost of debt.
- A14.114 As noted by the CC in the LLU Appeal Determination, this is very difficult to estimate because there are no direct comparators available for Openreach:

"We note that there is no stand-alone proxy for the Openreach business from which to observe a capital structure or a debt premium".<sup>360</sup>

- A14.115 In order to estimate an appropriate debt premium for Openreach, we have considered the range of debt premium observed for the network utilities which is currently around 0.9-1.3%, this is lower than the estimation at the time of the WBA CC Statement of 1-1.5%.
- A14.116 We consider that Openreach is likely to have a higher cost of debt than the network utilities, but would have a lower cost of debt than the Rest of BT. This is consistent with our assessment of the relative risk of Openreach discussed above in relation to the asset beta.
- A14.117 We have therefore also considered our range for the BT Group debt premium of 1.7-2.3%. We consider that applying a debt premium of 1.7% for Openreach and 2.3% for the Rest of BT would be a reasonable approximation of relative risk of these parts of BT for the purposes of estimating the debt premium.

<sup>&</sup>lt;sup>359</sup> The two year daily beta for Colt Group (100% equity funded) is 0.5, against the FTSE All share index. The two year daily asset beta for TTG is around 0.47 against the FTSE All share index as at December 2012.

<sup>&</sup>lt;sup>360</sup> Paragraph 2.367 available at:

http://www.competitioncommission.org.uk/appeals/communications\_act/llu\_determination.pdf

# The appropriate WACC for these charge controls

# The LLCC Consultation proposals

- A14.118 In the LLCC Consultation, we proposed to use the Rest of BT rate for the services covered by the charge controls.
- A14.119 This was consistent with the approach taken in the LLCC 2009 and was based on an assessment of the cyclicality of demand for leased lines services and, to a lesser extent, an analysis of the underlying asset base.

### Consultation responses

- A14.120 Three respondents commented on the use of the Rest of BT rate for the services covered by the charge controls. BT and Virgin agreed that the Rest of BT WACC was the appropriate rate to use. However, TalkTalk stated that the "Rest of BT figure overstates the business risk and WACC for supplying Ethernet circuits."<sup>361</sup>
- A14.121 TalkTalk argued that the Rest of BT WACC reflects the non-copper access parts of BT Group, including:
  - a) regulated wholesale leased lines;
  - b) wholesale broadband access, wholesale voice services;
  - c) UK residential/business retail services; and
  - d) telecoms/IT services to large corporates In UK and overseas.
- A14.122 TalkTalk argued that other areas have materially higher levels of risk/volatility than the supply of wholesale Ethernet/TI. TalkTalk accepted that the Openreach WACC "may not be entirely appropriate to use for Ethernet services." It therefore proposed to use a figure lower than the Rest of BT rate. TalkTalk stated that "Given there are limited reference figures for the cost of capital, we consider that Ofcom should at the very least use the BT Group figure of 6.1% to acknowledge the relatively lower risk versus the 'Rest of BT'".<sup>362</sup>

# Our response and conclusions

- A14.123 We disagree that the Rest of BT rate overstates the WACC for leased lines services covered by these charge controls. In the LLCC 2009, we set the WACC for leased lines services using the Rest of BT rate.
- A14.124 The CC upheld Ofcom's decision to use the Rest of BT rate as the appropriate rate for services covered by the charge controls in the LLCC 2009 appeal.<sup>363</sup> In particular, the CC considered Ofcom's arguments about the proportion of shared assets between Openreach and leased lines, the demand for leased lines services and analysis of the customer base i.e. that business customers were more able to reduce their consumption of bandwidth and thus reduce the amount paid to BT,

<sup>&</sup>lt;sup>361</sup> See TalkTalk non-confidential response to the LLCC Consultation, paragraphs 5.52 to 5.56, pages 46-47.

<sup>&</sup>lt;sup>362</sup> See TalkTalk non-confidential response to the LLCC Consultation, paragraphs 5.55, page 47.

<sup>&</sup>lt;sup>363</sup> Case 1112/3/3/09 Cable and Wireless v Office of Communications, Determination of the Competition Commission dated 30 June 2010, paragraph 4.238-4.333.

unlike residential customers who predominantly can only reduce consumption by disconnecting. The CC stated that:

"the arguments presented by Ofcom and BT tended to support the view that demand for leased lines services was more sensitive to economic conditions than demand for Openreach services."

- A14.125 In that determination, the CC considered whether Cable & Wireless (C&W) had demonstrated that the Rest of BT rate was too high for the leased lines services, and therefore the use of BT Group would be appropriate. The CC noted that, in order for C&W to make a case that Ofcom had erred, it would need to demonstrate why and to what extent the Rest of BT was not appropriate. The CC found that there was insufficient evidence to support C&W's contention that the Rest of BT rate was too high for leased lines services. We consider that the same applies to the argument put forward by TalkTalk in relation to the use of BT Group WACC. We do not consider that there is sufficient evidence to support the argument that the Rest of BT rate is not appropriate for leased lines services.
- A14.126 Furthermore, we calculate the BT Group WACC for the purposes of estimating the Openreach and Rest of BT WACC. We do not apply the BT Group WACC to specific services. If we were to use the BT Group WACC, we would need to evidence that it was the appropriate rate and would need to recalculate the WACC for both Openreach and the Rest of BT to reflect the revised share of BT Group assets within each section. If leased lines services were no longer in the Rest of BT, for example, the Rest of BT would no longer make up 50% of the mean capital employed of BT Group. Therefore, the disaggregation would need to be adjusted.
- A14.127 As stakeholders agree with our analysis that the Openreach WACC is not appropriate to use for the services covered in these charge controls, we consider our options are therefore to use the Rest of BT rate, or to further disaggregate the BT Group WACC and calculate another separate WACC for the services covered by these charge controls.
- A14.128 In our 2005 statement entitled 'Ofcom's approach to risk in the assessment of the cost of capital', we set out the conditions under which we would consider further disaggregation. They are:
  - there are strong a priori reasons for thinking that the systematic risk faced by the project was significantly different from that faced by the overall company (e.g. different income elasticities of demand and/or stability of cash flows);
  - ii) there is evidence which can be used to assess variations in risk, e.g.:
    - it is possible to identify benchmark firms that are close to "pure play" comparators in terms of having similar risk characteristics to individual projects within the firm;
    - it is possible to use other quantitative analysis (such as quantified risk assessments or the analysis carried out by PwC on behalf of Ofcom to assess variations in risk);
    - data on the firm are available at a disaggregated level (e.g. via separated accounts); and

