

# Partial Private Circuits Charge Control

Final Statement

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# Contents

<b>Chapter</b>		<b>Page</b>
	Summary	3
1	Introduction	9
2	Rationale for charge control	15
3	Construction of baskets for charge control	22
4	Deriving values of X	29
5	Implementation of charge control	48
6	Conclusions and Next Steps	60
A	Notification	64
B	Ofcom's Forecasting Model	87
C	Analysis of charges at start of charge control	100
D	Cost of Capital	107
E	Summary of NERA report	121
F	NERA response to BT comments on efficiency study	126
G	List of respondents	131
H	Glossary	132

## Summary

- S.1 In Ofcom's Final Statement on the Review of the retail leased lines, symmetric broadband origination and wholesale trunk segments markets ("the LLMR Statement") Ofcom concluded that BT has Significant Market Power ("SMP") in the wholesale markets for low bandwidth (up to and including 8Mbit/s) and high bandwidth (above 8Mbit/s up to and including 155Mbit/s) traditional interface symmetric broadband origination (TISBO) in the UK (excluding the Hull area). These markets include leased lines services, and in particular Partial Private Circuits ("PPCs") terminating segments. PPC terminating segments are wholesale leased line products that allow Altnets to compete with BT in the provision of end to end retail leased lines and other data services.
- S.2 The LLMR Statement imposed on BT, amongst other SMP services conditions, Conditions G4 and GG4 which implement an interim charge control for PPC terminating segments services falling within the markets for low bandwidth and high bandwidth TISBO respectively ("the interim charge control"). Under those conditions, the interim charge control has remained in place. This document implementing the longer term PPC terminating segments charge control ("the PPC terminating segments charge control") replaces the interim charge control.
- S.3 It is Ofcom's intention that the PPC terminating segments charge control set out in this document will give stability in the markets for PPC terminating segments and will encourage BT to reduce its costs of provision leading to the efficient supply of these services. This will also promote competition in the downstream markets, particularly retail leased lines.

### The present document

- S.4 On 24 June 2004 Ofcom set out its proposals to modify SMP services Conditions G4 and GG4 so as to control future prices for PPC terminating segments by means of an annual RPI-X% reduction. The formal Notification under the Communications Act 2003 ('the Act') recording Ofcom's specific proposals was published and stakeholders were invited to make representations within the consultation period ending on 30 July 2004.
- S.5 This document sets out Ofcom's final decisions for the PPC terminating segments charge control, having taken into account the representations of the stakeholders who responded to the consultation document. Respondents were invited to answer a number of specific questions regarding Ofcom's proposals and these are addressed in detail in the main document.

### Summary of Conclusions

#### Scope

- S.6 The scope of the PPC terminating segments charge control is limited to the products and services relating to the provision of PPC terminating segments in the low and high bandwidth markets for TISBO, where BT has been found to have SMP. Radio Base Station ("RBS") backhaul and Local Loop Unbundling ("LLU") backhaul products and services have not been included within the scope of the PPC terminating segments charge control. Although in Ofcom's view these backhaul products and services are technically equivalent to the PPC terminating segments products and services subject to the control, these

services were not subject to the PPC Phase 2 Direction. Moreover, Ofcom considers that to extend the scope of this regulation at this time is unnecessary, given the requirement on BT to supply these services on equivalent terms to PPC terminating segments. As in the case of any additional PPC terminating segment products, RBS backhaul and LLU backhaul products require BT to comply with its other ex-ante and general competition law obligations.

- S.7 The majority of respondents agreed with the proposed scope of the control. However, Ofcom received representations from some stakeholders that the scope of the PPC terminating segments charge control should be extended by 2005 to include all TISBO services (which includes RBS and LLU) and alternative interface symmetric broadband origination (AISBO) services.
- S.8 Ofcom has decided that it is not reasonable or proportionate to extend the scope of this control. Ofcom concluded in the LLMR Statement that the scope of the PPC charge control should be limited to the PPC products and services for which charges were determined as part of the Phase 2 Direction. Therefore, Ofcom is not intending to extend the scope of the charge control at this stage. BT is subject to ex-ante obligations e.g. non-discrimination, cost orientation and the requirement to meet reasonable requests for supply, along with its obligations under general competition law, in the provision of LLU backhaul and RBS backhaul services. Moreover, BT is required to ensure that charges for LLU backhaul are consistent with charges applicable to those elements which are common to LLU backhaul and PPCs. These ex-ante conditions are expected to have the effect of constraining BT's charges for these services.

#### **Duration**

- S.9 The PPC terminating segments charge control will have a duration of four years, as this will provide stability in the market and increase incentives on BT to achieve efficiency savings. This is in keeping with other charge controls that have been implemented in the telecommunications sector in the UK and Ofcom believes there are insufficient reasons for departing from the standard approach.
- S.10 Some respondents to the consultation document argued strongly for the charge control to be of shorter duration (2 years) or subject to a mid-term review because of uncertainty regarding the volume forecasts and costs for these services associated with a relatively new product market.
- S.11 Further informal representations regarding the duration of the PPC price control have been made by some stakeholders since the consultation period ended. Ofcom has considered all representations but has decided that imposing a two year charge control, or a mid-term review, would not be appropriate as it would weaken the incentive properties of the RPI-X control and would undermine Ofcom's objective of providing stability in the product market.
- S.12 If there were significant changes in the low and high bandwidth markets for TISBO these would be assessed in the next LLMR. If material changes in the relevant product markets were found to have occurred, Ofcom would be required to review whether the PPC terminating segments charge control remained appropriate.

## **Form**

S.13 An RPI-X form of charge control will be implemented. This form of charge control has been widely used in the regulation of UK utilities, including those in the telecommunications sector.

## **Structure**

S.14 Ofcom considered a number of key issues in relation to the structure of the control. These included:

- The construction of charge control baskets: Ofcom is imposing three separate baskets, one for PPC terminating segments equipment charges, one for low bandwidth PPC terminating segment connection and rental and maintenance charges and one for high bandwidth PPC terminating segment connection and rental and maintenance charges;
- The weighting of the charge control baskets: Ofcom is using prior year revenue weights in order to check compliance with the charge control;
- The treatment of BT's equipment costs within the charge control: Ofcom is using BT's equipment purchase contract to inform the proposed value of X;
- Geographic discounts: Ofcom is allowing BT to offer geographic discounts but these will not contribute to BT meeting its charge control obligations; and
- Volume discounts: Ofcom is not allowing BT to offer volume discounts.

## **Efficiency Studies**

S.15 The objective of the PPC terminating segments charge control is to bring BT's charges into line with an efficient level of costs at the end of the charge control period. As part of this process it is important to understand the extent of BT's efficiency/ inefficiency at the outset of the charge control so that if there is some inefficiency, its erosion can be reflected in the value of X.

S.16 Ofcom employed economic consultants NERA to carry out studies to examine the efficiency of BT's network relative to appropriate comparator companies, principally the US Local Exchange Carriers (LECs). These studies expand upon the comparative efficiency analysis which has previously been undertaken by NERA for Oftel in relation to other charge controls in place on BT.

S.17 NERA's conclusion is that BT is in the region of 9% to 10% inefficient in its provision of services over its network as a whole relative to the top performing decile of the US LECs. It is reasonable to expect inefficiency existing at the start of the charge control period to be eliminated over the life of the four year control, just as competitive pressure would force companies to become efficient in a competitive market. The underlying rate of cost reduction over the period of

the charge control is therefore adjusted to reflect the anticipated reduction in inefficiency.

- S.18 The range of values for X in the June consultation reflected Ofcom's view that BT's inefficiency was likely to be in the range of 5-10%. This followed discussions between NERA and BT prior to publication of the final NERA report, and presentation of an alternative model specification by BT which, it was argued, was a better statistical fit of the LEC data, and which suggested that BT's relative inefficiency is 1%. In Ofcom's view the result from the alternative model specification was implausible, as it contradicted known cost trends for the period measured by the report and did not fit a priori expectations.
- S.19 Most respondents supported Ofcom's conclusions on the measure of BT's relative inefficiency although some suggested that the relevant range was that concluded by NERA i.e. 9% to 10%. BT set out further arguments that a measure of 0% to 1% is more appropriate. After considering the responses to the consultation, Ofcom believes that the range proposed in the consultation document for BT's relative inefficiency of 5% to 10% is reasonable, and has decided to use 7.5%, the midpoint of this range, as a measurement of inefficiency.

### **BT's cost of capital**

- S.20 In deriving the values of X, the aim of the financial modelling exercise is to estimate charging constraints such that, by the end of the charge control period, BT is forecast to earn a level of return on the basket services that is equal to its weighted average cost of capital (WACC). As part of the current review Ofcom has updated its view on BT's cost of capital, last calculated by Oftel in February 2001, because the constituent parameters of BT's WACC tend to vary over time in line with changing equity and bond market conditions.
- S.21 Overall, using a broad range of parameters, Ofcom estimates BT's pre-tax nominal cost of capital for BT to be approximately 13%. This is slightly higher than the estimate proposed in the consultation document (12.5%) due to the use of a slightly higher risk free rate to reflect more recent information.

### **Values of X**

- S.22 Ofcom has developed a cost forecasting model to calculate proposed values of X for the PPC terminating segments charge control, apart from the value of X for the equipment costs basket which is informed by BT's current equipment purchase contract. The underlying methodology of Ofcom's approach is consistent with that used in other charge controls applicable to BT. The forecasting model uses a variety of inputs and data sources to calculate the values of X.
- S.23 Respondents to the consultation broadly agreed with Ofcom's adjustments to model parameter data provided by BT, in particular arguing that they would expect the volume of low bandwidth circuits to increase over the period of the control. BT disagreed with the adjustments Ofcom made to BT's data, arguing that the volume forecasts were those being used internally within BT. BT also argued that Ofcom's forecast of price reductions for cable and duct asset types were inappropriate and that modest price increases for these asset types were more likely. Ofcom has considered all the responses and has made

adjustments to the values of the model parameters where these are appropriate.

**Ofcom’s values of X for the PPC charge control to 2008/09**

Basket	Value of X <sup>1</sup>
POC end and third party end equipment charges	8.9%
Low bandwidth connection and rental and maintenance charges	4.0%
High bandwidth connection and rental and maintenance charges	6.5%

**Introduction of Sub-caps**

S.24 Ofcom, after considering responses to the June consultation document, is including in the charge control conditions sub-baskets for each of the main baskets. The sub-baskets for the low and high bandwidth baskets will require BT to reduce its connection charges and its rental and maintenance charges by RPI+0 in each year of the control. This is in response to concerns from respondents relating to BT’s ability to rebalance its charges between connection charges and rental and maintenance charges. The equipment sub-basket requires BT to reduce the charge for each individual item of equipment by RPI-3. This sub-basket reflects the additional flexibility offered BT by the change in the main equipment basket from an indexation of charges by RPI-8.9 to an aggregate basket approach and Ofcom’s belief that the prices BT will face for individual items of equipment will not, over the period of the control, increase in nominal terms.

**Level of charges at start of control**

- S.25 The PPC terminating segments charge control will be applied to the current charges in place on 30 September 2004.
- S.26 Prior to the publication of the consultation document, BT produced a model to derive individual charges for each service covered by the proposed PPC terminating segments charge control. However, use of the outputs derived directly from BT’s model would have resulted in significant increases in some charges and a change in the relative structure of prices. These outputs suggested a need for significant changes in the prices of BT’s PPC terminating segment charges, with prices rising overall. As set out in the consultation document, Ofcom is currently unable to endorse BT’s model or its outputs due to uncertainty about the assumptions used in BT’s model and conflicting outputs (which indicated prices needed to rise) and profitability information (that indicated that BT was recovering its costs). In addition, the most up to date accounting information provided BT indicates that its overall profitability in

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<sup>1</sup> Values of X for the low bandwidth and high bandwidth charge control baskets are rounded down to the nearest quarter integer.

providing PPC services is currently in excess of its cost of capital and therefore does not provide compelling evidence of a need for increased prices. Therefore, Ofcom is not proposing to revise starting charges for the charge control. This is consistent with the approach set out in the consultation.

### **Alternative BT proposals**

- S.27 Prior to publication of the consultation document, Ofcom offered BT the opportunity to put forward an alternative set of PPC terminating segments charges. Ofcom requested that BT's proposal address the competition problems in the relevant markets and related markets at least as well as Ofcom's proposals. BT's proposal would have the effect of rebalancing trunk and terminating segment charges within the context of a significant aggregate reduction in prices over the 4 years of the proposed control. These were set out in Section 6 of the consultation proposals.
- S.28 However, Ofcom continues to believe that its proposals for controlling PPC terminating segments are preferable, a view supported by all respondents apart from BT. Ofcom is therefore implementing a charge control on current PPC terminating segment charges, as set out in the consultation document.

## Chapter 1

# Introduction

### Historical regulation of PPCs

- 1.1 In December 2002, Director General of Telecommunications (OfTel) published the Phase 2 PPC Direction<sup>2</sup> which set the prices that BT could charge for the provision of PPC terminating segments. The Phase 2 PPC Direction set starting charges from 1 August 2001 based on BT's 2000/01 cost data.

### The New Regulatory Framework

- 1.2 A new regulatory framework for electronic communications networks and services entered into force on 25 July 2003. The framework is designed to create harmonised regulation across Europe and is aimed at reducing entry barriers and fostering prospects for effective competition to the benefit of consumers. The basis for the new regulatory framework is five new EU Communications Directives<sup>3</sup>. Four of these Directives were implemented in the UK via the Communications Act (the "Act") on 25 July 2003. Ofcom's powers and duties in respect of the regulation of electronic communications are set out in the Act. The fifth Directive was implemented by Regulations which came into force on 11 December 2003.
- 1.3 The new Directives require national regulatory authorities ("NRAs"), such as Ofcom, to carry out reviews of competition in communications markets to ensure that regulation remains proportionate in the light of changing market conditions.
- 1.4 Prior to the assumption by Ofcom of its full range of powers and functions under the Act on 29 December 2003, certain preparatory work, including a number of market review consultations, was carried out by OfTel. OfTel ceased to exist on 29 December 2003, and all preparatory work carried out by OfTel under the Act and new Directives prior to this date now has effect as if done by Ofcom. This includes the Leased Lines Market Review (LLMR) consultation

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<sup>2</sup> "Partial Private Circuits: Phase two. A direction to resolve a dispute concerning the provision of partial private circuits." OfTel, 23 December 2002.

<sup>3</sup> Directive 2002/21/EC on a common regulatory framework for electronic communications networks and services (the "Framework Directive"); Directive 2002/19/EC on access to, and interconnection of, electronic communications networks and associated facilities (the "Access and Interconnection Directive");

Directive 2002/20/EC on the authorisation of electronic communications networks and services (the "Authorisation Directive"); Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services (the "Universal Service Directive"); and Directive 2002/58/EC concerning the processing of personal data and the protection of privacy in the electronic communications sector (the "Privacy Directive").

documents of 11 April 2003<sup>4</sup> and 18 December 2003<sup>5</sup>, prior to the issue of the LLMR Final Statement by Ofcom, published on 30 June 2004.

## The Leased Lines Market Review

1.5 In the LLMR Ofcom assessed a number of markets and found that BT has SMP in, amongst others, the following product markets in the UK excluding the Hull area:

- low bandwidth traditional interface broadband origination; and
- high bandwidth traditional interface broadband origination.

Partial Private Circuits (“PPC”) terminating segments are services within each of these markets.

- 1.6 The LLMR consultation documents indicated that Oftel would, as part of its programme to implement the new EU Directives, implement a longer term PPC terminating segments charge control (“the PPC terminating segments charge control”) to regulate the price of PPC terminating segments, which are an important wholesale input into retail leased line markets.
- 1.7 Since assuming its full range of powers and functions under the Act in December 2003, Ofcom has continued the analysis of the leased lines market begun by Oftel. In the LLMR Statement Ofcom imposed, by way of SMP Services conditions G4 and GG4, an interim charge control on PPC terminating segments (“the interim charge control”), to be in place until the PPC terminating segments charge control could be implemented.
- 1.8 The interim charge control was imposed by the LLMR on the basis that a longer term PPC terminating segments charge control should be the subject of a separate consultation. This is because the imposition of a longer term charge control necessitated a detailed analysis of the likely future changes in the costs of providing PPC terminating segments TISBO services. At the time of consulting on the findings of the LLMR, the required analysis had not been completed. Ofcom therefore imposed an interim charge control to ensure that the provision of PPC terminating segments would remain broadly cost orientated while the analysis for the longer term PPC terminating segments charge control was being undertaken. The conclusions of that analysis have informed Ofcom’s decisions as set out in this statement.
- 1.9 This document, and in particular the Notification at Annex A, modifies SMP services Conditions G4 and GG4. These modifications set the control of future prices for PPC terminating segments by means of an annual RPI-X% reduction. The values of X, the amount by which the PPC terminating segments charges will reduce each year throughout the duration of the charge control, are set out in section 4. Further discussion regarding the implementation of the PPC charge control is set out in section 5.

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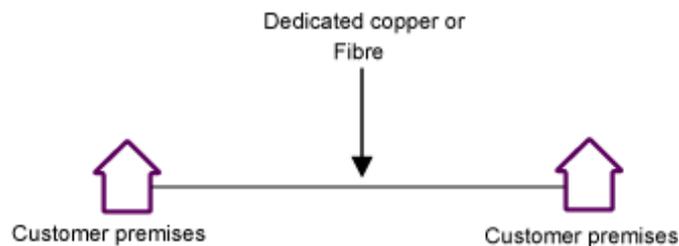
<sup>4</sup> “Review of the retail leased lines, symmetric broadband origination and wholesale trunk segment markets, A consultation by the Director General of Communications”, Oftel, 11 April 2003.

<sup>5</sup> [http://www.ofcom.org.uk/consultations/past/llmr/llmr\\_review/?a=87101](http://www.ofcom.org.uk/consultations/past/llmr/llmr_review/?a=87101)

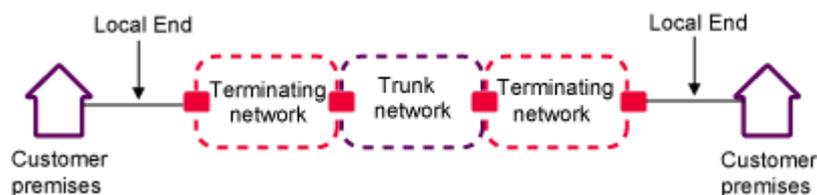
## Technical Background

- 1.10 A leased line is a connection between two customer premises providing a transmission link of a fixed bandwidth. The link is uncontended and provides dedicated capacity between the customer premises. A leased line can be used for voice, video and data communications between customer premises and enable access to the Internet. For instance leased lines can be used to connect an organisation's main offices to a central database to facilitate transactions, order handling and many other applications. There are a range of leased lines bandwidths to suit the requirements of retail customers, typically from 64kbit/s up to 1Gbit/s.
- 1.11 Leased lines are typically provided using copper or fibre and using a variety of transmission technologies. A leased line can be provided by linking a pair of customer premises using dedicated copper or fibre or can be provided by using copper or fibre local ends that connect the end customer to a transmission network.

**Figure 1.1: A Leased Line using a dedicated transmission medium**



**Figure 1.2: A Leased Line provided using a transmission network**

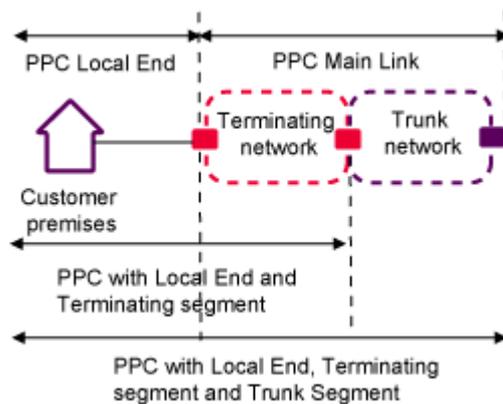


- 1.12 A leased line provided using dedicated fibre or copper is likely to be providing an Alternative Interface such as Ethernet whereas a leased line provided over a transmission network is likely to be providing a Traditional Interface such as Synchronous Digital Hierarchy ("SDH"), which is a network technology that enables transmission of various bandwidths of data to be combined and transmitted through fibre optic networks to enable complex leased lines and data communications services to be provided to customers.

## Partial Private Circuits

- 1.13 A PPC is a part leased line providing a dedicated capacity connection from a customer premise to an operator's point of connection (POC) with BT's Leased Line SDH network. PPCs are available at all bandwidths from 64kbit/s to 622Mbit/s. PPCs are available only in traditional interface form.
- 1.14 Figure 1.3 below depicts three PPCs each having different components which are effectively dependent on the length of the PPC.

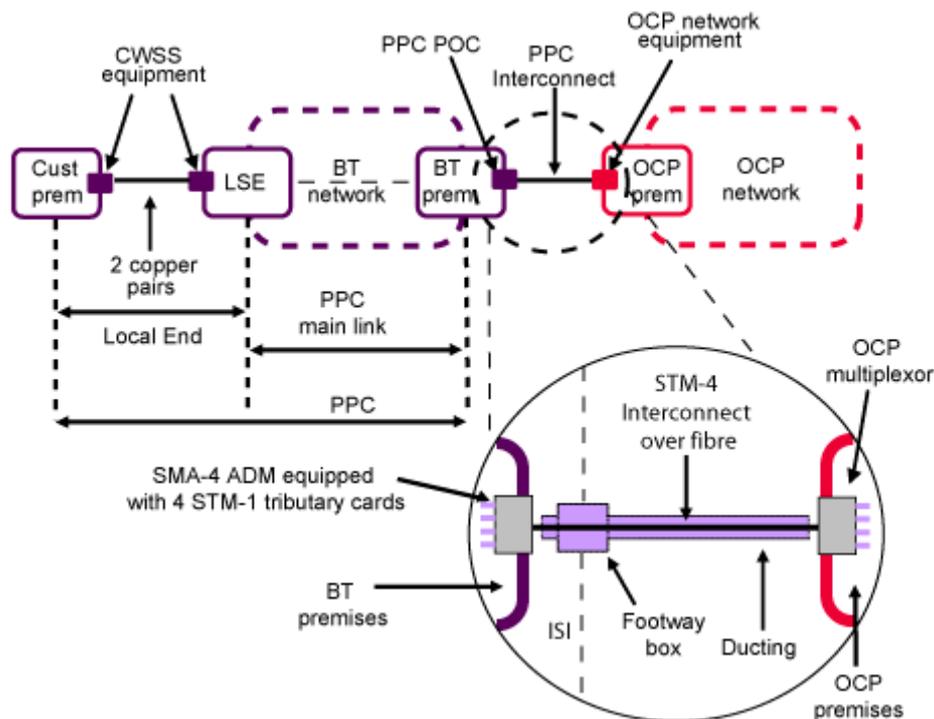
**Figure 1.3: A Partial Private Circuit**



1.15 A PPC will always have a terminating segment that includes a local end which is the dedicated link between the customer premise and the Local Serving Exchange (LSE) and is provided using copper pairs or fibre pairs. A PPC can also have a 'Main Link' which comprises dedicated transmission capacity between the Local Serving Exchange and the operator's Point of Connection with BT's network. This Main Link can have a mixture of Terminating network and Trunk network transmission usually called terminating and trunk segments. Ofcom's proposals set out in this consultation document relate only to PPC terminating segments.

1.16 Figure 1D below depicts a 2Mbit/s PPC in greater detail showing the Local End, Main Link and the Point of Connection (POC).

**Figure 1D – 2Mbit/s PPC**



## **The structure of PPC charges**

- 1.17 Ofcom is not proposing to make changes to the current PPC terminating segments charging structure that was originally constructed through a commercially negotiated agreement between BT and industry. The various charge types are explained below.

### **Equipment and infrastructure charges**

- 1.18 Where equipment and infrastructure was provided by BT to operators, the cost of the provision was to be recovered up-front. This included third party local end infrastructure and POC equipment and infrastructure. In the context of PPC terminating segments, equipment and infrastructure include: equipment, copper, fibre, and duct. PPC terminating segments, when ordered, would have a connection charge and a rental charge in addition to the third party equipment and infrastructure connection charges. POC equipment and infrastructure have a connection charge and a rental charge.

### **PPC circuit connection charges**

- 1.19 The circuit connection charge is the charge levied to recover the costs incurred by BT in provisioning the PPC terminating segments.

### **PPC circuit rental and maintenance charges**

- 1.20 The circuit rental and maintenance charges are the charges levied by BT for the ongoing rental and maintenance of the PPC terminating segments. The PPC terminating segments rental has three main components; a Local End Fixed Charge, a Main Link Fixed Charge and a Main Link per kilometre Charge.

#### **Local End Fixed Charge**

- 1.21 This is a flat rate charge depending on the bandwidth of the Local End but the costs of the Local End are averaged for each bandwidth so this charge is independent of the type of Local End infrastructure deployed. For instance, a 2Mbit/s Local End can be provided over copper or fibre but the Local End fixed charge is the same for either type of Local End.

#### **Main Link Fixed Charge**

- 1.22 This is a flat rate charge for PPC terminating segments with a Main Link and has no distance related element but is dependant on the bandwidth of the PPC terminating segments.

#### **Main Link per Kilometre Charge**

- 1.23 This is a charge per kilometre for the Main Link and again this varies by bandwidth. Initially the commercially agreed pricing for the Main Link per Kilometre charge was cost oriented up to 15km with pricing freedom for longer Main Links.

## **The consultation document**

1.24 The PPC terminating segments charge control consultation document was published on 30 June 2004 (“the June Consultation”). 10 responses were received and a list of respondents is set out in Annex G.

## **Outline of rest of the document**

1.25 The following Sections cover:

- Rationale for RPI-X form of control (Section 2)
- Proposals for charge control baskets (Section 3)
- Derivation of Values of X (Section 4)
- Implementation of charge control including the modification of the SMP condition (Section 5)
- Conclusions (Section 6)

1.26 In addition Ofcom has provided Annexes on:

- Notification of modification of existing SMP conditions G4 and GG4 (Annex A)
- Ofcom’s Forecasting Model (Annex B)
- Analysis of charges at the start of charge control (Annex C)
- BT’s Cost of Capital (Annex D)
- NERA efficiency study summary (Annex E)
- NERA response to BT comments on efficiency study (Annex F)
- List of respondents to the June consultation document (Annex G)
- Glossary (Annex H)

## Chapter 2

# Rationale for charge control

### Imposing a longer term charge control

- 2.1 Ofcom considers that it is appropriate to impose a longer term PPC terminating segments charge control in the markets for low and high bandwidth traditional interface symmetric broadband origination, where BT has been found to hold SMP, in order to promote competition in the downstream markets, including retail leased lines. Ofcom considers that the promotion of competition in these markets through the imposition of the PPC terminating segments charge control will further the interests of consumers by resulting in cheaper prices at the retail level.
- 2.2 Regulation at the wholesale level is designed to address the problems which result from the existence of SMP in the relevant wholesale market. In particular it is designed to ensure that the SMP at the wholesale level does not restrict or distort competition in the relevant downstream markets or operate against the interests of consumers, for example through excessively high prices. The long term PPC terminating segments charge control set out in this document will have the effect of encouraging BT to provide PPC terminating segments services at an efficient level as well as encouraging competition in retail leased lines, by preventing the fixing and maintaining of prices at an excessively high level in the wholesale markets for PPC terminating segments.
- 2.3 Ofcom does not consider that the obligations for cost orientation imposed on BT by the LLMR in the low bandwidth and high bandwidth TISBO markets provide sufficient constraint on PPC terminating segment charges and that it is necessary to apply a charge control. Ofcom concluded in the LLMR that in the absence of charge controls, BT would have little incentive to reduce or constrain increases in its costs and hence in its PPC terminating segments prices.
- 2.4 By regulating BT's PPC terminating segments prices in the manner set out in this document, Ofcom considers that a longer term charge control is appropriate for the purposes of promoting efficiency and sustainable competition by encouraging BT to be more efficient and enabling other communications providers to compete with BT at the retail level. This will result in the availability of a wider range of services at lower prices, thereby conferring the greatest possible benefits on the end users of public electronic communications services.
- 2.5 The longer term charge control will ensure that competing communications providers and ultimately retail customers will be protected from increasing wholesale charges and will provide incentives to improve efficiency.

### Scope of charge control

- 2.6 The scope of the PPC terminating segments charge control is limited to the products and services that fall within the market for TISBO services, the prices of which were determined as part of the Phase 2 Direction. The scope of the charge control is narrower than that addressed in the Phase 2 Direction because it does not include charges for very high bandwidth PPC terminating

segments which were also included in that Direction. The charge control excludes the very high bandwidth TISBO market since Ofcom's LLMR concluded that BT does not have SMP in this market. Therefore it is not necessary to impose ex-ante regulatory controls in this market.

- 2.7 It is open to BT to introduce additional PPC terminating segment products at any time subject to the notification and other requirements imposed by the LLMR. Subject to conditions G4 and GG4, set out in Annex A, any additional PPC terminating segment products would not be included within the scope of this charge control (except where any such new product is wholly or substantially in substitution for an existing product which is subject to the control). Nevertheless, BT will be required to comply with its other ex-ante obligations in the relevant markets i.e. non-discrimination, cost orientation and the requirement to meet reasonable requests for supply, along with its obligations under general competition law.

### **RBS Backhaul and LLU backhaul**

- 2.8 Ofcom has not included RBS backhaul and LLU backhaul products and services within the scope of the PPC terminating segments charge control, even though in Ofcom's view these backhaul products and services are technically equivalent to the PPC terminating segments products and services subject to the control. These services were not subject to the PPC Phase 2 Direction and Ofcom considers that to extend the scope of this regulation at this time is unnecessary. As in the case of any additional PPC terminating segment products, RBS backhaul and LLU backhaul products must be supplied by BT in accordance with its other ex-ante and general competition law obligations, as highlighted in the previous paragraph.

### **Form of control**

- 2.9 Ofcom has decided to apply a RPI-X form of control for a four-year period. An RPI-X form of control requires that a weighted average of prices should not increase by more than inflation less a specified X factor. A RPI-X charge control has a number of key features which include:
- baskets into which different products and services are grouped and to which different values of X can be applied; and,
  - a fixed duration over which the charge control is in place.
- 2.10 This form of control has been widely used in the regulation of UK utilities, including the telecommunications sector. It can be set over a number of years so as to reflect future efficient operating costs and an appropriate return to shareholders.
- 2.11 One of the main benefits of RPI-X type price regulation is that it creates incentives for firms to increase their efficiency. By divorcing the level of charges from the firm's incurred costs, for a period of time, the regulated firm has an incentive to increase its cost efficiency over and above the increase in efficiency forecast when the charge control is set, by reducing costs below those reflected within the charge cap i.e. generating unanticipated efficiency gains. The charge controlled firm benefits from this efficiency through increased profits for the remaining duration of the charge control.

- 2.12 If there is a subsequent charge control, in setting its terms, the gap between price and cost is generally closed by a glide path, rather than a one-off adjustment. Therefore, the regulated firm benefits from the unanticipated efficiency gain for some time into the subsequent charge control period. However these unanticipated efficiency gains feed into a tighter charge control going forward. In this way the gains from increased cost efficiency are shared between the firm and consumers, so that consumers benefit in the longer term.
- 2.13 In reaching its decision Ofcom considered whether other forms of charge control would be more appropriate for the regulation of BT's PPC terminating segment charges, such as "rate of return" regulation. Rate of return regulation involves setting the rate at which the regulated firm can make a return on its capital employed and it is this, along with its operating costs, that determines the charges that the firm can set. This form of regulation was popular in the regulation of utilities in the US and has the main advantage that there is unlikely to be any extreme profit or loss. However, this form of control involves out-turn costs being passed through to prices, so there is a significant incentive for the regulated firm to over-invest in its regulated business as it is guaranteed to earn a return on its investment. Furthermore, there is little incentive on firms to achieve efficiency savings. Therefore, customers may not benefit in the longer term. There are additional disadvantages in this approach related to the specification of the appropriate rate of return and how the firm and customers should share any losses.
- 2.14 In setting the terms of the charge control, Ofcom has taken account of the potential consequences of setting the charge control too tightly. This could impact the ability of LLU communications providers to build a sustainable business since TISBO is one of the markets that LLU communications providers might wish to enter; and the charge control may cause BT to price its PPC terminating segments below cost. This in turn could act as a disincentive (both to BT and to other communications providers) to invest in infrastructure.

### **Responses to the consultation**

- 2.15 Most respondents agreed with Ofcom's proposals to implement an RPI-X charge control on BT's PPC terminating segments. However, two respondents (Energis and UKCTA) commented that the scope of the charge control should be extended to include all traditional interface symmetric broadband origination (TISBO) and alternative interface symmetric broadband origination (AISBO) services.
- 2.16 Ofcom believes that it is currently unnecessary to include other TISBO services, such as LLU backhaul and RBS backhaul services, within the scope of the PPC charge control. While LLU backhaul and RBS backhaul fall within the boundary of the TISBO markets as defined in the LLMR, these services were not included within the PPC dispute, Phase 2 of which set the original PPC terminating segment charges (see paragraph 1.1).
- 2.17 BT, in the provision of LLU backhaul and RBS backhaul services remains subject to its ex-ante obligations, i.e. non-discrimination, cost orientation and the requirement to meet reasonable requests for supply, along with its obligations under general competition law. While Ofcom believes that it would be inappropriate to include LLU backhaul and RBS backhaul in this charge control, it may become appropriate to extend the scope of the PPC terminating segments charge control in the future, following full transparent consultation.

## Duration

- 2.18 Ofcom has decided to impose a four year RPI-X charge control on the products defined in the scope of the control. In the telecommunications sector in the UK, charge controls have generally been put in place for periods of four years. This period of time recognises an appropriate balance between providing efficiency incentives for the regulated firm and the constraints resulting from forecast uncertainty, as discussed in the following two paragraphs.
- 2.19 As recognised in paragraphs 2.16 of the consultation document, PPC terminating segments are a relatively new product with limited available information regarding how costs or demand at different bandwidths may change over time. If the duration of the control is too long, there is an increased likelihood that the actual costs will differ significantly from the forecast costs used to formulate the value of X. If the actual costs are below the forecast costs, the benefits of these lower costs will not be passed through to customers. On the other hand, if the actual costs are higher than predicted it may become difficult for the regulated firm to make a reasonable return on its regulated activities. One approach to address this concern would be to review the terms of the charge control before the end of the control period. However the uncertainty that this approach would create would reduce the incentives to increase efficiency.
- 2.20 While uncertainty about future cost and demand trends may suggest the need for a charge control of shorter duration, this would also reduce the time over which BT can outperform the control, thus diluting the incentive properties of the charge control. One result may be that BT's costs would not be reduced as quickly as if a charge control had been in place for a longer period of time and thus competing communications providers (referred to hereafter as Altnets) and ultimately consumers, may face higher charges in the future. In addition, if the duration of the charge control is too short, this would reduce the time between control reviews, increasing the regulatory burden.
- 2.21 Ofcom has also considered the duration of the proposed charge control in the context of the next review of competition in the wholesale leased lines markets, which could happen within the next two years. At that time it may be appropriate to revise Ofcom's conclusions about the relevant geographic market definitions, including the relevant geographic markets and the extent of competition in the relevant markets. When reviewing competition in the wholesale leased lines markets, Ofcom will be required to review whether the PPC terminating segments charge control remains appropriate. For example, if Ofcom were to conclude that BT no longer has SMP in some markets as currently defined, or in parts of the current markets, then it would be inappropriate to continue the charge control in these markets or parts of markets.

## Responses to the consultation

- 2.22 Three respondents (Cable and Wireless, Energis and UKCTA) expressed the view that the charge control should be of shorter duration or include a mid-term review after two years. This view reflects their concern that there is significant uncertainty around the volume forecasts provided by BT which creates uncertainty regarding the level of future costs and the associated values of X. Other respondents agreed with Ofcom's proposals for a four year control.

- 2.23 As discussed in paragraphs 2.20 above, the duration of the charge control can have important and significant effects on the incentives of the regulated firm to increase efficiency and on the ability of the charge control to mimic the effects of a competitive market. It is Ofcom's view that reducing the period of the control to two years, or including a mid-term review, would potentially undermine the incentives on BT. As noted in paragraph 2.20 above, a two year control may mean that BT's costs of providing PPC terminating segments would not be reduced as quickly as would be the case under a four year control. Hence Ofcom does not believe that a two year control is in the best interests of Altnets, a competitive market or, ultimately, end consumers.
- 2.24 In Ofcom's view a four year charge control strikes an appropriate balance between ensuring sufficient incentives to increase efficiency and reduce costs and the risk that the data used to forecast the change in costs underpinning the charge control proposals will be out of line with the actual data in the future.
- 2.25 Further informal representations regarding the duration of the PPC price control have been made by some stakeholders since the consultation period ended, during which the stakeholders argued that new information regarding future technology changes and other relevant Ofcom projects should be taken into account in the price control, particularly if a four year control is to be imposed.
- 2.26 Although Ofcom recognises that future changes in technology and the outcome of other projects may have an impact on the underlying costs of PPC terminating segments in the future, this must be weighed up against the benefits of the incentive properties of a four year control discussed above. If there were significant changes in the low and high bandwidth markets for TISBO within the next two years, these would be assessed in the next LLMR. If material changes in the relevant product markets were found to have occurred, Ofcom would be required to review whether the PPC terminating segments charge control remained appropriate.
- 2.27 In addition, SMP services conditions G3 and GG3 of the LLMR impose cost orientation obligations on BT in the markets for low and high bandwidth TISBO which constrains BT's pricing flexibility for individual services. BT is subject to further ex-ante obligations, i.e. non-discrimination, cost orientation and the requirement to meet reasonable requests for supply, along with its obligations under general competition law, in the provision of PPC terminating segments. The price controls imposed as a result of this document do not override BT's general obligations under Condition G3 and GG3 to ensure its charges are cost oriented.
- 2.28 Therefore Ofcom is implementing a four year PPC charge control, as proposed in the consultation document.

### **Approach to equipment charges**

- 2.29 BT's equipment costs are driven mainly by its equipment supply contract. BT's contract with its supplier includes a pricing schedule for all the PPC terminating segments equipment that is listed in the BT carrier price list and that is subject to the charge control.
- 2.30 BT's current contract with its supplier is due to expire before the end of the period of the control. This means that Ofcom has been able to come to a reasonably accurate view of BT's PPC terminating segment equipment costs

for a significant part but not all of the relevant period. Therefore, Ofcom does not have the relevant PPC terminating equipment cost data upon which it can base its view of cost changes over the whole of the period of the control.

2.31 In paragraphs 2.23 to 2.29 of the consultation document, Ofcom considered three alternative approaches to the treatment of equipment charges within the PPC charge control framework. These three alternative approaches were:

- cost pass-through;
- RPI-X charge cap; and
- an error correction mechanism.