- iii) correctly identifying variations in risk, and reflecting this in an adjusted rate of return, is likely to bring about significant gains for consumers.
- A14.129 We do not consider that these conditions are met in relation to the services covered by these charge controls. In our view, the present circumstances are similar to those which were recognised by the CC in its 2010 determination.<sup>364</sup> The CC noted in relation to the argument that Ofcom should have conducted fresh calculations to establish a cost of capital for the leased lines business:

"We consider that Ofcom and BT have presented credible arguments that fresh calculations to establish a cost of capital for the leased lines business were an unrealistic proposition due to lack of evidence to support specific disaggregation. In particular, BT's arguments that leased lines shared costs and assets with other services and there were significant synergies and other linkages between leased lines services and other parts of BT support Ofcom's view that it was difficult to consider leased lines to be a standalone business that could be benchmarked to an identifiable set of pure-play comparators and that would enable a sufficiently reliable assessment of beta to be made for Ofcom's purposes".<sup>365</sup>

A14.130 We continue to believe that the Rest of BT rate is the best proxy for the services covered by the current charge controls. We do not consider that there is sufficient evidence to warrant further disaggregation and believe that the Rest of BT estimate serves as a better proxy than the Openreach estimate.

# Net impact on the cost of capital

### The LLCC Consultation proposals

- A14.131 At the time of the WLR CC Statement, we considered that updating BT's estimated cost of capital to take account of recent movements in the asset beta, the risk free rate and the tax rate would not materially change our overall estimate from that in July 2011.
- A14.132 Given the uncertainty around the risk free rate and the asset beta, and the overall margin of error in estimating the WACC, we did not think that there was sufficient evidence to warrant a change in the WACC.
- A14.133 We were particularly mindful of the views of the CC on the mechanics of the Capital Asset Pricing Model (CAPM). In its Determination of the LLU Appeal, the CC noted:

"...the estimation of the cost of equity, which dominates the overall calculation of the WACC, has a significant margin of error".<sup>366</sup>

<sup>&</sup>lt;sup>364</sup> <u>http://www.catribunal.org.uk/238/Judgments.html</u>

<sup>&</sup>lt;sup>365</sup> Case 1112/3/3/09 Cable and Wireless v Office of Communications, Determination of the Competition Commission dated 30 June 2010, paragraph 4.236

<sup>&</sup>lt;sup>366</sup> Case 1111/3/3/09 The Carphone Warehouse Group Plc v Office of Communications (Local Loop Unbundling), Determination of the Competition Commission dated 31 August 2010 at §2.406: http://www.catribunal.org.uk/237-4154/1111-3-3-09-The-Carphone-Warehouse-Group-Plc.html

- A14.134 We also considered the principle set out in the WBA CC Statement that consistency is important in order to provide investors with a reasonable expectation that they can recover their investment and make a reasonable rate of return. We explained that this creates a regulatory environment which encourages efficient investment.
- A14.135 Given the proximity to the WLR LLU CC Statement, the small and uncertain likely impact on the overall WACC and the need for consistency, we did not think that updating the cost of capital was justified at the time of the LLCC Consultation.
- A14.136 For the reasons set out above, our provisional proposal was to use the WACC estimated in the WBA CC for the purposes of setting the charge controls for the leased line services. We proposed to use the pre-tax real Rest of BT rate of 6.5%.
- A14.137 We stated our intention to consider any changes in the cost of capital parameters prior to making a decision on our proposals, in order to ensure that the proposed estimate of the WACC remained appropriate. We explained that, if the relevant parameters changed materially, we would consider whether a change to our cost of capital estimates would be appropriate. We illustrated the potential impacts of such changes within our sensitivity analysis for both TI and Ethernet services.
- A14.138 We asked respondents whether they agreed with our proposals for the treatment of the cost of capital.

### Consultation responses

A14.139 Respondents did not comment in detail on our approach to the cost of capital, but those who did stated that we should use the most up to date estimates in order to calculate the WACC.

### Our response and conclusions

- A14.140 We have taken into account the latest evidence, and have adjusted the individual parameters accordingly.
- A14.141 As a result of updating the individual parameters of the WACC, we estimate a revised BT Group pre-tax WACC of 6.4% in real terms. We have used the Rest of BT real pre-tax WACC of 6.9% for the purposes of modelling the charge controls for the services covered by this Statement.
- A14.142 We note that we will be undertaking a review of our cost of capital methodology later in the year, as part of the WLR and LLU market review.

# Annex 15

# Geographic analysis for retail very low bandwidth traditional interface market

- A15.1 In Section 5, we discuss the key evidence which has informed our conclusion to define, for retail very low bandwidth TI leased lines, a national geographic market (excluding the Hull area). In this Annex, we present further results on the state of competitive conditions in this product market using an assessment of service shares.
- A15.2 We have produced below Figures displaying the variation in BT's service share first throughout the UK and then focusing on the London area.