2.32 Ofcom proposed to include BT's equipment costs within the RPI-X form of charge control.

### **RPI-X charge cap**

2.33 As explained in paragraphs 2.9 -2.14, Ofcom believes that an RPI-X charge cap has a number of merits. These merits also apply to the application of RPI-X to BT's equipment charges. This mechanism creates incentives that are consistent with those present in a competitive market. However, it does involve increased risks for the charge controlled firm compared to an alternative cost pass-through mechanism. In this particular instance, the risk on BT is related to the renegotiation of its equipment purchase contract. Under cost pass-through, BT would be guaranteed to recover all of its equipment costs. However, under a RPI-X mechanism, this guarantee is removed.

2.34 However, the incentive properties of RPI-X are improved compared to a cost pass-through mechanism. This is because BT will generate additional profits if it is successful in negotiating a revised contract that results in lower equipment purchase costs. Therefore, BT should have an incentive to negotiate in a way that ensures that its equipment costs are minimised over the period of its subsequent equipment purchase contract. However, in the event that BT is unable to successfully negotiate a lower cost contract, BT's customers will continue to be protected from price increases by the RPI-X formula.

2.35 If BT is successful in negotiating a contract which it finds more favourable than assumed by Ofcom in determining the charge control for equipment costs, although BT will not be required within the framework of the charge control to pass through these cost reductions to its wholesale customers (subject to its cost orientation obligations), customers will potentially benefit in the longer term. If a further charge control was formulated beyond October 2008, and BT had a lower cost equipment purchase contract, it is likely that this would be used as the basis for setting the value of X applicable to equipment costs for that charge control. Under this scenario, BT's wholesale customers would then benefit from the lower costs that BT would incur during part of the proposed control period.

2.36 There is a relatively high degree of certainty as to how BT's equipment costs will change over a significant period of the charge control given the terms of BT's agreement with its equipment supplier. Moreover, it is Ofcom's view that equipment costs will continue to fall after the expiry of that agreement because equipment used to provide equivalent functionality in the future should, on the basis of well-established trends, become cheaper in nominal terms than the equipment currently used to provide such functionality. Whilst the extent of

future cost reductions is uncertain, Ofcom believes that it is reasonable to set a value of X for the equipment basket based on the information available from BT's current equipment purchase contract.

### **Responses to the consultation**

- 2.37 Most respondents that commented on this issue agreed with Ofcom's proposed approach to the treatment of BT's PPC terminating segments equipment costs. BT highlights two main concerns that it has with Ofcom's proposed treatment of its equipment costs. However, these relate to the structure of the charge control baskets. BT's comments are addressed in paragraphs 3.12–3.15 below.

## Chapter 3

# Construction of Baskets for charge control

### Introduction

- 3.1 In the previous section, Ofcom set out its decision to implement an RPI-X form of charge control across the relevant group of PPC terminating segments products and services identified, for a period of four years. An RPI-X form of control requires that a weighted average of prices should not increase by more than inflation less a specified X factor.
- 3.2 A charge control basket is the term used to describe a group of products and services that are subject to the same charge control restrictions. To determine appropriate charge control baskets Ofcom considered whether there is a greater degree of competitive pressures for one set of products or services compared to another. Where there is a differentiation of competitive pressures, it is inappropriate to group these products and services in the same basket because this could create opportunities and incentives for BT to charge in a way that has an anti-competitive effect. Therefore the regulated products and services have been disaggregated to construct a minimum number of baskets given the competitive characteristics of PPC terminating segments.

### Charge control baskets & weightings

- 3.3 Ofcom has decided that the different categories of PPC terminating segments charges should be separated into three baskets. There will be one basket each for:
- point of connection (POC) equipment and infrastructure charges and third party equipment and infrastructure charges;
  - low bandwidth circuits - connection charges of a new circuit and on going rental and maintenance charges; and
  - high bandwidth circuits - connection charges of a new circuit and on going rental and maintenance charges.
- 3.4 Ofcom will calculate the value of X and assess BT's compliance with the PPC terminating segments charge control on the basis of prior year revenue weights. This is consistent with the other charge controls applicable to BT.

### Approach to basket construction

- 3.5 Ofcom has considered whether the regulated PPC terminating segments products and services are subject to substantially different degrees of competition. The LLMR defines separate wholesale traditional interface symmetric broadband origination markets on a bandwidth basis, with separate markets for:
- wholesale low bandwidth TISBO (up to and including 8Mbit/s);

- wholesale high bandwidth TISBO (above 8Mbit/s up to and including 155Mbit/s); and
  - wholesale very high bandwidth TISBO (above 155Mbit/s).
- 3.6 The market analysis set out in the LLMR concludes that BT has SMP in both the wholesale low bandwidth and the wholesale high bandwidth markets, but not the very high bandwidth market. The conclusions of the LLMR that defined separate markets at different bandwidths, together with Ofcom's approach outlined above in paragraph 3.2 where there is a differentiation of competitive pressures it is inappropriate to group these products and services in the same basket, suggests that there should be separate baskets for each of the two markets where BT is identified as having SMP.
- 3.7 This approach allows BT the flexibility to respond to demand changes and recover those common costs reflected within the charge control in an efficient way, without creating incentives for it to price anti-competitively. Constructing more baskets than are appropriate given the competitive conditions in the markets being regulated, would reduce the flexibility available to BT to set its prices for its products and services in an efficient manner.

### **Equipment and infrastructure costs**

- 3.8 Ofcom's preferred approach towards the treatment of equipment costs within the PPC terminating segments charge control, as set out in the June consultation, would be to combine equipment costs within the low bandwidth and high bandwidth connection and rental and maintenance baskets. This is not possible however because most of BT's equipment costs are not bandwidth specific i.e. the same PPC equipment can be used in the provision of low bandwidth and high bandwidth PPC terminating segments.
- 3.9 Ofcom, in the June consultation document at paragraphs 3.8–3.9, also considered whether to include BT's equipment costs within either the low or high bandwidth basket. It would be preferable to include BT's equipment costs within the low bandwidth basket, because the equipment costs would dominate the high-bandwidth basket, whereas this would not happen if they were included in the low-bandwidth basket. Prior to publication of the consultation document BT was unable to provide data upon which Ofcom could determine the appropriate weighting to give to equipment costs within the low bandwidth basket. Specifically, BT was unable to provide comparable data for circuits and equipment sold by BT to Altnets or for circuits and equipment used by BT to provide retail leased lines and other data services.
- 3.10 This led Ofcom to propose an indexation of BT's equipment charges, requiring that BT reduce its equipment charges for each individual item of equipment in line with the reductions in costs that are expected during the period of BT's current equipment purchasing agreement.

### **Responses to the consultation**

#### *Equipment basket*

- 3.11 No respondents specifically raised the issue of the construction of the equipment basket in responses to the consultation document. However, BT did

highlight two main concerns that it has with Ofcom's proposed treatment of its equipment costs.

- 3.12 The first concern highlighted by BT is the effect on supplier incentives and BT's ability to negotiate. The second is the lack of flexibility afforded by Ofcom's proposed control on individual items of equipment, which may generate inefficient and distorted arbitrage opportunities. These arbitrage opportunities arise from BT being required to index its charges for each individual item of equipment. Given the uncertainty of BT's equipment costs beyond the expiry of BT's current equipment purchase contract, this introduces the risk that charges for some individual items of equipment could be significantly below or above cost by the end of the charge control period. This could lead to customers cherry-picking those items being sold below cost, leaving BT unable to recover the total costs associated with its equipment contracts. In order to mitigate these problems, BT suggests an alternative approach, which involves including equipment charges in a separate aggregate basket. This alternative requires that the aggregate of charges in the equipment basket would have to decrease by RPI-X, but would not require that the charge for each individual item of equipment would have to decrease by that amount.
- 3.13 BT has stated to Ofcom in its response to the June consultation that it is now able to identify the PPC terminating segments equipment and infrastructure recovered by way of upfront charges from Altnets that will allow BT to calculate the weights of equipment within an aggregate equipment basket. However, BT is unable at this time to identify the equivalent PPC terminating segments equipment and infrastructure used by BT to provide retail leased lines and other data services. It would be necessary to have this complete information to be able to incorporate equipment costs within the low bandwidth connection and rental and maintenance basket on a consistent basis.
- 3.14 Ofcom agrees that an aggregate basket approach is preferable to the approach proposed in the consultation document for the reasons highlighted by BT in its response, in particular, it exposes BT to the risk of inefficient and distorted arbitrage opportunities, which are outlined in BT's response and summarised in paragraph 3.12 above. However, the absence of the data relating to BT to BT sales creates a lack of transparency about BT's incentives and whether it would benefit from focussing price reductions on the items of equipment that it itself predominately uses in the provision of leased lines.
- 3.15 It is Ofcom's view that the approach advocated by BT is preferable to requiring the charge for each individual item of PPC terminating segments equipment to reduce by RPI-X. However, in order to provide sufficient protection to Altnets, Ofcom has also decided to include charge control sub-caps. These sub-caps will require BT not to increase the charge for any individual item of equipment by more than RPI-3. Ofcom is applying a sub-cap of RPI-X because it believes that equipment charges will not increase in nominal terms over the period of the charge control. In Ofcom's view this represents a reasonable balance between allowing BT the flexibility to rebalance equipment charges within the aggregate basket if its new equipment purchase contract(s) do not uniformly alter all equipment charges, and protection for Altnets.

#### *Low and high bandwidth baskets*

- 3.16 Most respondents agreed with Ofcom's proposals for a separate low and high bandwidth basket for connection and rental charges. However, despite

agreeing with the broad proposals, a number of respondents (including Cable and Wireless, Energis, Thus and UKCTA) suggested that there should be a further sub-division of the connection and rental baskets. It was argued that this approach would reduce BT's ability to rebalance charges between connection charges and rental charges and would insulate BT's competitors from the potentially significant detrimental effects that such rebalancing can have on competitors' business plans. BT did not strongly object to the basket construction as proposed by Ofcom but would prefer a single basket.

- 3.17 Ofcom has considered the respondents' comments on this issue and recognises the concern that any significant change in the balance of cost recovery between connection charges and rental charges could have a significant impact on the ability of Altnets to compete effectively. However, Ofcom believes that it would be unduly restrictive to have separate baskets for connection charges and rental charges. Such separate baskets would significantly reduce BT's ability to rebalance charges, when this may be the most efficient course of action. Therefore there are two conflicting considerations.
- 3.18 Accordingly, in order to balance all considerations, Ofcom has decided to limit the extent to which BT can vary how it recovers its costs between connection charges and rental charges. Ofcom is imposing sub-caps, which require BT to limit any increases in either the sub-basket of connection charges or the sub-basket of rental charges to RPI+0<sup>6</sup>. This approach ensures that BT is able to adjust its prices if necessary (although it does limit the extent to which readjustments can occur in any single year) while protecting Altnets from significant unanticipated changes in the relative level of connection charges and rental charges. Ofcom's cost modelling indicates that over the period of the charge control the need for any requirement for rebalancing between connection charges and rental charges will be limited. Therefore, this approach is not unduly onerous on BT.

### **Approach to basket weightings**

- 3.19 The charge control basket weightings are used in the calculation of the values of X and to assess BT's compliance with its obligations set out within the terms of the charge control i.e. that it has reduced the prices of its PPC terminating segments products within the relevant baskets by appropriate amounts.
- 3.20 Prior to the June consultation, Ofcom considered whether to use prior year or current year revenues or volumes to weight the charge control baskets. In the other charge controls imposed on BT by Ofcom as a result of the narrowband market reviews, the practice has been to set basket weights equal to the proportions of basket revenues accruing to the relevant services in the year prior to that in which the price change occurs, i.e. prior year weighting. This is as opposed to using current year basket revenues as a proportion of total current year revenues i.e. current year weighting. Prior year weighting was

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<sup>6</sup> The value of X for these sub-baskets is different than for the sub-baskets for equipment charges because Ofcom has an expectation that charges for individual items of equipment charges will not increase in nominal terms over the period of the charge control. In addition, because of the lower values of X for the low bandwidth and high bandwidth baskets, a value of X greater than 0 would restrict the extent to which BT would be able to rebalance its charges between connection charges and rental and maintenance charges.

preferred to current year weighting in these previous controls as the latter requires forecasts of weights to be made, with the consequent need for retrospective adjustment for forecast errors. This approach has generally been supported by respondents to previous Ofcom consultations on charge controls. Therefore Ofcom proposed to use prior year weights to assess compliance with the PPC terminating segments charge control.

## **Responses to the consultation**

- 3.21 Some respondents to the June consultation have argued for the use of current year weights, based on volume forecasts, to weight the charge control baskets. These respondents argued that the uncertainty around the volume forecasts used to forecast the values of X, particularly in respect of the low bandwidth volumes, means that using current year weights would be more appropriate in order to reduce the ability of BT to game the charge control.
- 3.22 BT agreed with Ofcom's proposal that the use of prior year weights is appropriate. BT's view is that the time-lag introduces no more uncertainty into the process than other related factors, such as forecasting error. However, BT requested that the prior year be defined as being consistent with its financial year i.e. April to March, as opposed to the relevant charge control year i.e. October to September.
- 3.23 Ofcom recognises the respondents' concerns about the use of prior year weights to ensure compliance with the charge control. These concerns are of particular relevance when revenues from different product types within a basket are expected to change over the period of the charge control, which is forecast to be the case in this instance.
- 3.24 As discussed in the June consultation at paragraphs 3.12–3.14, there are arguments for switching from baskets calculated on the basis of prior year weightings to baskets calculated on the basis of current year weightings. This is mainly due to the relative newness of PPC terminating segments products and the fact that prior year relative revenues or volumes may not accurately reflect relative revenues or volumes in the year in which BT's compliance with the control is being assessed.
- 3.25 If revenues or volumes are erratic, either upwards or downwards between one year and the next, then in a regulatory environment where compliance with the charge control is determined by prior year weights, BT may have scope to "game" the compliance rules to its advantage. It is generally the case that there is an incentive to match price increases to those products and services whose weight will be increasing. One set of products and services may have a high weighting on a prior year basis, whereas if the weighting were calculated on the basis of current year, the outcome of the compliance calculation may differ. BT may, within its pricing decision, have scope to affect the weightings of the products and services within the basket in such a way as to make compliance with the cap less onerous.
- 3.26 In light of comments from respondents, Ofcom has again considered this issue and investigated further the implications of changing from using prior year weights to using forecast current year weights. However, despite any merits that the approach of using current year weights may have over the use of prior year weights to assess BT's compliance with the charge control, after considering the theoretical and practical implications of using current year

weights, Ofcom has concluded that using current year weights is neither necessary nor preferable in the relevant circumstances.

- 3.27 Gaming is, in principle, a risk from the use of prior year weights when volumes are erratic and this has been acknowledged by Ofcom in the consultation document and raised as a concern by some respondents. However, there are two reasons why Ofcom does not consider that this requires a change in its proposals. First, the use of current year weights may also give BT an incentive to game the charge control mechanism. For example BT in its forecasts could underestimate the absolute volume (and hence underestimate the weight) for a set of circuits on which it is intending to increase charges. This would ease its compliance with the cap, although adjustments for this error would be necessary in following periods. Second, the introduction of the sub-caps applicable to the PPC connection charges and rental and maintenance charges introduces a constraint on the ability of BT to game the control even if prior year weights are used.
- 3.28 Any anomalies between the forecast data associated with current year weights and with actual data would of course be picked up in the reconciliation. However, Ofcom would continually be playing catch up, raising the possibility of year-by-year price cuts that are seen in retrospect, when the true current year weights are known, to be too small to comply with the charge control.
- 3.29 In addition, there are a number of practical considerations. Ofcom's experience of using prior year weights to assess compliance with other charge controls applicable to BT is that this approach has not been without problems. These problems particularly concern the validation of historic volume and revenue data provided by BT. The use of current year weights would exacerbate these problems. These additional problems include:
- The use of forecasts gives Ofcom no benchmark on which to compare or challenge the data from BT. With prior year weights there will be actual and prior year data that Ofcom can consider and question BT on;
  - There would likely need to be a process designed to independently review BT's actual data against the forecasts and an adjustment made in succeeding years. This could become complex and costly;
  - There could be pressure for in-year adjustments. This is particularly so if actual data was significantly different from the forecasts. This pressure could come from within BT or from Altnets. This could increase the resources required to monitor compliance; and,
  - There would be a reduction in transparency. By their nature, forecasts are difficult to effectively review and are not necessarily prepared on a consistent basis over time. However, it is possible to ascertain whether actual data has been prepared on a consistent basis over time.
- 3.30 As noted above, it is Ofcom's view that the use of current year weights would not necessarily improve the incentives on BT. This combined with the practical difficulties of using current year weights outlined above and the additional constraint on BT's ability to game the control provided by the sub-caps on connection charges and rental and maintenance charges has leads Ofcom to

conclude that compliance with the charge control to be assessed using prior year weights, as proposed in the consultation document.

- 3.31 In respect of the issue of the period over which the prior year should be defined Ofcom agrees with BT that this should be changed to BT's financial year, April to March. This will significantly reduce the burden on BT to illustrate its compliance with the charge control. In addition, this approach is consistent with other charge controls applicable to BT.

## Chapter 4

# Deriving Values for X

### Introduction

- 4.1 The intention behind reducing the regulated charges by RPI-X in each year of the charge control is for the weighted average charge of the products and services within the charge control basket to equal the forecast of the efficient level of costs at the end of the charge control period. In formulating proposals for the charge control, it has been necessary for Ofcom to forecast how relevant costs could be expected to change over the period of the charge control. Ofcom has developed a forecasting model to derive the value of X to be applied to the charge control baskets, the construction of which is described in Annex B. The values of X from the forecasting model represent a forecast of how BT's costs of providing the products and services within each of the charge control baskets will change over time, including an allowance for any efficiency gap that may exist at the outset of the charge control.
- 4.2 Ofcom's approach to forecasting BT's costs over the period of the charge control and the methodology used to generate ranges for the values of X for the charge control is explained in this section. Ofcom has included at Annex B a sensitivity analysis for the key parameters in the cost forecast model.

### The values of X

- 4.3 Ofcom consulted on ranges for the values of X for the low bandwidth and high bandwidth charge control baskets. This is because the values of X for the charge control baskets are sensitive to the inputs used for the parameters in the model. Ofcom considered the responses to this consultation, in particular in relation to the input values for each of the parameters in the model, and made some adjustments to calculate its final view of the values of X for the charge control baskets. The final values for X are set out in table 4.1 below.

**Table 4.1 – Values of X for the PPC charge control to 2008/09**

<b>Basket</b>	<b>Value of X</b>	<b>Consultation range</b>
POC end and third party end equipment and infrastructure charges	8.9% (NB: an aggregate control)	8.9% (NB: an individual indexation approach)
Low bandwidth connection and rental and maintenance charges	4.0%	1.25 % to 5.0%
High bandwidth connection and rental and maintenance charges	6.5%	7.25 to 8.5%

## Changes since consultation

- 4.4 In calculating the final values of X set out in table 4.1, Ofcom has maintained its general approach set out in the consultation document. However, Ofcom has carefully considered the responses to the consultation document. In considering these responses, Ofcom has revised its position in relation to the key model parameters that affect the values of X. These revisions are discussed below. Following the revisions to the key model parameters the final value of X, for the high bandwidth basket only, falls outside the range in the consultation document.
- 4.5 The key parameters which affect the values of X, and have been reconsidered since consultation, are:
- Volume growth assumptions
  - BT's inefficiency adjustment
  - Revision of BT's cost of capital estimate
  - Adjustments to particular asset price changes
- 4.6 The model parameters used in the final calculations for the values of X, and the reasons for departing from parameter values set out in the consultation document, are explained throughout this section.

## The level of X for the charge control on BT's equipment charges

- 4.7 Ofcom has used BT's PPC terminating segments equipment purchase contract with its supplier (discussed at paragraph 2.9 above) to inform Ofcom's view of how the costs will change over the period of the control. BT's equipment purchase contract states that the relevant equipment prices will decrease by a specified amount per annum in nominal terms. One approach would be to require BT to reduce its equipment charges by the nominal terms price reduction stipulated in BT's equipment purchase contract. However, as explained earlier, at paragraph 2.30, BT's equipment purchase contract expires before the end of the charge control so there is uncertainty about the nominal price reductions that will be in effect from any revised equipment purchase contract. Therefore, Ofcom is proposing to stipulate the real terms reduction in BT's charges i.e. impose an RPI-X control.
- 4.8 In order to calculate the value of X, it is necessary to add on to this price change an allowance for inflation (in order to calculate the required real terms reduction). There are two broad approaches to including this allowance for inflation. One is to use the actual inflation rate in each year in which the control is in effect. A second is to use an average of the actual level of inflation over the period in which BT's equipment purchase contract has already been in place. Ofcom believes that the second approach is preferable. This is because this approach will ensure that the charge control on equipment charges will be the same as that which has effectively been achievable since BT's equipment purchase contract has been in effect. The second approach results in an RPI-8.9% charge cap.

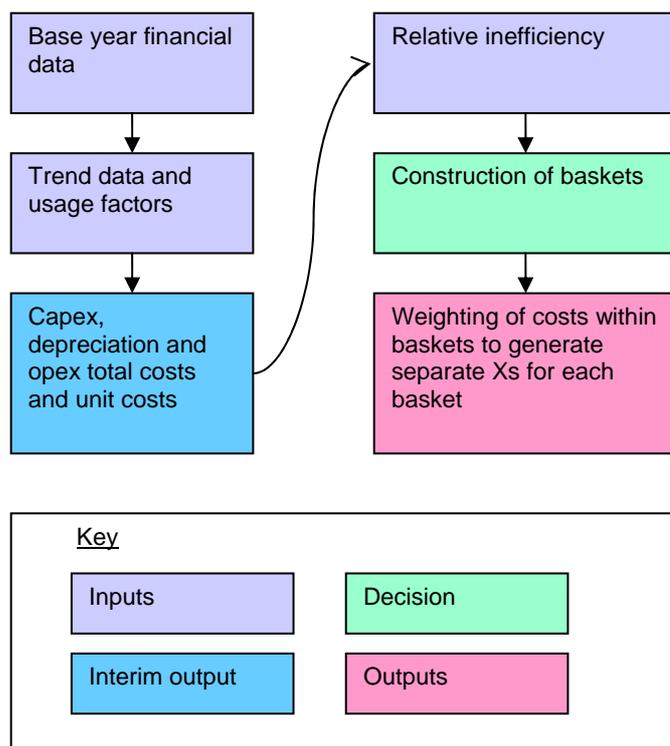
## Responses to the consultation

- 4.9 Most respondents, with the exception of BT and Vodafone, agree with Ofcom's proposals for the value of X applicable to the proposed equipment cost basket. However, BT's concerns relate mainly to the application of the value of X to each individual piece of equipment on the BT carrier price list (CPL). This has been addressed in paragraphs 3.12 – 3.15.
- 4.10 Cable and Wireless were concerned that BT's price increases to PPC terminating segment charges that resulted from the LLMR Statement and announced on 22 July may mean that the value of X for equipment charges would need to be reviewed.
- 4.11 The price increases referred to by Cable and Wireless were a correction for prices that were erroneously set too low by the Phase 2 Direction as BT omitted costs from its price calculation. As explained above, the X for equipment charges is driven by BT's equipment purchase contract. Therefore, the value of X does not require reviewing because of the price changes announced by BT.
- 4.12 Vodafone questions whether the value of X has been calculated on the basis of equipment prices at the end of the contract period or the end of the charge control and states that it should be at the end of the charge control.
- 4.13 Ofcom can confirm that the value of X for the equipment basket has been calculated on the basis of expected equipment prices at the end of the charge control and not at the end of the contract period.

## Ofcom's forecasting model

- 4.14 The PPC terminating segments cost forecasting model is based on a methodology consistent with that used by Oftel in developing its proposals for the current charge controls that operate in other markets. Ofcom has provided full details of its forecasting model methodology at Annex B. Figure 4.1 shows a flow diagram of the high level inter-relationships within the forecasting model.

**Figure 4.1 – Flow diagram of Ofcom’s cost forecasting model**



4.15 The inputs into the model consist of base year accounting data from BT’s regulatory costing systems as well as a number of assumptions for the parameters of the model, a parameter being variable within the model which when alternative values are used, results in different values of X. The main input parameters of the model are:

- volume changes (separately for “BT to BT”, “BT to Mobile Operators”, and “BT to Altnets”);
- asset price changes;
- asset volume elasticities (AVEs) and cost volume elasticities (CVEs); and
- BT’s relative inefficiency.

4.16 BT has provided Ofcom with its view of each of the model parameters. Where forecast data is required, BT has provided its view up to 2006/07. Where forecast data is required beyond 2006/07, it has been necessary for Ofcom to develop its own view of how these parameters will change, if at all, beyond the period for which BT has provided data.

4.17 Ofcom has analysed the data provided by BT to support its view of the input parameters of the model. In forming a view on the appropriate input values, Ofcom has used information available to it from work carried out on other charge controls, work related to the leased lines markets, information provided by Altnets, and responses to the June consultation.

## Volume changes

- 4.18 The values of X for the RPI-X charge control are dependent on the assumptions regarding the volume of circuits over the charge control period due to economies of scale which are captured by the interaction between volumes and the asset volume elasticities / cost volume elasticities, as described in paragraphs 4.41- 4.44 (see also paragraphs 4.21-4.25 of the consultation document).
- 4.19 Prior to publication of the consultation document, BT provided actual data on the volume of circuits for 2002/03 and a forecast of circuits up to the year 2006/07. These volumes are broken down into circuits provided internally to BT, circuits sold to Altnets and circuits sold to mobile operators. BT's information reflects an expectation that total volumes in the low bandwidth market will decrease over the period whilst total volumes in the high bandwidth market will increase. BT reasoned that low bandwidth volumes are likely to decrease due to external factors (such as companies ceasing to exist and rationalisation of costs) as well as the impact on retail leased lines of other new BT DSL products.
- 4.20 Altnets also provided information on volumes prior to the consultation. This information did not predict the significant rate of decline in low bandwidth volumes forecast by BT.
- 4.21 As stated in the consultation document (see paragraphs 4.12 to 4.17), Ofcom is of the view that BT's forecast of very large reductions in low bandwidth volumes is in contrast to Ofcom's expectation that declining retail prices are likely to stimulate increases, rather than decreases, in market volumes. It would appear that BT believes that the availability of PPCs will result in a shift in demand from circuits provided internally to BT to circuits sold to Altnets (see paragraph 4.14 of the consultation document). However, the derivation of values of X depends on the *total* volume of circuits and therefore this argument is not relevant to the calculation. Ofcom also rejects BT's argument that demand for low bandwidth circuits will likely decrease, due to companies ceasing to exist. If individual companies do cease to exist Ofcom would expect them to be replaced by other companies that will also require low bandwidth leased line products.
- 4.22 Whilst, to some degree, Ofcom accepts BT's argument regarding DSL products (see paragraph 4.27 below), Ofcom believes that the magnitude of this effect has been overstated by BT. In deriving the appropriate value of X, in the consultation document Ofcom considered a range of volume assumptions for low bandwidth circuits based on BT's forecast<sup>7</sup>: at the lower end a modified forecast which reduced the rate of volume decline for circuits provided internally to BT, and at the high end a forecast which assumed that the volume of these circuits remains constant over the charge control period. Taking account of responses to the consultation (see paragraphs 4.24 and 4.25 below), Ofcom has amended its forecast assumption for low bandwidth circuits to reflect constant overall volumes from 2002/03 onwards.

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<sup>7</sup> Ofcom also assumed the same rate of volume change in 2007/08 and 2008/09 as in 2006/07 (the last year for which BT provided a forecast).

- 4.23 For high bandwidth circuits Ofcom has used the unmodified forecasts provided by BT up to 2006/07 to derive an appropriate value of X. For the period from 2006/07 to 2008/09 Ofcom has assumed that high bandwidth volumes remain constant at 2006/07 levels, rather than, for example, continuing the rapid volume growth for circuits sold to Altnets as predicted by BT in previous years which Ofcom believes is unlikely to be sustained.

### **Responses to the consultation**

- 4.24 In its response to the consultation, BT emphasised that its forecast volume data was derived from its financial planning and accounting systems which are actively used within BT's business. BT stated that the forecasts were supported by its updated actual data and latest forecasts and so, in the absence of strong alternative evidence, caution should be applied before amending the forecasts significantly. Furthermore, BT expressed its view that price is not the key driver of demand for these products, but rather the key factor determining changes in demand is the availability of increasingly capable broadband and IP products.
- 4.25 The majority of responses from Altnets agreed with Ofcom's adjustment to BT's low bandwidth forecasts. Whilst one Altnet stated the opinion that the volume of 64kbit/s circuits may decrease, the general view was that there would be no decline in volumes for low bandwidth circuits overall and a constant volume assumption would be more appropriate. Further, some respondents argued that it would be more appropriate to assume positive growth in low bandwidth circuits, rather than decline, since the market as a whole is not in decline.

### **Ofcom's response**

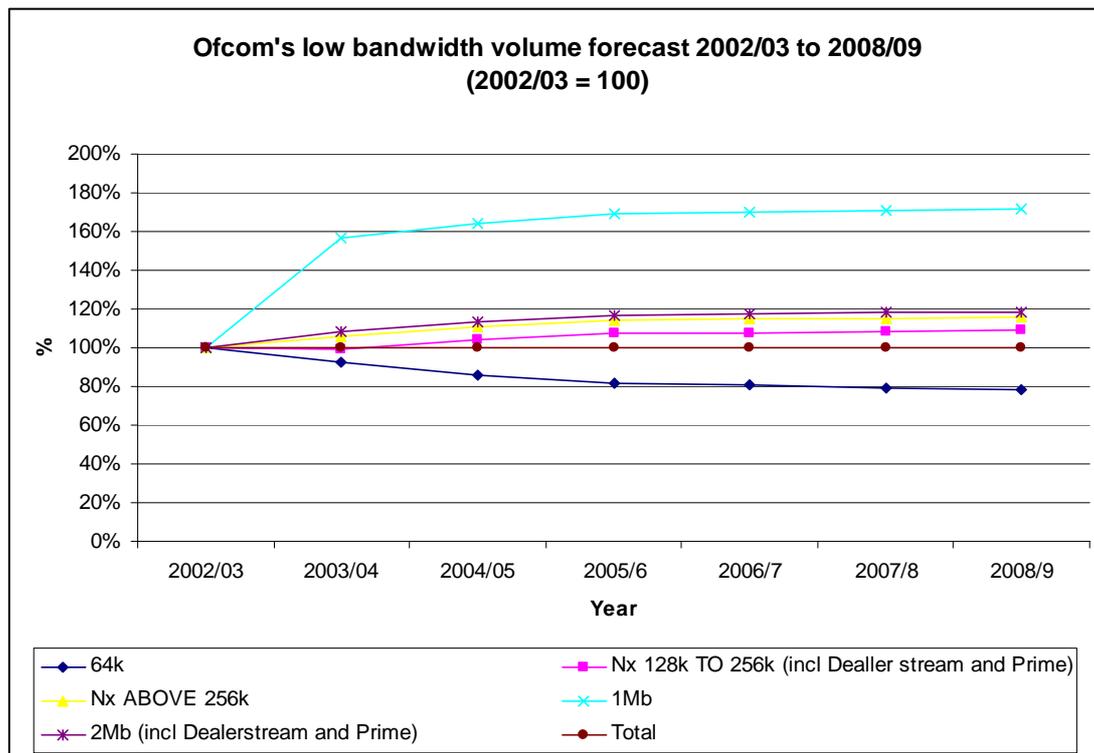
- 4.26 Ofcom has given further consideration to its forecast for low bandwidth circuits in the light of the responses to the consultation. Ofcom does not regard BT's forecast of dramatic decline in the volume of low bandwidth circuits from 2002/03 to 2006/07 as realistic.
- 4.27 BT has argued that a factor determining demand volumes is the extent of substitution with DSL-based products resulting in an increase of DSL-based connections at the expense of low bandwidth circuits. Ofcom acknowledges this point to some degree but does not believe the effect would be of the magnitude proposed by BT. Ofcom notes the view expressed by some respondents that the low bandwidth market as a whole is not in decline. Given this view and historic trends that show the number of circuits in the low bandwidth market increasing, it would seem unrealistic to expect a decline in the total number of low bandwidth circuits. Furthermore, to the degree that substitution to DSL-based products is likely to be based on SDSL (rather than ADSL) it is appropriate to include these circuits in the volume forecast (see paragraph 4.76).
- 4.28 Ofcom has considered more update actual volume information. Unfortunately the position is ambiguous due to conflicting data sets. Further information derived from BT's own management information systems regarding actual volumes for 2003/04 has become available since the close of the consultation. This information supports BT's view that low bandwidth circuits are in decline, although at a slower rate than previously forecast by BT. However, this data appears inconsistent with the information published in BT's regulatory financial statements. These financial statements indicate modest growth in low bandwidth circuit volumes between 2002/03 and 2003/04 consistent with the

higher end forecast adopted by Ofcom in the consultation document. In light of this issue, the views expressed by respondents and the arguments set out above, Ofcom has made the assumption that the total volume of low bandwidth circuits remains constant at 2002/03 levels for the duration of the charge control. This overall profile falls within the range of forecasts proposed in the consultation document.

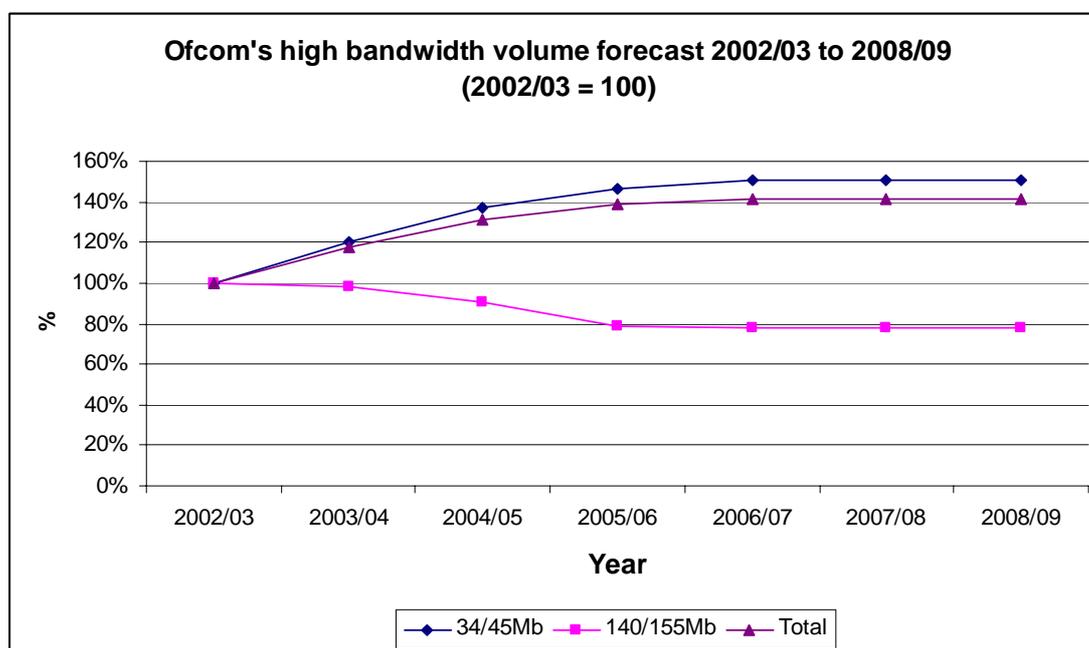
4.29 Ofcom did not receive any substantive responses to its forecast of high bandwidth volumes. In considering volume change assumptions Ofcom has given further consideration to its forecast of total high bandwidth circuits. In the consultation document Ofcom proposed a forecast which assumed constant volumes for circuits sold to Altnets after 2006/07 but extrapolated the decline in high bandwidth volumes provided internally to BT for these final two years of the control. This resulted in a decline in total high bandwidth volumes. Whilst the rapid growth in high bandwidth circuits may slow, Ofcom is not convinced that the volume of circuits will actually decline and therefore it is more appropriate to make the assumption that total high bandwidth volumes remain constant after 2006/07 and has modified accordingly.

4.30 Ofcom's forecasts of volumes for low bandwidth and high bandwidth circuits used in the calculations of X are set out in charts 4.1 and 4.2 respectively.

**Chart 4.1 – Ofcom's forecast of low bandwidth volumes from 2002/03 to 2008/09**



**Chart 4.2 – Ofcom’s forecast of high bandwidth volumes from 2002/03 to 2008/09**



### Asset price changes

- 4.31 The asset price change describes the extent of changes in year on year input prices experienced by BT for a unit of a given asset type. Ofcom has considered ten asset types<sup>8</sup> relevant to the provision of PPC terminating segments as reflected within BT’s regulatory financial statements.
- 4.32 Prior to publication of the consultation document, BT provided forecast data predominately exhibiting nominal price increases across the asset types despite actual data for recent years which showed asset prices falling for most asset types. BT’s forecast was also in contrast with previous figures for asset price changes used in the derivation of charge controls in other markets. The asset price change data at that time generally showed significant anticipated reductions in asset prices. As stated in the consultation document (paragraph 4.19), whilst BT argued that it was subject to premium pricing due to lack of commercial availability of some assets, thus leading to forecast asset price increases, Ofcom stated its belief that a lack of commercial availability is likely to reflect new more efficient methods of providing equivalent functionality and therefore asset prices should not increase over the period of the charge control.
- 4.33 In the consultation document (paragraph 4.20), these reservations led Ofcom to propose a forecast of asset price changes for 2003/04 onwards based on the average of BT’s historical asset price changes for 2001/02 and 2002/3.

<sup>8</sup> These are: cable, duct, local exchange, main exchange, transmission, other network equipment, motor transport, land & buildings, computers & OM and other.

## Responses to the consultation

- 4.34 BT, in its response to the consultation document, stated that its main concern was with respect to the Cable and Duct asset types. BT argued that the valuations for 2001/02 and 2002/03 (on which Ofcom based its proposed forecast) were not representative of future asset price changes since they reflected significant one-off adjustments (for example, price reductions resulting from the rationalisation of duct work streams and the installation contractor base). For this reason, BT expressed the view that its forecast price changes for the Cable and Duct asset types, which reflect the forecast trends of the key underlying components (for example labour costs), are a more appropriate basis on which to derive values of X than the average of the 2001/02 and 2002/03 valuations.
- 4.35 BT expressed minor concern with the asset price changes in the consultation document for the Other Network Equipment and Other asset type categories, but otherwise acknowledged that the remaining asset price changes appeared to be reasonable.
- 4.36 Other respondents agreed with the general approach proposed by Ofcom, although both Cable and Wireless and UKCTA expressed some concern over the asset type categories with forecast increases in asset prices and the degree of relevance of these categories in the provision of PPC terminating segments.
- 4.37 UKCTA also requested reassurance that BT would not be permitted to load the costs of its other network projects, such as next generation networks, into its regulated return on PPC terminating segments. Ofcom observes that to the extent that they represent the evolution of, for example, BT's switching capability, these costs would fall within the local and main exchanges asset categories or equivalent, rather than, for example, transmission or cable and duct categories. Ofcom notes that the contribution that local and main exchanges make, as indicated in Table 4.2 below, to overall asset costs for the purposes of the PPC price control, is negligible.