# Figure A15.1: BT's service share in the very low bandwidth TI retail market: UK





# Figure A15.2: BT's service share in the very low bandwidth TI retail market: London

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

- A15.3 We have evaluated the average service shares in the key areas proposed as separate geographic markets for other (wholesale) product markets. The average service share for very low bandwidth TI retail services in the UK (excluding Hull) is 84%; in the WECLA+ it is 66%; while in the UK excluding the WECLA+ and Hull it is 89%. Accordingly, average shares in both areas are high and we do not distinguish between the two areas in our market definition.
- A15.4 Figure A15.3 below displays the distribution of BT's service shares across all the UK postcode sectors. BT's share differs across postcode sectors, with extreme values of 100% and 0%. However, such variations are to be expected where the number of sites in an individual postcode sector may be very low.

# Figure A15.3 Distribution of BT very low bandwidth TI retail service shares UK-wide



A15.5 Overall, the Figures above show that there is little variation in BT's service share in the very low bandwidth TI retail market when assessed on a postcode sector basis. This analysis shows that, throughout the UK, BT holds a significantly high share of services supplied, which signals limited variation in competitive conditions by geography, with the exception of Hull.

# Annex 16

# Sources of evidence

# Introduction

- A16.1 We have noted throughout this Statement the evidence we have relied upon in relation to our findings and how we have relied upon that evidence. This Annex lists the main sources of that evidence. We also list the responses to our various consultations and to our various notices under section 135 of the Communications Act 2003.
- A16.2 Whilst the Annex lists the main evidence we have relied upon, the list is for convenience only and is not intended to be exhaustive.

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- A16.13 Valuing copper access, Final Statement, August 2005. <u>http://stakeholders.ofcom.org.uk/binaries/consultations/copper/statement/statement.</u> <u>pdf</u>
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- A16.17 The replicability of BT's regulated retail business services and the regulation of business retail markets, Statement, April 2006. <u>http://www.ofcom.org.uk/consult/condocs/busretail/statement/</u>
- A16.18 Complaint from Thus Plc and Gamma Telecom Limited against BT about alleged margin squeeze in wholesale call pricing, Case Reference: CW/00988/06/08. <u>http://stakeholders.ofcom.org.uk/enforcement/competition-bulletins/open-cases/all-open-cases/cw\_988/</u>
- A16.19 Review of the wholesale broadband access markets 2006/07, 15 November 2007 http://stakeholders.ofcom.org.uk/consultations/wbamr07/
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- A16.119 Bidding Markets, Report prepared for the Competition Commission, Paul Klemperer, June 2005.
- A16.120 Markets with bidding processes: Economic discussion paper, Report prepared for the OFT by DotEcon Ltd, May 2007.

# Stakeholder responses to the Call for Inputs

- A16.121 Respondents to our Call for Inputs are listed in Annex 1 of the June consultation <u>http://stakeholders.ofcom.org.uk/binaries/consultations/business-</u> <u>connectivity/annexes/annex1-13.pdf</u> and the responses are published on our website.
- A16.122 Responses to the Business Connectivity Market Review Call for Inputs April 2011. <u>http://stakeholders.ofcom.org.uk/consultations/bcmr-inputs/?showResponses=true&pageNum=1#responses</u>

# Stakeholder responses to the market review and charge control consultations

- A16.123 Stakeholder responses to the three consultations in this review are listed in Annex 1 (except those that asked us not to disclose their names). We have published those responses that stakeholders agreed we could publish. In some cases we have published redacted versions with information that stakeholders consider confidential removed. Links to the published responses below.
- A16.124 The Business Connectivity Market Review Consultation, Review of the retail leased lines, wholesale symmetric broadband origination and wholesale trunk segments markets, 18 June 2012 <u>http://stakeholders.ofcom.org.uk/consultations/business-</u> <u>connectivity-mr/?showResponses=true</u>
- A16.125 Leased Lines Charge Control Consultation, Proposals for a new charge control framework for certain leased lines services, 5 July 2012. http://stakeholders.ofcom.org.uk/consultations/llcc-2012/?showResponses=true
- A16.126 The Business Connectivity Market Review: Further Consultation, 15 November 2012. <u>http://stakeholders.ofcom.org.uk/consultations/bcmr-reconsultation/?showResponses=true</u>

# Other stakeholder submissions

A16.127 BT

- BT submission to Ofcom Discussion paper: The Regulation of BT in the Provision of Trunk TI Service. 7 December 2011;
- BT submission to Ofcom BT Position Paper on Traditional Interface (TI) SMP Remedies;
- BT letter to Ofcom, "Re TI trunk", 17 December 2012;

A16.128 Cable and Wireless Worldwide

- email correspondence with Ofcom, "RE: BCMR BT proposals on TI trunk "19 March 2012
- submission to Ofcom, "BCMR Trunk Note", 7 January 2013

# Information requests for the market review

- A16.129 We issued a series of notices under section 135 of the Communications Act 2003, requiring various CPs to provide specified information as set out in the Notice. These information requests and the responses received are listed below.
- A16.130 Information request of 23 May 2011 covering specified information about network and network reach, business connectivity retail services, provision of wholesale services to OCPs, purchases of wholesale services from OCPs and internal selfsupply. Information received from:
  - Response from BT Group.
- A16.131 Information request of 23 May 2011 covering specified information about network and network reach, business connectivity retail services, provision of wholesale services to BT and OCPs, purchases of wholesale services from BT and other OCPs. Information received from:
  - Response from AT&T;
  - Response from BSkyB;
  - Response from Colt Technology Services;
  - Response from Cable and Wireless Worldwide;
  - Response from Easynet Global Services;
  - Response from Exponential-e Limited;
  - Response from Geo Networks Limited;
  - Response from Global Crossing UK Telecommunications Ltd;
  - Response from KCOM Group;
  - Response from Level 3 Communications Limited;
  - Response from MLL Telecom Limited;
  - Response from Neos Networks (Scottish and Southern Energy Limited);
  - Response from Newnet (c/o Timico Limited);
  - Response from Orange Business Services;
  - Response from TalkTalk Group;