## Ofcom's response

- 4.38 Ofcom has considered the further information submitted by BT in response to the consultation with reference to Cable and Duct asset price changes. As stated in the consultation document (paragraph 4.19), Ofcom acknowledges that a significant part of these costs is labour related, and hence there is an argument that Cable and Duct asset prices, all other things remaining the same, may be expected to increase. Together with the explanation provided by BT that the 2001/02 and 2002/03 valuations reflected one-off adjustments, Ofcom believes that it is more appropriate to use BT's forecast nominal asset price changes for Cable and Duct (of about 2.8% and 2.1% respectively) than the average of the 2001/02 and 2002/03 valuations (-0.6% and -0.3% respectively).
- 4.39 Therefore, following responses to the June consultation Ofcom has amended the values for asset price changes applicable to the Cable and Duct asset types. For these two categories, rather than basing the forecast of asset price changes on the average values for 2001/02 and 2002/03, Ofcom has adopted the forecast values proposed by BT for the reasons stated in paragraph 4.34.

4.40 For the remaining eight categories, Ofcom has not modified the asset price change values used in the consultation document. The asset price changes used to derive the value of X, in comparison with the values proposed in the consultation document, are set out in Table 4.2. The impact of these individual values depends on the weight that each asset type contributes in the delivery of PPC terminating segments. The weights used in the derivation of the value of X, based on their proportion of total Gross Replacement Cost (GRC) in 2002/03, are also shown in Table 4.2.

**Table 4.2: Asset type weights and forecast nominal asset price changes from 2004/05 to 2008/09 based on the average of BT's historical values for 2001/02 and 2002/03 and BT's forecast values for Cable and Duct**

	Weighting of asset type	Asset price changes used in consultation (nominal) <sup>9</sup>	Asset price changes used in the final statement (nominal) <sup>10</sup>
Cable	11.7%	-0.6%	+2.8% to +2.9%
Duct	25.2%	-0.3%	+2.1%
Local Exchange	0.2%		+0.9%
Main Exchange	<0.1%		+0.2%
Transmission	30.7%		-1.2%
Other Network Equipment	24.7%		+0.0%
Motor Transport	0.7%		-1.9%
Land & Buildings	5.2%		+1.3%
Computers & OM	0.6%		+0.8%
Other	0.9%		+0.8%

#### Asset volume elasticities and cost volume elasticities

4.41 The impact of economies of scale on the values of X in the RPI-X charge control is captured by asset volume elasticities (AVEs) and cost volume elasticities (CVEs) which measure the percentage increase in costs for a 1% increase in volume. A cost volume elasticity of close to 1 would imply that economies of scale are largely absent and that real unit costs, and hence the

<sup>9</sup> Table 4.3 in the consultation document contained a transpositional error in the last six rows of the table. The figures stated here are the values that underpinned the model Ofcom used to derive the values of X in the consultation document.

<sup>10</sup> Values are derived from the average of actual data for 2001/02 and 2002/03 except in the case of Cable and Duct asset price changes which reflect BT's forecast.

value of X, would be largely unaffected by volume growth rates. A cost volume elasticity of close to zero would imply that economies of scale are very significant and that costs would be largely fixed with respect to volumes, so average costs would fall significantly as volumes rise.

- 4.42 AVEs reflect the extent to which the gross replacement cost (GRC) for the ten individual asset types (see paragraph 4.31 above) relevant in the provision of PPC terminating segments changes in relation to volumes. Similarly, CVEs reflect the extent to which operating costs excluding depreciation change with a change in volumes. CVEs are considered in two categories, labour and non-labour.
- 4.43 Prior to publication of the consultation document, BT provided CVE and AVE estimates by measuring the LRIC to FAC ratio for each asset type and operating cost category. However, Ofcom does not agree that this methodology is appropriate since LRIC to FAC ratios are conceptually different from AVEs and CVEs. The LRIC of a product or service may include any fixed costs<sup>11</sup> incurred in its provision, while the AVE relates to changes in cost at the margin. Ofcom also notes that the LRIC to FAC ratios provided by BT in some cases exceeded 0.75. This compares to the average AVE used in the current Network Charge Control of 0.31<sup>12</sup>, which apply in markets where the asset types are common with those used in the provision of PPC terminating segments. Ofcom has no grounds to believe that BT's AVEs and CVEs will have changed to the extent implied by BT's data provided for this charge control.
- 4.44 BT's estimate of AVEs and CVEs are constant over time. This is consistent with Ofcom's approach in other charge controls currently applying to BT.

### **Responses to the consultation document**

- 4.45 BT acknowledged Ofcom's reservation about the use of LRIC to FAC ratios in its response to the consultation. BT made no substantive comments on the values proposed by Ofcom but requested clarity on their source and the weightings applied in deriving values of X.
- 4.46 Similarly, other respondents agreed that it was inappropriate to use LRIC to FAC ratios and expressed agreement with the use of AVEs and CVEs found in other charge controls.
- 4.47 Given that no objections were raised in response to the AVEs and CVEs proposed in the consultation document, Ofcom has had no reason to modify these figures in deriving the values of X. Ofcom has used AVEs and CVEs consistent with the current Network Charge Control with weightings as shown in Table 4.3.

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<sup>11</sup> These costs are fixed in the sense that they do not vary with or directly scale with changes in volumes

<sup>12</sup> BT's proposed an average AVE of 0.29 in setting these controls.

**Table 4.3: Asset type weights / Asset volume elasticities and Cost category weights / Cost volume elasticities used to derive values of X**

<b>Asset type</b>	<b>Weighting<sup>13</sup></b>	<b>Values</b>
Cable	11.7%	0.20
Duct	25.2%	0.05
Local Exchange	0.2%	0.55
Main Exchange	<0.1%	0.70
Transmission	30.7%	0.65
Other Network Equipment	24.7%	0.65
Motor Transport	0.7%	0.40
Land & Buildings	5.2%	0.20
Computers & OM	0.6%	0.74
Other	0.9%	0.65
<b>Cost category</b>		
Non-pay	62%	0.24
Pay	38%	0.24

### **BT's relative inefficiency**

4.48 As explained in Section 2 (paragraphs 2.11 and 2.12 of the consultation document), one of the main benefits of an RPI-X form of charge control is that it creates incentives on the charge controlled firm to increase its efficiency, over the period in which the charge control is in force. The objective of the charge control is to bring the controlled charges of the regulated firm into line with an efficient level of costs at the end of the charge control period. As part of this process it is important to understand the extent of BT's efficiency / inefficiency at the outset of the charge control so that erosion of inefficiency can be reflected in the value of X. It is reasonable to expect inefficiency existing at the start of the charge control to be eliminated over the life of the four-year control, just as competitive pressures would force inefficient companies to become efficient in a competitive market.

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<sup>13</sup> The weightings applicable to asset types are based on the proportion of total Gross Replacement Cost (GRC) in 2002/03; the weightings applicable to cost categories (non-pay and pay) are based on the proportion of total operating expenditure in 2002/03.

- 4.49 The output of the forecasting model, represented by the value of X, reflects the extent to which the regulated firm can reduce its real unit costs, when the starting charges are equivalent to costs. The value of X is derived by forecasting the level of efficiently incurred costs at the end of the period of the control.
- 4.50 Ofcom has employed the consultancy NERA to undertake a comparative efficiency study to examine the efficiency of BT's network relative to appropriate comparator companies, principally the US Local Exchange Carriers (LECs). A summary of the conclusions of NERA's report is set out in Annex E and a copy of the full report is available on Ofcom's website. The US LECs were chosen as comparators because better performing LECs are likely to provide a reasonable benchmark for efficiency and, from a pragmatic perspective, a significant amount of detailed cost data is available for these operators. One alternative approach would have been to generate results based on similar companies in markets where competitive pressures are more intense or where prices are lower than in the UK and the US, such as Scandinavian countries.<sup>14</sup> However, the relatively little financial data available for these Scandinavian companies means that it is not possible to carry out as robust a comparative efficiency study as has been undertaken for the US LECs. It would therefore not be practicable to derive the benchmark for efficiency on the basis of this information.
- 4.51 NERA's conclusion is that BT is in the region of 9% to 10% inefficient in its provision of services over its network as a whole relative to the top performing decile (i.e. the top performing 10%) of the US LECs. Ofcom has taken into account the conclusions of the efficiency study in calculating values of X for the charge control. This is achieved by reducing the target level of costs in 2008/09 by an amount corresponding to the efficiency gap and implementing a glide-path from the starting level in [2004/05] to reach the revised target level at the end of the charge control. The implication of this adjustment is that BT has the duration of the charge control to improve its efficiency and to close the efficiency gap implied by the conclusions of NERA's study. Further explanation of how the conclusions of the efficiency study are incorporated into the calculation of the values of X is included in Annex B.
- 4.52 Prior to publication of the consultation document, BT was provided with a copy of NERA's draft final report and access to the underlying analysis as an opportunity to provide detailed comments. These comments were taken into account in the final report.
- 4.53 BT views itself to be in the region 0% to 1% inefficient in relation to the US LECs. However, NERA disagrees that BT's alternative model specification (the BT specification) is the most appropriate way in which to assess BT's relative inefficiency. Whilst NERA acknowledges that the BT specification does have merits, NERA believes that its own model is a better indication of BT's relative inefficiency.
- 4.54 Ofcom has considered the details of NERA's report and BT's reasons for believing that it is more efficient than implied by the report. In order to reflect

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<sup>14</sup> Pricing data received by Ofcom suggests prices may be up to 40% lower in Scandinavia than the level offered by operators in the US/UK.

BT's arguments that the report overstates its relative inefficiency, in formulating ranges for the values of X for the PPC terminating segments charge control, Ofcom consulted on using a measure of inefficiency in the range between 5% and 10%.

### **Responses to consultation document**

4.55 BT argued in its response that Ofcom's proposed adjustment to take account of the efficiency gap was too demanding and risked creating prices that are below cost. BT argued that an efficiency adjustment of 0% to 1% would be more appropriate. BT advanced three main arguments questioning the appropriateness of Ofcom's proposals:

- NERA has failed to reflect in the final published version of its report a number of BT's comments on NERA's report made prior to publication of the consultation document;
- A model developed by Professor Andrew Chesher on behalf of BT (the BT specification) is superior to NERA's model and shows a lower level of relative inefficiency; and
- The relative efficiency should be measured with respect to the average performing US LEC and not the top decile, as in NERA's report.

4.56 With respect to BT's first concern, Ofcom is of the view that NERA's final report addresses BT's comments adequately. In the period prior to publication of NERA's final report, Ofcom and NERA responded to all of BT's comments and queries on NERA's report. Of the seven examples set out in BT's response to the consultation, three are new issues for which BT provided no evidence in support of its concerns. The other four issues were responded to by NERA prior to publication of NERA's final report. Ofcom provided NERA with an opportunity to respond to BT's comments, and this response is provided at Annex F.

4.57 BT submitted two annexes with its response in support of its arguments. Annex D of BT's response, by Professor Andrew Chesher, sets out the arguments in support of an alternative model specification. Annex C of BT's response by Professor Paul Grout argues that it is inappropriate to assess relative efficiency with reference to the top decile of US LECs. These are considered in turn below.

4.58 Professor Chesher argues that compared to the NERA model, the BT specification has a better statistical fit to the empirical data used to measure relative inefficiency, and hence the BT specification should be strongly preferred over NERA's specification. In its final report, having considered the BT specification, NERA set out three arguments for concluding that its model is preferable for assessing BT's comparative efficiency:

- Continuity with the models previously used to estimate BT's comparative efficiency;
- Consistency with the movements in costs over time; and,
- Consistency with BT's regulatory cost base.

- 4.59 BT disagrees that these are adequate reasons for rejecting the BT specification and maintains that it is superior to NERA's because it has a better statistical fit. As a result, BT argues that the BT specification should be used to calculate BT's relative inefficiency, potentially with adjustments to reflect NERA's arguments.
- 4.60 Ofcom has considered both BT's arguments in support of the BT specification and NERA's reasons for rejecting this alternative model. Ofcom has concluded that it is appropriate to take some account of the results of the BT specification given the issues of statistical fit raised by BT. However BT argues that this specification estimates BT's inefficiency at 1% relative to the top decile of US LECs (this compares to an inefficiency of 9% to 10% as derived using NERA's specification). Ofcom considers such result as unlikely in the light of other information. In particular, NERA identified in its report (section 5.4.2) that BT's unit costs have increased over time (between 1999/00 and 2001/02) while the unit costs of the US LECs have decreased.<sup>15</sup> This would indicate that BT's efficiency has not kept up with that of the US LECs and thus BT would be less efficient relative to the US LECs than was concluded previously. Given that the previous study of BT's relative inefficiency in 2000 concluded that BT was 3% inefficient, a figure of 1%, as proposed by BT, would seem unrealistic.
- 4.61 Ofcom therefore believes that it is appropriate to amend the range for BT's relative inefficiency from 9% to 10%, as concluded by NERA, down to 5% to 10%, as proposed in the consultation document.
- 4.62 Professor Paul Grout sets out comments on Ofcom's use of the conclusions of NERA's report and the relationship between efficiency studies and the rate of return. Professor Grout states that Ofcom's comparison of BT's relative efficiency to the top decile of the US LECs is inappropriate. He argues that, in a competitive market, firms will earn their cost of capital in the long run. Those that are more efficient than the average firm will earn above their cost of capital and those that are less efficient will earn below their cost of capital. Since the proposed charge control is aiming to replicate the incentives of a competitive market, Professor Grout claims that it follows that the price level chosen for the price cap should be set at a level "that rewards the regulated company (i.e. it earns above its cost of capital) when it is more efficient than the average benchmark mix of companies that reflects the diversity that would exist in a competitive market".
- 4.63 However, Professor Grout acknowledges that the average performance of the comparator group may not be the appropriate level at which to set the target, but that the appropriate level might be either higher or lower. He argues that the companies in the comparator group are from an innovative sector and therefore may be an "abnormally efficient" group of companies. This would mean that the comparator group is more efficient than a reasonable benchmark market. However, it could be argued that the sample group consists of incumbents in markets with low levels of competition, indicating that a target above the average of the comparator sample may be more appropriate.

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<sup>15</sup> Between 1999/00 and 2001/00 BT experienced a 19% increase in costs in the face of a 13.4% increase in output while the US LECs experienced no increase in costs while their output grew 7.4%. In other words BT's costs grew faster than its outputs while the opposite was true for the US LECs.

- 4.64 Professor Grout argues that this reasoning means that the use of the top decile, or even the top quartile of US LECs is an inappropriate benchmark against which to measure BT's relative inefficiency as this suggests that only 20% or 50%<sup>16</sup> of the firms in the sample group are capable of surviving in a competitive market. Professor Grout states that this proposition is unrealistic.
- 4.65 To assess BT's relative efficiency in the way suggested by Professor Grout would require the construction of a benchmark group of UK companies (to reflect the cost of capital calculation, which is based on the UK stock market) with the characteristics of telecoms companies. This is not the approach that Ofcom has chosen to adopt for pragmatic reasons of data availability (see paragraph 4.50). Rather, Ofcom has used results from a comparator group of US LECs; a group of companies amongst which there was an immature state of competition at the time of data used in the efficiency study (2001/02). To draw a similar comparison between the level of efficiency of this group of companies and the cost of capital calculation would appear to require consideration of whether the group of LECs is representative of the average level of efficiency of US companies as a whole. Ofcom believes that this is unlikely to be the case. As Professor Grout notes, there may be a good reason to adopt an efficiency target above the average of these companies: "...one may take the view that there are some companies in this sample that would not survive in a truly competitive market and so may wish to set the price cap so that the company only achieves its cost of capital when it lies above the average."
- 4.66 Professor Grout raises the question of whether the US LECs represent an "abnormally efficient" group of companies given the innovative sector in which they operate. Firstly, it is not necessarily the case that the incumbent firms in the comparator group are themselves highly innovative. Secondly, amongst a group of companies where there is limited competition it is unclear that innovation necessarily implies a high degree of efficiency.
- 4.67 Furthermore, since May 2004 when NERA completed its study, it has become evident to Ofcom through analysis related to other areas of work that there may be differences between the preparation of BT's accounts and the US LECs' accounts. This analysis has enabled Ofcom to reassess the comparability of financial accounting inputs that NERA has used in its model – in particular highlighting areas where the benchmark population's costs might be lower using BT's basis of preparation. These areas include the capitalisation of interest, the auto disposal of assets reaching the end of their book life and indexation of local access assets. Ofcom's work in this area has not yet been concluded, but initial indications are that the impact of harmonising the bases of preparation more closely could increase the level of BT's relative inefficiency by several percentage points.
- 4.68 While noting the argument concerning benchmark efficiency in relation to the cost of capital, Ofcom is of the view that the comparator group is not representative of a sample of US companies of average competitiveness or efficiency and thus it is appropriate to adopt an efficiency benchmark above the average of this group. Further, in light of the differences of data preparation

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<sup>16</sup> 20% or 50% because if the benchmark is the top decile or the top quartile of all firms in the sample then this will be approximate to the average of 20% or 50% of all firms in the sample.

highlighted in the paragraph above which may have a significant impact on the results, Ofcom believes that it is reasonable to adopt the approach taken in NERA's study of setting the benchmark at the top performing decile resulting in the view that BT's relative inefficiency lies in the range of 5% to 10%.

### **Other respondents**

- 4.69 Most other respondents agreed with Ofcom's proposals for the inefficiency adjustment to BT's data. However, Energis, Thus and UKCTA argued that the range should be limited to that proposed by NERA i.e. between 9% and 10%, while another respondent argued for an adjustment towards the upper end of this range.
- 4.70 Ofcom has considered the position of Altnets' regarding a measure of inefficiency of between 9% and 10% as concluded by NERA. However, given that no additional evidence has been provided by Altnets for this position, Ofcom believes that a measure of inefficiency in the range 5% to 10% is more appropriate.
- 4.71 Vodafone argued for an inefficiency adjustment of between 15% and 30%, with a mid point of 22%. Vodafone argued that an adjustment of this magnitude would take account of increases in US LEC efficiency since 2001/02 (the date of the information on which the comparative efficiency study is based) and would allow for the fact that BT's efficiency is being compared with a group of operators from a sector in which there is little competition.
- 4.72 Ofcom is not aware of any evidence to suggest that BT's relative efficiency between 2001/02 and the start of the charge control has diminished and therefore disagrees with Vodafone's suggested amendment. Ofcom does not believe that this is an appropriate approach to reflect the absence of a fully competitive market in the case of US LECs. This issue has already been reflected by Ofcom in the use of the top decile as the efficiency benchmark as discussed in paragraphs 4.62 to 4.68 above.

### **Conclusion**

- 4.73 After considering all of the responses to the consultation, Ofcom believes that the range proposed in the consultation document for BT's relative inefficiency of 5% to 10% is reasonable, and has decided to use 7.5%, the midpoint of this range, as a measurement of inefficiency.

### **SDSL & the charge control**

- 4.74 Traditional HDSL technology is now widely being replaced by SDSL as a means of delivering low bandwidth leased line terminating segments over copper. This is an evolutionary process; several variants of HDSL have been implemented over the last decade in order to improve the bandwidth and reach of the technology. The current standard is generally known as G.SHDSL, and was ratified by the ITU in February 2001.
- 4.75 G.SHDSL is used by BT and by LLU operators to provide leased line terminating segments. The principal advantage of G.SHDSL in the current context is that it reduces the number of copper pairs required to deliver an E1 (2MBit/s) circuit. It has several other advantages, including improved spectral compatibility with ADSL.