- Response from Verizon Global Solutions UK Ltd;
- Response from Virgin Media;
- Response from Vtesse.
- A16.132 Information request of 23 May 2011 covering specified information about network and network reach and about leased lines volumes and revenues, in particular about purchases of wholesale services from BT and other CPs and self-supplied circuits used to deliver MNO's mobile network connectivity requirements. Information received from:
  - Response from Everything Everywhere Limited;
  - Response from Vodafone Limited;
  - Response from Telefonica O2 UK Ltd;
  - Response from Hutchison 3G UK Limited.
- A16.133 Information request of 10 August 2011 covering specified information related to the identification of the telecommunications markets for retail leased lines, any other forms of retail business connectivity services and associated wholesale services and the assessment of market power within them (In particular information about typical Ethernet purchasing scenarios, the new Openreach Ethernet network and optical spectrum products). Information received from:
  - Response from British Telecommunications plc.
- A16.134 Information request of 13 September 2011 covering specified information about OCP's network extension practice. Information received from:
  - Response from AT&T;
  - Response from BSkyB;
  - Response from Colt Technology Services;
  - Response from Cable and Wireless Worldwide;
  - Response from Easynet Global Services;
  - Response from Exponential-e Limited;
  - Response from Geo Networks Limited;
  - Response from Global Crossing UK Telecommunications Ltd;
  - Response from KCOM Group;
  - Response from Level 3 Communications Limited;
  - Response from MLL Telecom Limited;
  - Response from Neos Networks (Scottish and Southern Energy Limited);

- Response from Newnet (c/o Timico Limited);
- Response from Orange Business Services;
- Response from TalkTalk Group;
- Response from Verizon Global Solutions UK Ltd;
- Response from Virgin Media;
- Response from Vtesse.
- A16.135 Information request of 5 October 2011 covering specified information related to the identification of the telecommunications markets for retail leased lines, any other forms of retail business connectivity services and associated wholesale services and the assessment of market power within them (in particular additional information on Wavestream products). Information received from:
  - Response from British Telecommunications plc.
- A16.136 Information request of 3 November 2011 covering specified information related to the identification of the telecommunications markets for retail leased lines, any other forms of retail business connectivity services and associated wholesale services and the assessment of market power within them (in particular information on retail traditional interface leased line services at 8Mbit/s and below). Information received from:
  - Response from British Telecommunications plc.
- A16.137 Information request of 22 December 2011 covering specified information related to the identification of the telecommunications markets for retail leased lines, any other forms of retail business connectivity services and associated wholesale services and the assessment of market power within them (in particular information on the equipment costs associated with the provision of new wholesale Ethernet-based leased line services and information on the relative costs of provisioning WDM services ). Information received from:
  - Response from British Telecommunications plc.
- A16.138 Information request of 11 October 2012 covering specified information related to the identification of the telecommunications markets for retail leased lines, any other forms of retail business connectivity services and associated wholesale services and the assessment of market power within them (covering specified information about TOA data). Information received from:
  - Response from British Telecommunications plc
- A16.139 Information request of 7 December 2012 covering specified information related to the identification of the telecommunications markets for retail leased lines, any other forms of retail business connectivity services and associated wholesale services and the assessment of market power within them (covering specified information about EFM data). Information received from:
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- Response from Cable & Wireless Worldwide;
- Response from Easynet Global Services;
- Response from TalkTalk Group;
- Response from Updata Infrastructure UK Ltd.

# Information requests for the charge control

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  - Response from BT Wholesale.
  - Response from BT Openreach.
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  - Response from BT Openreach.
- A16.144 Information request of 4 April 2012 covering specified information related to the identification of the telecommunications markets for retail leased lines, any other forms of retail business connectivity services and associated wholesale services and the assessment of market power within them (covering specified information about financial data). Information received from:
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- A16.145 Information request of 25 May 2012 covering specified information related to the identification of the telecommunications markets for retail leased lines, any other forms of retail business connectivity services and associated wholesale services and the assessment of market power within them (covering specified information about financial data). Information received from:
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- A16.146[**℅**].

A16.147 [**×**].

A16.148[**℅**].

A16.149[**℅**].

A16.150[**℅**].

- A16.151 Information request of 28 September 2012 covering specified information related to the identification of the telecommunications markets for retail leased lines, any other forms of retail business connectivity services and associated wholesale services and the assessment of market power within them (covering specified information about financial data). Information received from:
  - Response from British Telecommunications plc.
- A16.152 Information request of 14 February 2013 covering specified information related to the identification of the telecommunications markets for retail leased lines, any other forms of retail business connectivity services and associated wholesale services and the assessment of market power within them (covering specified information about financial data). Information received from:
  - Response from BT Wholesale;
  - Response from BT Openreach.
- A16.153 Information request of 5 March 2013 covering specified information related to the identification of the telecommunications markets for retail leased lines, any other forms of retail business connectivity services and associated wholesale services and the assessment of market power within them (covering specified information about financial data). Information received from:
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- A16.154 Information request of 20 March 2013 covering specified information related to the identification of the telecommunications markets for retail leased lines, any other forms of retail business connectivity services and associated wholesale services and the assessment of market power within them (covering specified information about financial data). Information received from:
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- A16.173 Quarterly update webcall on BT's 21CN programme, January 2012, <u>https://www.btwholesale.com/pages/downloads/21\_Century\_Network\_Community/2</u> <u>1CN\_quarterly\_webcall\_%20220110.ppt</u>
- A16.174 Openreach, GEN109/11 EMP Release R1900 scope notification EIP1, Date: 19/10/2011. <u>http://www.openreach.co.uk/orpg/home/updates/briefings/generalbrie</u>
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- A16.191 Openreach Optical spectrum services <u>http://www.openreach.co.uk/orpg/home/products/opticalservices/downloads/Optical</u> <u>SolutionsPortfoliooverview.pdf</u>
- A16.192 BT response to 2008 leased line charge control consultation. http://stakeholders.ofcom.org.uk/binaries/consultations/llcc/responses/BT1.pdf

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www.datacentermap.com

# A16.200 Fujitsu

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- A16.204 HM Revenue & Customs (HMRC), Corporation Tax rates http://www.hmrc.gov.uk/rates/corp.htm
- A16.205 Building Cost Information Service. The General Building Cost Index http://www.bcis.co.uk/construction
- A16.206 Office of National Statistics, Consumer Price Indices http://www.ons.gov.uk/ons/datasets-and-tables/data-selector.html?dataset=mm23
- A16.207 Beacon Dodsworth. Source of information on postcode sector changes in t he UK. http://www.beacon-dodsworth.co.uk/site/support/postcode\_changes
- A16.208 Royal Mail Door to Door FAQ. <u>http://www.royalmail.com/marketing-</u> services/campaign-delivery/door-door/faqs#29600259.
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## Annex 17

# Glossary

## Accumulated (HCA) depreciation

Totality of deductions made to the original purchase price of a tangible fixed asset to reflect its cumulative consumption since acquisition.

## Accumulated (CCA) depreciation

Totality of deductions made to the gross replacement cost of a tangible fixed asset to reflect its cumulative consumption since acquisition.

## The Act

The Communications Act 2003.

## Alternative interface symmetric broadband origination (AISBO)

A form of symmetric broadband origination service providing symmetric capacity between two sites, generally using an Ethernet IEEE 802.3 interface.

## Anchor pricing

An approach that sets the upper bound for charges of existing services by reference to the cost of providing those services using existing technology. This ensures that the introduction of new technology which is intended to provide a greater range of services does not inappropriately lead to an increase in the cost of the existing services.

## **Ancillary services**

Services that relate to the core rental services and that are of an ancillary nature but which fall within markets in which BT has been found to have SMP.

#### **Asset lives**

Asset lives of each component are calculated by dividing the GRC by the depreciation charge in the base year assuming straight line depreciation.

#### Asset Volume Elasticity (AVE)

The percentage increase in capital costs required for a 1% increase in volume.

#### Asymmetric Digital Subscriber Line (ADSL)

A variant of DSL that supports higher bandwidth on downlink transmissions, i.e. from the exchange to the end user than from the end user to the exchange.

#### Asynchronous Transfer Mode (ATM)

A network technology that uses asynchronous time division multiplexing techniques and which supports data transmissions at up to 622Mbit/s.

## **Backhaul Ethernet Services (BES)**

A wholesale Ethernet service which provides high speed, point-to-point data circuits. Each one provides a secure link from a customer's premises, to a Communications Provider's Digital Subscriber Line Access Multiplexer and the Communications Provider's site.

#### Bandwidth

In digital telecommunications systems, the rate measured in bits per second (bit/s), at which information can be transferred.

## **Base-station Controller (BSC)**

An element of a mobile telephone network that controls a number of Radio Base Stations.

## **Business Connectivity Market Review (BCMR)**

This market review.

## **Bulk Transport Link (BTL)**

A BT wholesale Ethernet product which provides high capacity, resilient solution for the delivery of multiple Openreach services from an Openreach Handover Point (OHP) to a Communications Provider's site not located in a BT Local Exchange.

## Call for Input (the CFI)

The document issued by Ofcom at the start of this review seeking initial stakeholder input.

## **Capital expenditure**

Spending on assets that have physical substance and are held for use in the production or supply of goods or services, for rental to others, or for administrative purposes on a continuing basis in an entity's activities.

## Central and East London Area (CELA)

The geographic market covered central and east London as defined by Ofcom in the 2007/8 Review.

## **Co-location**

The provision of space at a BT MDF site that enables a CP to locate equipment within that MDF site.

## **Communications Provider (CP)**

An organisation that provides electronic communications services.

## **Compound Annual Growth Rate (CAGR)**

The year-on-year smoothed annualised growth rate of an investment. It can be calculated as

follows: CAGR =  $\left(\frac{Ending \, Value}{Beginning \, Value}\right)^{\left(\frac{1}{number \, of \, years}\right)} - 1$ 

## **Cost Volume Elasticity (CVE)**

The percentage increase in operating costs for a 1% increase in volume.

## **Consumer price index (CPI)**

The consumer price index (CPI) is a measure of inflation. It measures changes in the price level of consumer goods and services purchased by households. The most significant item excluded in the CPI, but included in the RPI, is mortgage interest rate payments.

## **Current Cost Accounting (CCA)**

An accounting convention, where assets are valued and depreciated according to their current replacement cost whilst maintaining the operating or financial capital of the business entity.

## **Customer Premises Equipment (CPE)**

Sometimes referred to as customer apparatus or consumer equipment, being equipment on consumers' premises which is not part of the public telecommunications network and which is directly or indirectly attached to it.

## **Customer Sited Handover (CSH)**

An interconnection between BT and another communications provider where the BT handover circuit terminates at the communications provider's premises.