- 4.76 The LLMR Statement defined SDSL as being in the same market as low bandwidth PPC terminating segments. Therefore, to the extent that BT provides leased lines terminating segments using G.SHDSL then these will be included within the volume forecasts in the model.
- 4.77 A PPC terminating segment based on G.SHDSL is likely to be a lower cost alternative to one based on traditional HDSL technologies because of the reduction in copper costs. However, this cost reduction will not apply to all low bandwidth terminating segments, for the following reasons:
- the maximum bandwidth that can be delivered using G.SHDSL is 2.3 MBit/s. This is sufficient to deliver an E1 circuit, once overheads are taken into consideration, but not sufficient for all low bandwidth terminating segments.
  - range limitations mean that it will not always be possible to deliver an E1 circuit using G.SHDSL. The maximum range over which the full bandwidth can be delivered is about 4km, though lower bandwidths can be delivered over longer ranges.
  - it is unlikely to be cost effective to migrate existing PPC terminating segments from HDSL to G.SHDSL.
- 4.78 Given this increasing utilisation of SDSL technologies in the provision of low bandwidth leased lines, Ofcom considered the extent to which this development should be reflected in the PPC terminating segments charge control.
- 4.79 SDSL is included within the cost information provided by BT to Ofcom to formulate the charge control proposals. As the proposed charge control applies to HDSL and SDSL delivered PPC terminating segments, the charge control as proposed will ensure that BT has the incentive to deploy the most suitable low cost technology when provisioning PPC terminating segments.

### **Responses to the consultation**

- 4.80 Broadly, respondents support Ofcom's proposed approach to the treatment of SDSL within the PPC charge control. However, some respondents comment that they would appreciate further transparency and understanding of how SDSL is used, particularly if the duration of the control is 4 years. Cable and Wireless comment that the uncertainty over SDSL deployment over the period of the charge control indicates that a two year control should be put in place, in order to minimise the risk of market distortions arising from inaccurate forecasts.
- 4.81 Ofcom intends to continue with the approach outlined in the consultation document i.e. to use BT's volume forecasts to incorporate SDSL into the charge control. While Ofcom recognises that there is uncertainty around the deployment of SDSL over the period of the charge control, the fact that SDSL has been incorporated into the charge control proposals creates an incentive for BT to deploy the most economically efficient technology in the provision of its PPC terminating segments, be this SDSL or some other technology. By reducing costs, BT will be able to increase its profits over the period of the control.

4.82 Ofcom recognises that SDSL could be deployed to a greater extent than that assumed within BT's forecasts. However, the lower cost base associated with SDSL will be the starting point for any successive charge control, meaning that lower charges will flow to Altnets at that time. Reducing the duration of the charge control to two years would undermine these incentive effects as BT will have a shorter period over which to increase its profits and thus will have less intense signals to increase SDSL deployment. This could lead in the longer term to higher charges than may otherwise be the case.

## Chapter 5

# Implementation of Charge Control

5.1 This section discusses the following issues relating to the implementation of the proposed charge control:

- what are the charges used to begin the control
- the scope for geographic discounts under the control
- the scope for volume discounts under the control
- the compliance regime envisaged for the control
- the modification to current SMP conditions.

### Starting charges for the Charge Control

5.2 In the consultation document Ofcom set out its proposals for the introduction of a longer term charge control for PPC terminating segment charges. Prior to publication of the consultation document Ofcom considered whether it was necessary to stipulate the level of starting charges for the charge control. Ofcom's view is that the PPC charge control in the first year should apply to the relevant charges as they exist at the start of the charge control (1 October 2004), namely those charges that were set by way of the interim charge control as part of the LLMR Final Statement. While BT has argued strongly that these charges are not cost reflective and in particular result in an under recovery of the efficiently incurred costs, Ofcom considers that there is insufficient evidence at present for it to accept that view.

5.3 In calculating the values of X for the charge control, Ofcom has forecast the change in BT's costs in providing PPC terminating segments from 2002/03, the most recent year for which full cost data was available, to 2008/09, the final year of the four year charge control. The values of X take into account that BT was required to reduce its PPC terminating segment charges by RPI-7 on 1 August 2002 and 1 August 2003. The outputs of Ofcom's forecasting model indicate that these RPI-7 price reductions overstated the reductions in BT's costs in these years required to ensure that the level of prices in 2008/09 matches the forecast level of costs in 2008/09. Therefore, Ofcom's approach has been to modify the appropriate values of X for the remaining four years until 2008/09 to recognise this observation. A description of this calculation in the forecasting model is set out in table B9 of Annex B.

### Scope for geographic discounts

5.4 The LLMR Final Statement concludes that while the retail markets for leased lines and the wholesale market for traditional interface symmetric broadband origination (PPC terminating segments) are national, underlying costs and competitive conditions are not homogenous throughout the UK. In such circumstances, geographically differentiated averaged prices could be an indication of BT responding legitimately to cost differences in the face of competition. However, Ofcom notes that in responding to competition, BT has a

duty to ensure that it continues to comply with its ex-ante and general competition law obligations.

- 5.5 Given this approach, Ofcom proposed in the June consultation that BT should, within the context of the PPC terminating segments charge control, be allowed to set differential charges between different geographic areas. This would allow BT the freedom to charge in a way that more accurately reflects the costs incurred and to respond to the local characteristics of competition that exist in these markets. Moreover, given the scale of cost differences that may exist and the extent of competition in some areas, BT's ability to compete could be limited if it were required to maintain nationally uniform prices.
- 5.6 However, Ofcom proposed in the consultation that in setting geographically differentiated charges, any price reduction below that mandated by the proposed charge control in any particular area should not contribute towards BT's charge control obligations. This approach should ensure that BT will be prevented from charging above the level required by the charge control in instances where competitive pressures are particularly weak.

### **Responses to the consultation**

- 5.7 Most respondents agreed with Ofcom's proposals for the treatment of geographical discounts within the charge control framework. However, Cable and Wireless commented that allowing geographic discounts risks foreclosing the market to competitive entry, by allowing BT to offer selective discounts. In addition one operator argued that Ofcom's proposals are potentially in contradiction of the European Commission's guidelines on geographic markets. BT commented that it would prefer any geographic discounts that it may offer to count towards its meeting its charge control obligations.
- 5.8 Ofcom disagrees that its proposals potentially contradict the European Commission's guidance. The proposed approach is consistent with a national geographic definition, although Ofcom recognises that definition may need to be revisited in subsequent leased lines market reviews if BT did offer widespread geographic discounts. Ofcom continues to believe that it is not appropriate to allow any geographic discounts offered by BT to contribute towards it meeting its charge control obligations. This approach will ensure that consumers in areas where competitive pressures may emerge more slowly will continue to be protected by the charge control.
- 5.9 In calculating the values of X for the charge control baskets, Ofcom has based its volume forecasts on an assumption that BT does not offer geographically differentiated charges. Thus it is implicit that BT loses share more rapidly in relatively low cost areas and this tends to increase average circuit costs. However, if BT were to offer geographically differentiated charges this may alter the mix of the circuits that it is selling, i.e. assuming that BT offers discounts in areas where costs are lower and/or competition is greater, the proportion of circuits being sold in these areas will increase relative to the volume forecasts used to calculate the values of X. This would mean that the actual average cost of provision of all circuits would be lower than implied by the mix of circuits used to generate the forecast of volumes. In this respect and given that any discounts would be offered voluntarily, any geographic discounting by BT of its PPC terminating segments could be self-financing and it would not be necessary for BT to increase its charges in other higher cost, lower competition areas.

## Scope for volume discounts under the control

- 5.10 Volume discounts are a feature of the retail leased lines markets where BT (and to a lesser extent other operators) offer significant discounts on retail leased lines, the size of these discounts being related to the volume of circuits purchased. Volume discounts could cause concern to Ofcom due to the potential for such discounts to have a detrimental effect on competition. This is because BT's scale gives it an advantage such that not all other operators can match the volume discounts on offer from BT.
- 5.11 However, what is of concern within this charge control is the ability of BT to offer volume discounts in the provision of PPC terminating segments. BT will be selling these terminating segments to its competitors i.e. Altnets, and providing equivalent products and services to BT's downstream activities. Currently BT's largest customer for PPC terminating segments (or, in reality, equivalent products and services) is BT's downstream arm. BT forecasts this to be the case for the duration of the charge control. This raises the concern that if volume discounts are allowed within the charge control framework, these could be used by BT to justify price discrimination in favour of its downstream arm as any discount will be related to volume. Depending on the structure of any discount scheme, this may mean that only BT's downstream arm can qualify for the lower priced wholesale products.
- 5.12 If BT is able to source wholesale inputs at a lower cost than its competitors in the retail markets, such an outcome has real potential to be detrimental to the development of competition in the retail leased lines market. One of the main motivations for the introduction of PPC terminating segments was to provide a wholesale product that would encourage the fostering of a more competitive retail market. It was therefore Ofcom's proposal within the consultation not to allow volume discounts, on the basis that that if BT were permitted within the charge control framework to offer volume related discounts this could be detrimental to the development of competition in related downstream markets.

## Responses to the consultation

- 5.13 Of the respondents who commented on this issue, only Vodafone and BT did not agree with Ofcom's proposal. Vodafone argued that volume discounts should be allowed but that there should be appropriate safeguards to ensure that BT does not discriminate to the advantage of its downstream activities. BT stated that, while it understood some of the reservations expressed by Ofcom, it does not agree with the proposal to exclude volume discounts from the charge control. BT argued that there are cost savings associated with scale and volumes and that these cost savings should be reflected in its charges.
- 5.14 However, Ofcom continues to believe that its proposed approach is appropriate. While there may indeed be cost savings associated with scale and scope, Ofcom believes the potential risks to competition in related markets are too great to allow volume discounts for PPC terminating segments. In Ofcom's view the approach suggested by Vodafone would be likely to lead to considerable lengthy ex post investigations which would create uncertainty for all players. Therefore, Ofcom has determined that BT will not be allowed to offer volume related discounts on its PPC terminating segments.

## **Monitoring compliance with the charge control**

### **Services in baskets**

- 5.15 BT's freedom to set charges for the services controlled by the three main charge control baskets and the sub baskets in each of the main bandwidth baskets will be constrained so that the average charge in each basket at the start of the control year cannot be increased by more than RPI less the relevant value of 'X' set out in the Conditions. RPI (i.e. the controlling value of RPI) is the term used to represent the percentage change in the Retail Prices Index in the 12 months up to June preceding the start of the relevant charge control year (the relevant year).
- 5.16 Compliance with this constraint will be monitored by calculating a 'weighted' average change in charges for each basket, where the weight for each service is BT's revenue for that service in the previous financial year as a proportion of basket revenue in the previous financial year. The 'weighted' average for each basket is then compared with its respective value of RPI less the value of 'X'.
- 5.17 The weights for the low and the high bandwidth baskets and sub-baskets will include revenues from all sales of PPC terminating segments i.e. external sales to Altnets and internal sales within BT. For the equipment basket and the sub-basket the weights will only include revenues from all external sales of PPC terminating segments equipment to Altnets. In addition, for the equipment charges sub-basket, the value of 'X' applies to the charge for each individual piece of equipment in this basket. Therefore none of these individual charges may increase by more than RPI-'X' throughout any control year.

### **Geographic discounts**

- 5.18 BT discussed above, BT is permitted to offer geographic discounts within the charge control framework. However, where BT offers geographic discounts, these discounts will not contribute towards BT meeting its charge control obligations. As such, for any PPC terminating segment products or services that fall within the scope of the charge control that are sold at a discount by BT on the basis of geographic location, BT is required to use the undiscounted charges and report the revenues from such products and services on the basis that no discount was offered. This applies both to the charges in the relevant charge control year for calculating the percentage change in charges, and for calculating the weights for each of the products and services in the basket i.e. BT's revenue for that product and service in the relevant prior financial year. The mechanisms by which the revenues for charge control purposes are calculated are set out in the modifications to Conditions G4 and GG4.

### **Provision for carryover**

- 5.19 For the main charge control baskets, namely the basket of connections, rental and maintenance services in each bandwidth, and the equipment basket, BT will be able to carryover any price reductions it makes in excess of the requirements of the charge control. That is, if BT's average charge for these baskets at the end of the Relevant Year is lower than required by the associated RPI minus 'X' constraint, it will be able to carryover the difference into the next charge control year. This means that the benchmark for assessing BT's compliance with the control in the following year will be the level of charges BT was required to achieve, rather than the level it actually achieved.

Conversely, if its average charge is higher than the required level, it has to take the excess into account in the following year. These 'carryover' provisions will not apply to the sub-baskets within the main baskets, since the general expectation is for the charge levels to be lower than that required by the sub-basket conditions (as is necessary for at least one charge within each sub-basket in order for the overall main basket conditions to be met).

### **Notice period for changes to charges**

5.20 The LLMR Final Statement imposed requirements on BT relating to the notification period for changes to any charges for services provided by BT within the markets in which it was found to have SMP. Conditions G6 and GG6 require BT to provide ninety days' notice of a change to a charge or the structure of the charge. This requirement remains in place in respect of high and low bandwidth TISBO services irrespective of the proposals set out in this consultation document.

### **Duration**

5.21 The charge control will last for four years, starting on 1 October 2004.

### **Accounting Separation and Financial Reporting**

5.22 Ofcom has imposed ex-ante financial obligations on BT requiring it to prepare and publish financial information for PPC terminating segments in order for it to demonstrate its compliance with its cost orientation and non-discrimination obligations. The financial information also helps to enable Ofcom to make determinations on specific charges or in assessing whether BT has breached competition rules. The basis of preparation of this financial information is set out in within its Accounting Documents and as expanded within its secondary accounting documents available on BT's website ([www.groupbt.com/corporate/index.htm](http://www.groupbt.com/corporate/index.htm)).

5.23 Ofcom has concluded that the PPC charge control which will start on 1 October 2004 should be applied to current charges i.e. those in place on 30 September 2004. BT has the freedom within each individual basket to set charges subject to a cost-orientation obligation for each individual service.

5.24 Ofcom would interpret cost orientation of an individual service as being based on its long run incremental costs plus an appropriate mark up for common costs. In particular any individual price would be expected to typically fall between its long run incremental cost and its standalone cost ceiling.

5.25 Where it has been deemed appropriate BT will be subject to regulatory reporting requirements in respect of each service within all wholesale markets in which BT has been found to have SMP<sup>17</sup>.

5.26 As a result of its review of BT's Pricing Model, Ofcom is aware that BT's current set of PPC terminating segments network components and associated volume measures are not readily capable of transparently and reliably demonstrating

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<sup>17</sup> BT's regulatory financial reporting obligations are set out in: "The regulatory financial reporting obligations on BT and Kingston Communications" published 22 July 2004  
[http://www.ofcom.org.uk/consultations/past/fin\\_reporting/fin\\_report\\_statement/?a=87101](http://www.ofcom.org.uk/consultations/past/fin_reporting/fin_report_statement/?a=87101)

either the cost orientation of individual PPC terminating segments services or that services have been supplied to Altnets in accordance with the requirement not to unduly discriminate.

- 5.27 Furthermore the costs for certain PPC terminating segments elements, notably for third party customer link and point of handover equipment connection charges, are currently reflected by BT in the regulatory financial statements on an accruals accounting basis. The revenues however are recognised fully in the profit and loss in the year of sale. This accounting treatment means that the current Standard Service Statements, which compare the costs and revenues for individual services, for certain PPC terminating segments services are not prepared on a comparable basis.
- 5.28 Ofcom is also aware that BT's existing list of network components may not be sufficiently granular to adequately demonstrate non-discrimination both in terms of the costing of network elements (both PPC terminating segments and non-PPC terminating segments alike) between each other and between the services sold to Altnets and those supplied to BT's downstream retail activities. As a result Ofcom has set up a workstream within its regulatory financial information project to review and update the list of network components. This revised set of network components will be subject to public consultation before Ofcom finally directs BT to implement it within the regulatory financial statements.

### **Modification of existing SMP Conditions**

- 5.29 Section 87(1) of the Act provides that, where Ofcom has made a determination that a person is dominant in a particular market, it must set such SMP services conditions as it considers appropriate and as are authorised in the Act. This implements Article 8 of the Access and Interconnection Directive.
- 5.30 The Act (sections 45-50 and 87-92) sets out the obligations that Ofcom can impose if it finds that any undertaking has SMP. In particular, Ofcom can impose charge controls and rules in relation to cost recovery and cost orientation (section 87(9)). As discussed above, the LLMR Final Statement imposed SMP services conditions G4 and GG4 on BT implementing an interim charge control for PPC terminating segments in the low and high bandwidth TISBO markets.
- 5.31 Section 86 prevents Ofcom from modifying a SMP services condition outside of a market review unless it is satisfied that there has been no material change in the markets identified since the market power determination was made.
- 5.32 The conclusions in this document for the longer term PPC terminating segments charge control cover wholesale low and high bandwidth traditional interface broadband origination. As the LLMR was only concluded by Ofcom in June this year, Ofcom is satisfied that there has been no material change in the relevant markets.
- 5.33 The final modifications are attached to the Notification at Annex A. The Notification itself is given under sections 48 and 86 of the Act and sets out the final modifications to SMP services conditions G4 and GG4 in respect of the low and high bandwidth TISBO markets identified in the LLMR. In effect, the modifications amount to entire replacements of each condition. The replacement to current SMP services condition G4 is set out in Schedule 1 to

the Notification and the replacement to current SMP services condition GG4 is set out at Schedule 2.

- 5.34 The modifications implement the key conclusions reached in this document as follows.
- 5.35 SMP conditions G4 and GG4 currently apply in the low and high bandwidth markets respectively. The modifications to these conditions therefore follow this 'market by market' structure. That is, SMP condition G4 sets the charge control for low bandwidth PPC terminating segments; and SMP condition GG4 sets the charge control for high bandwidth PPC terminating segments. For the remainder of this section, references to paragraphs within the SMP conditions, refers to both Condition G4 and GG4, unless otherwise stated.
- 5.36 In respect of each bandwidth (high and low), there will be two main 'baskets' in the construction of the charge control: the first capturing connection, rental and maintenance charges and the second capturing equipment charges (paragraph 4.1(a) and (b)). Within the first main basket, two sub-baskets will also be controlled: connection services in isolation, and rental and maintenance services in isolation (paragraph 4.1(c) and (d)). Within the second main basket (equipment), additional sub-caps will apply to the charges for each individual piece of equipment (paragraph 4.1(e)). The relevant services and equipment for each market are listed in Annexes A and B to each condition respectively, and the services and equipment listed therein reflect Ofcom's conclusions on the scope of the charge control as discussed above at Section 2.
- 5.37 The formulation of the charge control in terms of baskets allows flexibility to change the prices of individual services, provided the conditions regarding the overall sub-baskets and main baskets are met. The charge control allows further flexibility for price changes to be made at any point throughout each charge control year, provided these changes are sufficient to satisfy the requirements over the year as a whole. Paragraph 4.2 recognises that price changes may be implemented after the first day of the charge control year and indicates the required magnitude of later price reductions in order to achieve compliance.
- 5.38 The formulae to be used in calculating the percentage change in charges for the relevant services over the charge control year differs for the different baskets and sub-baskets. The formula to be used in respect of the first main basket (connection, rental and maintenance) and its two corresponding sub-baskets is set out at paragraph 4.3. The formula to be used in respect of the second main basket (equipment) is set out at paragraph 4.4. The two formulae differ to the extent that the formula in paragraph 4.3 requires the volume of equivalent BT to BT transactions, as well as BT to Altnet transactions, to be inputted into the calculation. The calculation of the percentage change in charges in the main equipment basket does not require consideration of the volume of such equipment sold by BT to itself.
- 5.39 The formula to be used in respect of the individual equipment sub-caps is set out at paragraph 4.5. This formula is quite different to the other formulae because it relates to specific individual charges and not to a basket where charges need to be aggregated.
- 5.40 The values of 'X' are set out in paragraph 4.6, and result in:

- The main connection, rental and maintenance basket of charges being controlled by RPI – 4% in low bandwidth, and RPI – 6.5% in high bandwidth (paragraph 4.5(a));
- The main equipment basket of charges in each bandwidth being controlled by RPI – 8.9% (paragraph 4.5(b));
- The sub-basket for connection charges being controlled by RPI – 0% in both low and high bandwidth (paragraph 4.5(c));
- The sub-basket for rental and maintenance charges being controlled by RPI – 0% in both low and high bandwidth (paragraph 4.5(d)); and
- Each individual equipment charge being sub-capped by RPI - 3% in both low and high bandwidth (paragraph 4.5(e)).

5.41 Some of the equipment used in the provision of PPC terminating segments services in both the low and high bandwidth markets is non-bandwidth specific. That is, the same equipment can equally be used for the provision of services in either market. Because the SMP conditions to be modified apply on a market by market basis, the controls on the relevant equipment charges in both markets are identical (RPI – 8.9% on the basket of equipment, with individual sub-caps individual equipment charges of RPI – 3%). This has the effect of requiring the relevant equipment charges to comply with the price control irrespective of which market the equipment is used in.

5.42 The charge control will commence on 1 October 2004 and end on 30 September 2008. This is reflected in the definition of 'Relevant Year' set out at paragraph 4.12 in each of the conditions. Although each charge control year will run from October to September, BT is required to demonstrate its compliance with the charge control based on revenue data it collects in the preceding financial year (April to March). As discussed at paragraphs 3.22 and 3.31 above, this is because there are practical difficulties for BT associated with provision of revenue data that is prepared on the basis of October to September and that is audited and reconcilable to its regulatory financial statements data.

5.43 Additional points to note about the modifications to SMP services conditions G4 and GG4 are:

- the charge control provisions are explicitly without prejudice to the general cost orientation obligations which are already in place as a result of the LLMR (current conditions G3 and GG3). This means that, irrespective of the charge controls, BT is still subject to cost orientation obligations in charging for PPC terminating segments;
- paragraphs 4.7 to 4.12 have been included so as to allow Ofcom to calculate BT's compliance with the charge in the Relevant Year, and also to allow some flexibility to the operation of the charge control in terms of carryover, as discussed at paragraph 5.19 above. However, carryover provisions apply only to the main baskets and not to the sub-baskets since the general expectation is for the charge levels to be lower than that required by the sub-basket conditions (as is necessary for at least one charge within each sub-basket in order for the overall main basket conditions to be met).

- in interpreting the condition, the definitions that apply for the purposes of the current SMP services conditions set by the LLMR Final Statement should be referred to, except where specific definitions apply by virtue of paragraphs 4.13 and 4.14; and
- the definition of 'Partial Private Circuit' in paragraph 4.14 necessarily limits the concept of PPC to a circuit provided by BT to Altnets, as it is the price charged by BT to others that is required to be controlled. However, this definition should not be construed by BT as implying that they are not required to consider the volumes of equivalent circuits and services which are used by their own retail arm in demonstrating compliance with the charge control. As set out at paragraph 5.17 above, consideration of BT to BT volumes is specifically required in respect of the connection, rental and maintenance charge controls in each bandwidth.

### **Changes to proposals since the June consultation**

5.44 As a result of the June consultation, Ofcom has, in its final conclusions on PPC price controls, amended its initial proposals which were subject to consultation. Ofcom is satisfied that these changes are not material, and that it has fully and fairly taken all consultation responses into account in coming to its final decision, as discussed throughout this document. Ofcom has summarised the major revisions to its proposals for the price control conditions below for completeness and transparency.

5.45 As discussed in Sections 2 and 3 above, Ofcom has concluded, as a result of the June consultation, that the structure of the charge control needs to be more detailed than the proposals put forward in the consultation. While Ofcom has agreed with BT that an aggregate equipment basket is appropriate as a main control, additional sub-caps on individual equipment charges are necessary in order to ensure that charges for individual items of equipment do not increase in nominal terms over the period of the charge control. Further, although Ofcom does not agree that separate charge controls should be imposed on connection and rental and maintenance charges, Ofcom recognises the concerns of respondents related to BT's ability to rebalance charges between connection charges and rental and maintenance charges. Ofcom has therefore decided to introduce sub-caps within the main charge control basket for connection and rental and maintenance charges.

5.46 The drafting of the modifications to conditions G4 and GG4 in Annex A has been amended from the version included in the June consultation document. These amendments reflect a number of factors since publication of the consultation document:

- BT, in its response to the consultation, commented that it had a strong preference to use the BT financial year (March to April) as the basis for the prior year revenue weights as this simplifies the collection of the data necessary to monitor compliance and enables the prior years to be known at the start of the charge control (which would not be possible in the case of prior year weights based on the October to September period);

- The main equipment basket is now an aggregate basket, which allows BT more flexibility in setting its charges for individual items of equipment; and,
- Ofcom is now introducing sub-baskets for the main low bandwidth, high bandwidth and equipment baskets.

5.47 Therefore, in order to reflect BT's concerns and to provide greater clarity on the operation of the charge control, Ofcom has modified the formulae in the charge control condition to state the percentage change explicitly in terms of percentage change in prices weighted by revenues from BT's previous financial year (March to April). Ofcom has also provided further detail to give greater clarity on how compliance with the control may be achieved. Furthermore, Ofcom has inserted additional requirements on BT to ensure that it complies with its obligations related to the charge control sub-baskets.

5.48 In the June consultation, Ofcom proposed that the values of X for the connection, rental and maintenance charge controls in each bandwidth be within the following ranges: for low bandwidth, 1.25 to 5%; and for high bandwidth, 7.25 – 8.5%. As discussed in Section 4, and in particular at paragraph 4.3, Ofcom has concluded on final values of X for each bandwidth of 4% and 6.5% respectively. The final value of X for the high bandwidth charge control is slightly below the range consulted upon. This value of X reflects revisions to the key model parameters since publication of the consultation document. These revisions were made after consideration of responses to the consultation document, as discussed in Section 4 above.

5.49 Ofcom has concluded, in the limited circumstances discussed at paragraph 5.4 to 5.9 above, that BT will be allowed to apply geographic discounts to the charges for PPC terminating segments services and equipment in each of the relevant markets. However, Ofcom takes the view that BT should not be able to use any such discounts to its advantage in demonstrating its compliance with the relevant charge control.

5.50 In the June consultation, Ofcom proposed modifications to Conditions G4 and GG4 which explicitly required any geographic discounts to be specifically taken into account by using additional formulae. Further to the consultation, Ofcom has reconsidered the detailed requirements set out in the charge control and determined that the same goal can be achieved by a less complicated means: namely, by reference to prices and revenues excluding any discounts that may be offered by BT. Ofcom has therefore modified its proposals accordingly.

### **Communications Act tests**

5.51 Section 3 of the Act imposes general duties on Ofcom, in carrying out its functions, to further the interests of citizens in relation to communications matters and of consumers in relevant markets, where appropriate by promoting competition. Ofcom considers that its final price control conditions fulfil these general duties under section 3 of the Act, having regard to the outcome expected to be achieved by them, namely that charges for wholesale services are set at a level that enable communications providers to compete downstream. Section 3 also sets out certain matters to which Ofcom must have regard in performing its general duties. In considering which remedies to impose, Ofcom has had regard to these matters, in particular to the matters in section 3(4) and 3(5) of the Act, including the desirability of promoting

competition in relevant markets, and the interests of consumers in respect of choice, price, quality of service and value for money, as set out below.

- 5.52 Section 4 of the Act sets out the Community requirements on Ofcom which flow from Article 8 of the Framework Directive. In considering which, if any, SMP services conditions to propose, Ofcom has taken account of all of these requirements. In particular, Ofcom has considered the requirement to promote competition and to secure efficient and sustainable competition for the benefit of consumers.
- 5.53 Ofcom has carried out a full regulatory option appraisal in relation to the implementation of a charge control for PPC terminating segments as required by section 7 of the Act. This was set out in the LLMR consultation documents published in April 2003 and in December 2003.
- 5.54 As well as being appropriate (see section 87(1)), any amendments to an SMP condition must also satisfy the tests set out in section 47 of the Act, namely that the amendment must be:
- objectively justifiable in relation to the networks, services or facilities to which it relates;
  - not such as to discriminate unduly against particular persons or a particular description of persons;
  - proportionate as to what the condition is intended to achieve; and
  - in relation to what it is intended to achieve, transparent.
- 5.55 The conditions are objectively justifiable in that they impose an RPI-X charge control which will provide an effective mechanism to reduce prices in circumstances where competition cannot be expected to do so.
- 5.56 A longer term charge control will not discriminate against a particular person or particular persons because any provider of communications networks, services or associated facilities can request PPC terminating segments from BT. However, while BT will be subject to charge control obligations and Kingston Communications will not, Ofcom does not consider this to be unduly discriminatory. This is because formulating a charge control for Kingston would be disproportionate due to the relatively low number of leased lines in the Hull area. Kingston is in any case subject to a cost orientation obligation and a non-discrimination obligation, and will be required to meet all reasonable requests for access.
- 5.57 Modification of the relevant SMP conditions to impose longer term charge controls is proportionate because the charge controls will impose a glide path requiring BT to reduce its charges for PPC terminating segments that will encourage BT to make cost savings over a four year period, in a market where Ofcom considers BT is likely to hold significant market power over the period of the control. Moreover, the reduction in charges required of BT over the period of the control has been formulated using information on BT's costs and a consideration of how these costs will change over time. In addition, Ofcom has also used the conclusions of a study carried out by NERA into BT's relative inefficiency to determine the magnitude of the required cost reductions.

- 5.58 Ofcom has included within the charge control structure relatively broad baskets. This will allow BT to recover common costs efficiently. Additionally, the charge control includes sub-baskets for the equipment charges and the low bandwidth and high bandwidth connection and rental and maintenance charges, which impose proportionate restrictions on BT's flexibility with the main baskets. These sub-baskets are necessary to ensure that the charges for individual items of equipment do not increase in nominal terms; and to limit BT's ability to dramatically rebalance its charges between connection charges and rental and maintenance charges.
- 5.59 The charge control also allows BT to offer geographically de-averaged charges, although any discounts offered by BT will not count towards meeting its charge control obligations. This balances the need to allow BT to react to any developments in competition that may arise in a localised area with the need to protect customers where BT faces no competitive pressures. Overall, Ofcom considers that its proposals for the PPC terminating segments charge control are proportionate and strike an appropriate balance.
- 5.60 Ofcom consulted fully on its proposals for the longer term charge control in the June consultation, and has set out its analysis of the responses and its basis for final decisions in this document. The final modifications to Condition G4 and GG4 are set out at Annex A. Ofcom therefore considers that it has met the requirement for transparency set out in section 47 of the Act.
- 5.61 Section 88 imposes additional requirements for any modifications to SMP conditions which impose charge controls. The LLMR Final Statement has set out why Ofcom considers that the imposition of a charge control for PPC terminating segments meets these requirements.
- 5.62 In modifying SMP conditions G4 and GG4, Ofcom is therefore satisfied that it has considered all of the relevant requirements of the Act.

### **Obligation to inform the Commission and the Secretary of State**

- 5.63 Pursuant to section 50 of the Act, the Notification specifying the modifications has been sent to the European Commission and the Secretary of State.

## Chapter 6

# Conclusions

### Ofcom's conclusions

- 6.1 This document has set out Ofcom's decision for the implementation of the PPC charge control on 1 October 2004.
- 6.2 In summary for the reasons set out in this statement Ofcom has decided to:
- to start a control from current charges (i.e. today's charges)
  - to establish 3 baskets
    - point of connection (POC) equipment charges and third party equipment charges;
    - low bandwidth circuits - connection charges of a new circuit and on going rental and maintenance charges; and
    - high bandwidth circuits - connection charges of a new circuit and on going rental and maintenance charges.
  - to set the percentage by which charges must fall in each year of the 4 year control within the following ranges:
    - low bandwidth: RPI – 4.0%
    - high bandwidth: RPI – 6.5%
    - equipment charges: RPI – 8.9%
- 6.3 The RPI-X control relates to PPC terminating segments. As explained in the LLMR, Ofcom is not currently minded to impose a charge control for trunk segment charges. However, these will continue to be covered by a cost-orientation obligation.

### BT's Proposals

- 6.4 Prior to publication of the consultation document BT provided Ofcom with a new pricing model for PPC terminating segments using Excel workbooks populated with the latest audited financial information (2002/03) ("BT's Pricing Model"). The model derived individual charges for each service that is covered by the PPC charge control. Ofcom scrutinized that model as part of its assessment of whether charges should be revised at the start of the PPC charge control. Ofcom's investigation into BT's Pricing Model, is set out in Annex C.
- 6.5 BT argued that the BT Pricing Model produced robust outputs for costs and charges, and felt that it provided the best basis for the PPC charge control. Significantly on that basis the current charges for PPC terminating segments result in a significant under recovery of costs.

6.6 BT therefore proposed an alternative basis of charging which would lead to terminating segment charges which were more closely aligned with the outputs of its model by the end of the control period. Were this alternative accepted, BT was prepared to enter into a formal commitment to a voluntary price cap on trunk segment charges. The aggregate effect, taking trunk and terminating segments together, would have been beneficial to purchasers of PPCs, in BT's view.

6.7 In full, BT proposals were as follows:

For PPC terminating segments:

- BT to apply the interim adjustment of RPI-7% to current charges (set from 1 Aug 02), backdated to 1 Aug 03, to derive the starting charges for the charge control commencing on 1 October 2004.
- From 1 October 2004 Local end fixed charges for 34/45mb/s and 140/155mbs circuits would be reduced further by 8% and 53% respectively in line with BT's most recent cost information.
- For the period from 1 October 2005 to 30 September 2008, an annual adjustment of RPI-0.5% for PPC terminating segments

For PPC trunk segment charges:

- For low bandwidth circuits successive annual adjustments from 1 October 2004 of RPI-22.5%, RPI – 12.5%, RPI – 7.5%, RPI – 5.5%
- For high bandwidth circuits from 1 October 2004 annual reductions of RPI-8%

6.11 Ofcom estimated that the effect of BT's proposals would be as follows; Over the period of the control (1 October 2004 to 30 September 2008), terminating segment charges would fall by approximately 4% in real terms while trunk segment charges would fall by around 40%. In aggregate, this would lead to a reduction on PPC charges (including terminating segment and trunk charges) of approximately 25%. This compared with Ofcom's own proposals which would lead to a corresponding fall in terminating segment charges of between 8% and 20% over the period of the proposed charge control, depending on the final values of X.

6.12 It should be noted that these are only estimations of the aggregate impact on PPC charges, and are expressed in real terms. The impact on individual Altnets would vary depending on the types and quantities of circuits they purchase from BT.

## Responses

6.13 BT argued that its proposal was a serious alternative to the one proposed by Ofcom, and maintained that:

*"From BT's point of view it appears that we may not have been charging for these terminating services at an appropriate level for some time".*

- 6.14 BT felt that the charges for terminating segments need to increase, but understood that a one off increase would disrupt the market, and felt that their gradual approach would be preferable and allow them to make internal cost savings to “catch up” with the low starting charges.
- 6.15 The majority of respondents urged Ofcom to reject BT’s proposals and use Ofcom’s proposed rates for setting starting charges and the value of X. Respondents stated that BT’s proposals would only deliver nominal reductions in the charges for PPC terminating segments, which were the focus of Ofcom’s charge control analysis, and noted that while BT was offering reductions in trunk segments this was outside the scope of the consultation. In particular Cable and Wireless stated:
- “As trunk segments are not included in the scope of SBO markets, any reductions by BT in this area cannot be a remedy for SMP in SBO markets and must not be considered as such”*
- 6.16 Respondents also felt that since Ofcom’s analysis suggested that there was insufficient evidence that BT was under recovering costs on terminating segments, they would rely on Ofcom’s judgement and support the proposed rates.
- 6.17 Several Altnets made the point that, as a result of the SMP determination on trunk circuits in the LLMR, BT is under a cost orientation obligation with regards to trunk circuits and felt BT’s proposals on lower trunk charges suggest that they are not sufficiently cost orientated and that there may be scope for reductions regardless of what happens to terminating segments. Cable and Wireless and UKCTA also noted that as well as complying with the SMP obligations, BT must comply with more general competition requirements on predatory pricing.

## Conclusions

- 6.18 Ofcom maintains that its approach to set the charge control for PPC terminating segments with the following values for X is the most appropriate way forward:

Basket	Value of X	Consultation range
POC end and third party end equipment and infrastructure charges	8.9% (NB: an aggregate control)	8.9% (NB: an individual indexation approach)
Low bandwidth connection and rental and maintenance charges	4.0%	1.25 % to 5.0%
High bandwidth connection and rental and maintenance charges	6.5%	7.25 to 8.5%

6.19 This approach has been supported by all parties apart from BT in response to the June consultation and BT has not provided any new evidence to demonstrate that its approach would lead to charges which were more cost reflective.

## **Annex A**

# **Notification**

## **NOTIFICATION UNDER SECTIONS 48(1) AND 86 OF THE COMMUNICATIONS ACT 2003**

### **The modification of SMP services conditions G4 and GG4 in relation to BT for the purposes of regulating charges for PPC terminating segments**

#### **WHEREAS**

A. OFCOM issued a notification pursuant to section 48(2) and 86 of the Act setting out their proposals for the modification of SMP services condition G4 and GG4 on 24 June 2004 ('the First Notification');

B. A copy of the First Notification was sent to the Secretary of State in accordance with section 50(1)(a), the European Commission and to the regulatory authorities of every other Member State in accordance with section 50(3) of the Act;

C. In the First Notification and accompanying explanatory statement, OFCOM invited representations about any of the proposals set out therein by 30 July 2004;

D. By virtue of section 48(5) of the Act, OFCOM may give effect to any proposals to modify SMP services conditions as set out in the First Notification, with or without modification, where:

(i) they have considered every representation about the proposals made to them within the period specified in the First Notification; and

(ii) they have had regard to every international obligation of the United Kingdom (if any) which has been notified to them for this purpose by the Secretary of State;

E. OFCOM received responses to the First Notification and have considered every such representation made to them in respect of the proposals set out in the First Notification and the accompanying explanatory statement; and the Secretary of State has not notified OFCOM of any international obligation of the United Kingdom for this purpose;

#### **THEREFORE**

1. OFCOM, in accordance with sections 48(1) and 86 of the Act, hereby make the following modifications to SMP services conditions by reference to market power determinations made in relation to markets in which OFCOM are satisfied there has been no material change since those determinations were made.

2. The modifications contained in this Notification are further to the market power determinations made in a Notification under section 79 of the Act by OFCOM on 24 June 2004 whereby BT was determined to have significant market power in the following markets:

(a) traditional interface symmetric broadband origination up to and including 8Mbit/s in the UK excluding the Hull Area; and

(b) traditional interface symmetric broadband origination above 8Mbit/s up to and including 155Mbit/s in the UK excluding the Hull Area.

3. SMP services conditions G4 and GG4 currently apply to BT in the markets listed at subparagraphs (a) and (b) of paragraph 2 respectively. OFCOM are modifying SMP services conditions G4 and GG4 as set out in Schedules 1 and 2 respectively to this Notification.

4. The effect of, and OFCOM's reasons for making, the modifications referred to in paragraph 3 are set out in the explanatory statement published with this Notification.