#### **Cost Volume Relationship (CVR)**

The relationship of how cost and volumes move in relation to one another.

#### Data Over Cable Service Interface Specification (DOCSIS)

A telecommunications standard that enables cable TV networks to support broadband internet access services.

#### Digital Local Exchange (DLE)

The telephone exchange to which customers are connected, usually via a concentrator.

#### Distributed long run incremental cost (DLRIC)

The LRIC of the individual service with a share of costs which are common to other services over BT's core network.

#### **Digital Main Switching Unit (DMSU)**

The main type of tandem switch, primarily used for conveying long distance calls. DMSUs form the backbone of the trunk network.

#### **Digital Private Circuit Network (DPCN)**

The BT Wholesale sub 2Mbit/s aggregation and cross-connect network.

#### Distributed stand alone cost (DSAC)

An accounting approach estimated by adding to the DLRIC a proportionate share of the inter-increment common costs. Rather than all common costs shared by a service being allocated to the service under consideration, the common costs are instead allocated amongst all the services that share the network increment.

#### **Digital Subscriber Line (DSL)**

A family of technologies generically referred to as DSL or xDSL that enable ordinary copper telephone lines to transmit broadband signals. ADSL (Asymmetric Digital Subscriber Line), HDSL (High bit rate Digital Subscriber Line) and VDSL (Very high data rate Digital Subscriber Line) are all variants of xDSL.

## Equi-proportional Mark-Up (EPMU)

The application of the same percentage mark-up to the incremental costs of two or more services.

#### Equivalence of Input (EOI)

A remedy designed to prevent a vertically-integrated company from discriminating between its competitors and its own business in providing upstream inputs. This requires BT to provide the same wholesale products to all CPs including BT's own downstream division on the same timescales, terms and conditions (including price and service levels) by means of the same systems and processes, and includes the provision to all CPs (including BT) of the same commercial information about such products, services, systems and processes.

#### Ethernet

A packet-based technology originally developed for and still widely used in Local Area Networks. Ethernet networking protocols are defined in IEEE 802.3 and published by the Institute of Electrical and Electronic Engineers. Developments of this technology known as Metro Ethernet or Carrier Ethernet are now being used in communications providers' networks to provide leased line and backhaul services.

## Ethernet Access Direct (EAD)

A wholesale Ethernet product which offers permanently connected, point-to-point high speed data circuits that provide a secure and un-contended access service for Communications Providers. EAD is a next generation network compatible service designed to complement Openreach's Ethernet Backhaul Direct (EBD) and Bulk Transport Link (BTL) products already offered within the Connectivity Services portfolio.

## Ethernet Backhaul Direct (EBD)

A BT wholesale Ethernet product which offers permanently connected, point-to-point high bandwidth data circuits that provide a secure and un-contended backhaul service for Communications Providers.

## **Excess Construction Charges (ECC)**

A charge levied by BT where additional construction of duct and fibre or copper is required to provide service to a customer premise.

## Ethernet in the First Mile (EFM)

A network technology for the delivery of Ethernet services over access networks. Although the technology also encompasses fibre access networks, in common usage EFM refers to the provision of Ethernet services over copper access networks.

## Fully allocated cost (FAC)

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

## Financial capability maintenance (FCM)

The maintenance of an entity's financial capability (i.e. the amount of the shareholders' equity interest) when determining the profitability of an entity.

## **Frame Relay**

A packet-based technology used to connect several Local Area Networks.

## Fibre-to-the-Cabinet (FTTC)

An access network structure in which the optical fibre

extends from the exchange to the cabinet. The street cabinet is usually located only a few hundred metres from the subscriber's premises. The remaining part of the access network from the cabinet to the customer is usually copper wire but could use another technology, such as wireless.

## Fibre-to-the-Premises (FTTP)

An access network structure in which the optical fibre network runs from the local exchange to the end user's house or business premise. The optical fibre may be point-to-point – there is one dedicated fibre connection for each home – or may use a shared infrastructure such as a GPON. Sometimes also referred to as Fibre To The Home (FTTH).

## Gbit/s

Gigabits per second (1 Gigabit = 1,000,000,000 bits) A measure of bandwidth in a digital system.

## General Building Cost Index (GBCI)

A national index that measures the costs of construction work including materials and labour.

## **Gigabit Passive Optical Network (GPON)**

A shared fibre network architecture that can be used for NGA.

## **Gross Replacement Cost (GRC)**

The cost of replacing an existing tangible fixed asset with an identical or substantially similar new asset having a similar production or service capacity.

#### HCA (historical cost accounting) depreciation

The measure of the cost in terms of its original purchase price of the economic benefits of tangible fixed assets that have been consumed during a period. Consumption includes the wearing out, using up or other reduction in the useful economic life of a tangible fixed asset whether arising from use, effluxion of time or obsolescence through either changes in technology or demand for the goods and services produced by the asset.

## Hull Area

The area defined as the 'Licensed Area' in the licence granted on 30 November 1987 by the Secretary of State under section 7 of the Telecommunications Act 1984 to Kingston upon Hull City Council and Kingston Communications (Hull) plc.

#### In Building Handover (IBH)

BT provides a POC at collocation space rented by a CP in a BT local exchange

## In Span Handover (ISH)

An interconnection between BT and another communications provider where the BT handover circuit terminates at a point between BT's premises and the communications provider's premises.

## Internet Protocol (IP)

A network technology used in packed-switched networks to route packets across network nodes.

#### Internet Service Provider (ISP)

An organisation that provides internet access services.

#### ISDN30

A digital multiline telephone service conforming to the ISDN Primary Rate Access standard as defined by the ITU.

#### Jitter

A measure of the variation of delay in transmission over a transmission path.

#### kbit/s

Kilobits per second (1 kilobit = 1,000 bits) A measure of bandwidth in a digital system.

#### Latency

A measure of delay in transmission over a transmission path.

#### Leased line

A permanently connected communications link between two premises dedicated to the customers' exclusive use.

#### LLCC 2009

The statement published in 2009 implementing charge controls in wholesale leased lines markets. See Annex 16 for links to this document.

#### Local Area Network (LAN)

A network typically linking a number of computers together within a business premise, enabling intercommunication between users and access to email, internet and intranet applications.

## Local loop

The access network connection between the customer's premises and the local serving exchange, usually comprised of two copper wires twisted together.

## Local Loop Unbundling

A process by which a dominant provider's local loops are physically disconnected from its network and connected to competing provider's networks. This enables operators other than the incumbent to use the local loop to provide services directly to customers.

## Local Loop Unbundling (LLU) backhaul circuit

A circuit provided by BT that enables the connection of a communications provider's DSLAM to a communications provider's point of connection with BT's SDH network.

## Long Run Incremental Cost (LRIC)

The cost caused by the provision of a defined increment of output given that costs can, if necessary, be varied and that some level of output is already produced.

## Local Serving Exchange (LSE)

A building at which local loops are terminated and which also houses telecommunications network and switching equipment.

## Main Distribution Frame (MDF)

A wiring flexibility frame where copper local loops are terminated.

## **MDF Site**

A BT operational building containing an MDF. Also referred to as a Local Serving Exchange.

## Multiple Interface (MI) leased lines

Leased line services with bandwidths greater than 1Gbits/s and leased lines services of any bandwidth delivered using WDM equipment at the customer's premises.

## Multiple Interface Symmetric Broadband Origination (MISBO)

A form of symmetric broadband origination service providing symmetric capacity from a customer's premises to an appropriate point of aggregation in the network hierarchy for services with bandwidths greater than 1Gbit/s or services of any bandwidth delivered using WDM equipment at the customer's premises.

## Modern equivalent asset (MEA)

The approach to set charges by basing costs and asset values on what is believed to be the most efficient available technology that performs the same function as the current technology.

## Mean capital employed (MCE)

The mean value of the assets that contribute to a company's ability to generate revenues.

## Mobile switching Centre (MSC)

A component of a mobile telephone network that switches voice calls between mobile users.

## Multi Protocol Label Switching (MPLS)

A packet-based technology that uses label switching techniques in order to improve and prioritise the routing of packets between network nodes. MPLS is commonly deployed in VPN and NGN core applications.

#### Multi Service Access Node (MSAN)

A network access device associated with an IP-based core network that provides network interfaces for telephony, broadband and other services. MSANs are typically installed in a telephone exchange or a roadside cabinet.

## Mbit/s

Megabits per second (1 Megabit = 1 million bits). A measure of bandwidth in a digital system.

## Net current assets (NCA)

Total current assets less current liabilities.

## Next generation access (NGA)

A new or updgraded access network capable of supporting much high capacity broadband services than traditional copper access networks. Generally an access network that employs optical fibre cable in whole or in part.

## Next Generation Network (NGN)

An IP based multi-service network capable of providing voice telephony, broadband and other services.

## Net replacement cost (NRC)

Gross replacement cost less accumulated depreciation based on gross replacement cost. An alternative is *Depreciated replacement cost* (of tangible fixed assets other than property:-The cost of replacing an existing tangible fixed asset with an identical or substantially similar new asset having a similar production or service capacity, from which appropriate deductions are made to reflect the value attributable to the remaining portion of the total useful economic life of the asset and the residual value at the end of the asset's useful economic life.

## **Operating capability maintenance (OCM depreciation)**

The maintenance of an entity's operational capability (i.e. the capacity to produce goods and services) when determining the profitability of an entity. OCM depreciation is calculated as the sum of CCA depreciation and HCA depreciation.

#### **Operating expenditure**

Costs reflected in the profit and loss account excluding depreciation financing costs such as interest charges.

## **Openreach Network Backhaul Services (ONBS)**

Openreach Network Backhaul Service offers connectivity between a Communications Providers equipment installed within Co-location, Netlocate or BT Locate at a BT MSAN Site, and their equipment installed within Co-location, Netlocate or BT Locate at either the nearest BT MSAN Site, BT Metro Node Site or another BT MSAN Site or Metro Node Site which is within a distance of 15 radial kilometres of the first BT MSAN/Metro Site.

## Other Communications Providers (OCPs)

A communications provider other than BT.

## **Optical Spectrum Access (OSA)**

A BT wholesale WDM service.

## **Optical Spectrum Extended Access (OSEA)**

A BT wholesale WDM services supporting longer circuits than OSA.

## Partial Private Circuit (PPC)

A generic term used to describe a category of private circuits that terminate at a point of connection between two communications providers' networks. It is therefore the provision of transparent transmission capacity between a customer's premises and a point of connection between the two communications providers' networks. It may also be termed a part leased line.

## Passive Infrastructure Access (PIA)

A remedy requiring BT to provide CPs with access to its passive access network infrastructure (i.e. ducts and poles).

## **Passive Optical Network (PON)**

A particular configuration of fibre-optic network that brings optical fibre cabling and signals all or most of the way to the end user

## Plesiochronous Digital Hierarchy (PDH)

An older digital transmission technology that uses Time Division Multiplexing. Although PDH systems are is still in widespread use, they are being replaced by SDH and increasingly Ethernet services.

## **Points of Connection (POC)**

A point where one communications provider interconnects with another communications provider for the purposes of connecting their networks to 3rd party customers in order to provide services to those end customers

## **POH Statement**

An Ofcom statement on POH pricing. See annex 16 for links to the document.

## Point of Handover (POH)

A point where one communications provider interconnects with another communications provider for the purposes of connecting their networks to 3rd party customers in order to provide services to those end customers.

#### **Point of Presence (POP)**

A node in a CPs network (such as an exchange or other operational building), generally one used to serve customers in a particular locality.

#### Public Switched Telephone Network (PSTN)

A telecommunications network that uses circuit switched technology to provide voice telephony services.

## Radio Base Station (RBS) backhaul circuit

A circuit provided by BT that connects a mobile communications provider's base-station to the mobile communications provider's mobile switching centre.

## **RAV model**

This model calculates the forecast asset values, depreciation and holding gains for Access Copper and Duct. The model also applies a regulatory adjustment (RAV adjustment) previously applied by Ofcom.

#### Regulatory asset value (RAV)

The value ascribed by Ofcom to an asset or capital employed in the relevant licensed business.

## **Regulatory financial statements (RFS)**

The financial statements that BT is required by Ofcom to prepare, have audited and publish.

## **Return on capital employed (ROCE)**

The ratio of accounting profit to capital employed. The measure of capital employed can be either Historic Cost Accounting (HCA) or Current Cost Accounting (CCA).

#### **Retail price index (RPI)**

A measure of inflation published monthly by the Office for National Statistics. It measures the change in the cost of a basket of retail goods and services.

#### Service Level Agreement (SLA)

A contract between a network service provider and a customer that specifies, usually in measurable terms, what services the network service provider will furnish.

## Service Level Guarantee (SLG)

A contractual agreement specifying the compensation payable if the service provider fails to deliver the agreed service performance.

#### Stand Alone Cost (SAC)

An accounting approach under which the total cost incurred in providing a product is allocated to that product.

#### Storage Area Network (SAN)

A high bandwidth special-purpose network that connects different kinds of data storage devices with associated data servers on behalf of a larger network of users.

#### Supplementary depreciation

The additional depreciation charge to convert an HCA depreciation charge into a CCA depreciation charge.

#### SSNIP

Small but Significant Non-transitory Increase in Price, usually considered to be 5 to 10 per cent, which is part of the hypothetical monopolist test used in market definition analysis.

#### Synchronous Digital Hierarchy (SDH)

A digital transmission standard that is widely used in communications networks and for leased lines.

#### Symmetric broadband origination (SBO)

A symmetric broadband origination service provides symmetric capacity from a customer's premises to an appropriate point of aggregation, generally referred to as a node, in the network hierarchy. In this context, a "customer" refers to any public electronic communications network provider or end-user.

## Symmetric Digital Subscriber Line (SDSL)

A DSL variant that allows broadband signals to be transmitted at the same rate from end user to exchange as from exchange to end user.

## The June BCMR Consultation

The June 2012 consultation forming part of this market review. See Annex 16 for links to the document.

## The LLCC Consultation

The July 2012 consultation on charge controls for leased lines services, forming part of this market review. See Annex 16 for links to this document

## The November BCMR Consultation

The November 2012 consultation forming part of this market review. See Annex 16 for links to the document.

## The 2007/8 Review

Ofcom's previous of the retail and wholesale leased lines markets.

## Tier 1

A tier in BT's SDH network that denotes a network of nodes covering areas of high population. These nodes are connected by very high capacity line systems and denote the BT trunk network.

## Traditional Interface (TI) Leased Lines

Leased lines services with an ITU G.703 Interface.

## Traditional interface symmetric broadband origination (TISBO)

A form of symmetric broadband origination service providing symmetric capacity from a customer's premises to an appropriate point of aggregation in the network hierarchy, using a ITU G.703 interface.

## Time Division Multiplexing (TDM)

A method of combining multiple data streams for transmission over a shared channelby means of time-sharing. The multiplexor shares the channel by repeatedly allowing each data stream in turn to transmit data for a short period. PDH and SDH are examples of systems that employ TDM.

#### Voice over IP (VoIP)

A generic term used to describe telephony services provided over IP networks.

## Virtual Private Network (VPN)

A technology allowing users to make inter-site connections over a public telecommunications network that is software partitioned to emulate the service offered by a physically distinct private network.

#### Wave Division Multiplex (WDM)

An optical frequency division multiplexing transmission technology that enables multiple high capacity circuits, to share an optical fibre pair by modulating each on a different optical wavelength.

## Weighted average cost of capital (WACC)

The rate that a company is expected to pay on average to all its security holders to finance its assets.

#### Wide Area Network (WAN)

A geographically dispersed telecommunications network, typically a corporate network linking multiple sites at different locations.

#### Wholesale Broadband Access (WBA) Market

The wholesale market for fixed broadband services.

#### WBA CC

Ofcom statement published in March 2012 implementing charge controls on services provided by BT in the WBA Market. See Annex 16 for links to the document

#### Western, Eastern, Central and East London Area (WECLA)

The geographic market defined by Ofcom in this market review.

#### Wholesale Extension Service (WES)

A BT wholesale Ethernet product that can be used to link a customer premise to a node in a communications network.

#### Wholesale end-to-end service (WEES)

A BT wholesale Ethernet product that can be used to provide a point-to-point connection between two customer's sites.

#### Wholesale Local Access (WLA) Market

The wholesale market for fixed telecommunications infrastructure, specifically the physical connection between end users' premises and a local exchange..

#### Wholesale Line Rental (WLR)

A remedy that requires BT to rent telephone lines to CPs on a wholesale basis.

#### WLR LLU CC

Ofcom statement published in July 2011 implementing charge controls on WLR and LLU services provided by BT.

#### 21st Century Network (21CN)

BT's next generation network upgrade.