5. OFCOM consider that the modifications referred to in paragraph 3 comply with the requirements of sections 45 to 50 and sections 78 to 92 of the Act, as appropriate and relevant to each of the modifications.

6. In making the modifications set out in this Notification, OFCOM have considered and acted in accordance with their general duties in section 3 of the Act and the six Community requirements in section 4 of the Act.

7. Copies of this Notification and the accompanying explanatory statement have been sent to the Secretary of State in accordance with section 50(1)(a), and to the European Commission in accordance with section 50(2)(a) of the Act.

8. In this Notification (not including the Schedules) -

(a) 'the Act' means the Communications Act 2003;

(b) 'BT' 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 by Section 736 of the Companies Act 1985 as amended by the Companies Act 1989;

(c) 'OFCOM' means the Office of Communications;

(d) except as otherwise defined in this Notification, words or expressions used shall have the same meaning as in the Act.

9. This Notification, and the modifications set out in the Schedules hereto, shall take effect from 1 October 2004.

**GARETH DAVIES**

**Competition Policy Director, Ofcom**

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

30 September 2004

## SCHEDULE 1

### Amendments to SMP services condition G4

Paragraphs G4.1-G4.4 and Annex A thereto shall be deleted and replaced as follows:

“G4.1 Without prejudice to the generality of Condition G3, and subject to paragraph G4.2, the Dominant Provider shall take all reasonable steps to secure that, at the end of each Relevant Year, the Percentage Change (determined in accordance with paragraphs G4.3, G4.4 or G4.5 as appropriate) in:

- (a) the aggregate of charges for all of the products and services listed in Annex A to this Condition;
- (b) the aggregate of charges for all of the products and services listed in Annex B to this Condition,
- (c) the aggregate of charges for the connection services listed in Part 1 of Annex A to this Condition;
- (d) the aggregate of charges for the rental and maintenance services listed in Part 2 of Annex A to this Condition; and
- (e) each of the charges for the products and services listed in Annex B to this Condition;

is not more than the Controlling Percentage (determined in accordance with paragraph G4.6).

G4.2 For the purpose of complying with paragraph G4.1, the Dominant Provider shall take all reasonable steps to secure that the revenue it accrues as a result of all relevant individual charge changes during any Relevant Year shall be no more than that which it would have accrued had all of those changes been made at 1st October in the Relevant Year. For the avoidance of doubt, this obligation shall be deemed to be satisfied where, in the case of a single change in charges during the Relevant Year, the following formula is satisfied:

$$RC(1 - D) \leq TRC$$

where:

*RC* is the revenue change associated with the single charge change made in the Relevant Year, calculated by the relevant Percentage Change immediately following the charge change multiplied by the revenue accrued during the Relevant Financial Year;

*TRC* is the target revenue change required in the Relevant Year to achieve compliance with paragraph G4.1, calculated by the Percentage Change required in the Relevant Year to achieve compliance with paragraph G4.1 multiplied by the revenue accrued during the Relevant Financial Year; and

$D$  is the elapsed proportion of the Relevant Year, calculated as the date on which the change in charges takes effect, expressed as a numeric entity on a scale ranging from 1st October = 0 to 30th September = 364, divided by 365. In the case of a leap year it is calculated as the date on which the change in charges takes effect, expressed as a numeric entity on a scale ranging from 1st October = 0 to 30th September = 365, divided by 366.

G4.3 The Percentage Change for the purposes of each of the categories of products and services specified in paragraphs G4.1(a), G4.1(c) and G4.1(d) shall be calculated by employing the following formula:

$$C_t = \frac{\sum_{i=1}^n \left[ R_i \frac{(p_{t,i} - p_{0,i})}{p_{0,i}} \right]}{\sum_{i=1}^n R_i}$$

where:

$C_t$  is the Percentage Change in the aggregate of charges for the products and services in the specified category at a particular time  $t$  during the Relevant Year;

$n$  is the number of products and services in the specified category;

$R_i$  is the sum of the revenue accrued during the Relevant Financial Year in respect of the specific product or service  $i$  and the revenue accrued during the Relevant Financial Year in respect of equivalent products or services provided by the Dominant Provider to itself, calculated to exclude any discounts offered by the Dominant Provider;

$p_{0,i}$  is the published charge made by the Dominant Provider for the specific product or service  $i$  at the beginning of the Relevant Year excluding any discounts offered by the Dominant Provider; and

$p_{t,i}$  is the published charge made by the Dominant Provider for the specific product or service  $i$  at time  $t$  during the Relevant Year excluding any discounts offered by the Dominant Provider.

G4.4 The Percentage Change for the purposes of the category of products and services specified in paragraph G4.1(b) shall be calculated by employing the following formula:

$$C_t = \frac{\sum_{i=1}^n \left[ R_i \frac{(p_{t,i} - p_{0,i})}{p_{0,i}} \right]}{\sum_{i=1}^n R_i}$$

where:

$C_t$  is the Percentage Change in the aggregate of charges for the products and services in the category specified in paragraph G4.1(b) at a particular time  $t$  during the Relevant Year;

$n$  is the number of products and services in the specified category;

$R_i$  is the revenue accrued during the Relevant Financial Year in respect of the specific product or service  $i$ , calculated to exclude any discounts offered by the Dominant Provider;

$p_{0,i}$  is the published charge made by the Dominant Provider for the specific product or service  $i$  at the beginning of the Relevant Year excluding any discounts offered by the Dominant Provider; and

$p_{t,i}$  is the published charge made by the Dominant Provider for the specific product or service  $i$  at time  $t$  during the Relevant Year excluding any discounts offered by the Dominant Provider.

G4.5 The Percentage Change for the purposes of the category of products and services specified in paragraph G4.1(e) shall be calculated by employing the following formula:

$$C_t = \frac{(p_t - p_0)}{p_0}$$

where:

$C_t$  is the Percentage Change in charges for the specific product or service in the category specified in paragraph G4.1(e) at a particular time  $t$  during the Relevant Year;

$p_0$  is the published charge made by the Dominant Provider for the specific product or service at the beginning of the Relevant Year excluding any discounts offered by the Dominant Provider; and

$p_t$  is the published charge made by the Dominant Provider for the specific product or service at the time  $t$  during the Relevant Year excluding any discounts offered by the Dominant Provider.

G4.6 Subject to paragraphs G4.7 and G4.8, the Controlling Percentage in relation to any Relevant Year means RPI reduced:

(a) for the category of products and services specified in paragraph G4.1(a), by 4 percentage points;

(b) for the category of products and services specified in paragraph G4.1(b), by 8.9 percentage points;

(c) for the category of products and services specified in paragraph G4.1(c), by 0 percentage points;

(d) for the category of products and services specified in paragraph G4.1(d), by 0 percentage points; and

(e) for the category of products and services specified in paragraph G4.1(e), by 3 percentage points.

G4.7 Where the Percentage Change in any Relevant Year is less than the Controlling Percentage, then for the purposes of the categories of products and services identified in paragraphs G4.1(a) and G4.1(b) the Controlling Percentage for the following Relevant Year shall be determined in accordance with paragraph G4.6, but increased by the amount of such deficiency.

G4.8 Where the Percentage Change in any Relevant Year is more than the Controlling Percentage, then for the purposes of the categories of products and services identified in paragraphs G4.1(a) and G4.1(b) the Controlling Percentage for the following Relevant Year shall be determined in accordance with paragraph G4.6, but decreased by the amount of such excess.

G4.9 Where the Dominant Provider makes a material change (other than to a charge) to any product or service which is subject to this Condition or to the date on which its financial year ends or there is a material change in the basis of the Retail Prices Index, paragraphs G4.1 to G4.8 shall have effect subject to such reasonable adjustment to take account of the change as Ofcom may direct to be appropriate in the circumstances. For the purposes of this paragraph, a material change to any product or service which is subject to this Condition includes the introduction of a new product or service wholly or substantially in substitution for that existing product or service.

G4.10 The Dominant Provider shall, no later than three months after the end of each Relevant Year, supply Ofcom, in writing, the data necessary to perform the calculation of the Percentage Change.

G4.11 Paragraphs G4.1 to G4.10 shall not apply to such extent as Ofcom may direct.

G4.12 The Dominant Provider shall comply with any direction Ofcom may make from time to time under this Condition.

G4.13 In this Condition:

(a) "Relevant Financial Year" means the period of 12 months ending on 31 March immediately preceding the Relevant Year;

(b) "Controlling Percentage" is to be determined in accordance with Condition G4.6;

(c) "Relevant Year" means any of the four periods of 12 months beginning on 1<sup>st</sup> October starting with 1<sup>st</sup> October 2004 and ending on 30 September 2008;

(d) "Retail Prices Index" means the index of retail prices compiled by an agency or a public body on behalf of Her Majesty's Government or a governmental department (which is the Office of National Statistics at the time of publication of this Notification) from time to time in respect of all items; and

(e) "RPI" means the amount of the change in the Retail Prices Index in the period of twelve months ending on 30<sup>th</sup> June immediately before the beginning of a Relevant Year, expressed as a percentage (rounded to two decimal places) of that Retail Prices Index as at the beginning of that first mentioned period.

G4.14 In the Annexes to this Condition:

(a) "Partial Private Circuit" or "PPC" means a circuit provided pursuant to the PPC Contract and in accordance with any directions made by Ofcom pursuant to SMP services conditions G1, G3 or G7 under section 49 of the Act; and

(b) "PPC Contract" means the Dominant Provider's Standard PPC Handover Agreement as at 24 June 2004.

## **Annex A to Condition G4**

### **Products and services subject to charge control pursuant to paragraphs G4.1(a), G4.1(c) and G4.1(d)**

Part 1: Connection services in respect of the provision of a Partial Private Circuit in each of the following bandwidths:

- 64 kbit/s – 960 kbit/s
- 1 Mbit/s
- 2 Mbit/s

Part 2: Rental and maintenance services in respect of the provision of a Partial Private Circuit in each of the following bandwidths:

- 64k
- 128k
- 192k
- 256k
- 320k
- 384k
- 448k
- 512k
- 576k
- 640k
- 704k
- 768k
- 832k
- 896k
- 960k
- 1Mb
- 2Mb.

## Annex B to Condition G4

### Products and services subject to charge control pursuant to paragraphs G4.1(b) and G4.1(e)

Part 1: Each of the following point of connection equipment products used in the provision of a Partial Private Circuit:

(a) Customer Sited Handover (CSH) products:

(i) in respect of CSH Configuration SMA-16:

- SMA-16 ADM with no trib interfaces (single fibre working) – existing site
- SMA-16 ADM with no trib interfaces (dual fibre working 1300nm) – existing site
- SMA-16 ADM with no trib interfaces (dual fibre working 1550nm) – existing site
- Additional charge for new site
- Standby batteries if required
- STM-1 electrical trib interface (2 ports)
- STM-1 optical (1300nm) trib interface (1 port)
- STM-1 electrical trib card (2 ports), required for 1+1 card protection
- STM-1 optical (1300nm) trib card (1 port), required for MSP protection
- STM-4 optical (1300nm) trib interface (1 port)
- STM-4 optical (1300nm) trib card (1 port), required for MSP protection

(ii) in respect of CSH Configuration SMA-4:

- SMA-4 ADM with no trib interfaces (single fibre working) – existing site
- SMA-4 ADM with no trib interfaces (dual fibre working 1300nm) – existing site
- SMA-4 ADM with no trib interfaces (dual fibre working 1550nm) – existing site
- Additional charge for new site
- Standby batteries if required
- STM-1 electrical trib interface (1 port)
- STM-1 optical (1300nm) trib interface (1 port)
- STM-1 electrical trib card (1 port), required for 1+1 card protection

- STM-1 optical (1300nm) trib card (1 port), required for MSP protection
- STM-4 optical (1300nm) trib interface (1 port)
- STM-4 optical (1300nm) trib card (1 port), required for MSP protection

(iii) in respect of CSH Configuration MSH51:

- MSH51 ADM with no trib interfaces (single fibre working) - existing site
- MSH51 ADM with no trib interfaces (dual fibre working 1300nm) - existing site
- MSH51 ADM with no trib interfaces (dual fibre working 1550nm) - existing site
- Additional charge for new site
- Per km from serving exchange to MSH node - single fibre working
- Per km from serving exchange to MSH node - dual fibre working
- Standby batteries if required
- STM-1 electrical trib interface (4 ports)
- STM-1 optical (1300nm) trib interface (2 ports)
- STM-1 electrical trib card (4 ports), required for 1+1 card protection
- STM-1 optical (1300nm) trib card (2 ports), required for MSP protection
- STM-4 optical (1300nm) trib interface (1 port)
- STM-4 optical (1300nm) trib card (1 port), required for MSP protection
- STM1 - legacy equipment
- 16x2 - legacy equipment
- 2M Bearer Access – required for access to DPCN
- plus rental per km from POH serving exchange to DPCN node

(b) In Span Handover (ISH) products:

(i) in respect of ISH Configuration STM-16:

- SMA –16 ADM with single STM-16 handover (1300nm)
- Optional STM-16 1550nm handover

(ii) in respect of ISH Configuration STM-4:

- SMA-4 ADM with single STM-4 handover (1300nm)

- Optional STM-4 1550nm handover
- (iii) in respect of ISH Configuration STM-1:
- SMA-4 ADM with single STM-1 handover (1300nm)
  - Additional cost for STM-1 1550nm handover
  - Additional STM-1 handovers (1300nm) – max 3
  - Additional STM-1 handovers (1550nm) – max 3
- (iv) in respect of ISH Configuration MSH51:
- MSH51 ADM with single STM-16 handover (1300nm)
  - Optional STM-16 1550nm handover
- (v) where MSH51 ISH is provided at nearest MSH node to customer:
- 2M Bearer Access – required for access to DPCN
  - plus rental per km from POH serving exchange to DPCN node

Part 2: Each of the following third party equipment products used in the provision of a Partial Private Circuit:

(a) Third party customer link infrastructure:

- KiloStream NTU 64k – 256k on existing copper
- KiloStream NTU 64k – 256k on new copper
- KiloStream NTU 320k – 640k on existing copper
- KiloStream NTU 320k – 640k on new copper
- KiloStream NTU 128k – 640k on 2Mb infrastructure
- KiloStream NTU 704k – 960k all delivery options
- 1Mb/s circuit on existing copper (from 23/10/2001)
- 1Mb/s circuit on new copper (from 23/10/2001)
- 2Mbit/s circuit on HDSL on existing copper
- 2Mbit/s circuit on HDSL on new copper
- First 2Mbit/s circuit on 4x2 at existing site
- First 2Mbit/s circuit on 16x2 at existing site

- Additional Charge for 4x2 and 16x2 new site
- Subsequent 2Mbit/s circuit on existing PPC 4x2 or 16x2

(b) in respect of third party customer sited SMA-1 ADM:

- SMA-1 ADM with no trib interfaces (single fibre working) - existing site
- SMA-1 ADM with no trib interfaces (dual fibre working 1300nm) - existing site
- SMA-1 ADM with no trib interfaces (dual fibre working 1550nm) - existing site
- Additional charge for new site
- Standby batteries if required
- 2Mbit/s trib card (16 ports)

(c) in respect of third party customer sited SMA-4 ADM:

- SMA-4 ADM with no trib interfaces (single fibre working) - existing site
- SMA-4 ADM with no trib interfaces (dual fibre working 1300nm) - existing site
- SMA-4 ADM with no trib interfaces (dual fibre working 1550nm) - existing site
- Additional charge for new site
- Standby batteries if required
- 2Mbit/s trib cards (32 ports)

(d) in respect of third party customer sited SMA-16 ADM:

- SMA-16 ADM with no trib interfaces (single fibre working) - existing site
- SMA-16 ADM with no trib interfaces (dual fibre working 1300nm) - existing site
- SMA-16 ADM with no trib interfaces (dual fibre working 1550nm) - existing site
- Additional charge for new site
- Standby batteries if required
- 2Mbit/s trib cards (32 ports).”

## SCHEDULE 2

### Amendments to SMP services condition GG4

Paragraphs GG4.1-GG4.4 and Annex A thereto shall be deleted and replaced as follows:

“GG4.1 Without prejudice to the generality of Condition GG3, and subject to paragraph GG4.2, the Dominant Provider shall take all reasonable steps to secure that, at the end of each Relevant Year, the Percentage Change (determined in accordance with paragraphs GG4.3, GG4.4 or GG4.5 as appropriate) in:

- (a) the aggregate of charges for all of the products and services listed in Annex A to this Condition;
- (b) the aggregate of charges for all of the products and services listed in Annex B to this Condition,
- (c) the aggregate of charges for the connection services listed in Part 1 of Annex A to this Condition;
- (d) the aggregate of charges for the rental and maintenance services listed in Part 2 of Annex A to this Condition; and
- (e) each of the charges for the products and services listed in Annex B to this Condition;

is not more than the Controlling Percentage (determined in accordance with paragraph GG4.6).

GG4.2 For the purpose of complying with paragraph GG4.1, the Dominant Provider shall take all reasonable steps to secure that the revenue it accrues as a result of all relevant individual charge changes during any Relevant Year shall be no more than that which it would have accrued had all of those changes been made at 1st October in the Relevant Year. For the avoidance of doubt, this obligation shall be deemed to be satisfied where, in the case of a single change in charges during the Relevant Year, the following formula is satisfied:

$$RC(1 - D) \leq TRC$$

where:

*RC* is the revenue change associated with the single charge change made in the Relevant Year, calculated by the relevant Percentage Change immediately following the charge change multiplied by the revenue accrued during the Relevant Financial Year;

*TRC* is the target revenue change required in the Relevant Year to achieve compliance with paragraph GG4.1, calculated by the Percentage Change required in the Relevant Year to achieve compliance with paragraph GG4.1 multiplied by the revenue accrued during the Relevant Financial Year; and

$D$  is the elapsed proportion of the Relevant Year, calculated as the date on which the change in charges takes effect, expressed as a numeric entity on a scale ranging from 1st October = 0 to 30th September = 364, divided by 365. In the case of a leap year it is calculated as the date on which the change in charges takes effect, expressed as a numeric entity on a scale ranging from 1st October = 0 to 30th September = 365, divided by 366.

GG4.3 The Percentage Change for the purposes of each of the categories of products and services specified in paragraphs GG4.1(a), GG4.1(c) and GG4.1(d) shall be calculated by employing the following formula:

$$C_t = \frac{\sum_{i=1}^n \left[ R_i \frac{(p_{t,i} - p_{0,i})}{p_{0,i}} \right]}{\sum_{i=1}^n R_i}$$

where:

$C_t$  is the Percentage Change in the aggregate of charges for the products and services in the specified category at a particular time  $t$  during the Relevant Year;

$n$  is the number of products and services in the specified category;

$R_i$  is the sum of the revenue accrued during the Relevant Financial Year in respect of the specific product or service  $i$  and the revenue accrued during the Relevant Financial Year in respect of equivalent products or services provided by the Dominant Provider to itself, calculated to exclude any discounts offered by the Dominant Provider;

$p_{0,i}$  is the published charge made by the Dominant Provider for the specific product or service  $i$  at the beginning of the Relevant Year excluding any discounts offered by the Dominant Provider; and

$p_{t,i}$  is the published charge made by the Dominant Provider for the specific product or service  $i$  at time  $t$  during the Relevant Year excluding any discounts offered by the Dominant Provider.

GG4.4 The Percentage Change for the purposes of the category of products and services specified in paragraph GG4.1(b) shall be calculated by employing the following formula:

$$C_t = \frac{\sum_{i=1}^n \left[ R_i \frac{(p_{t,i} - p_{0,i})}{p_{0,i}} \right]}{\sum_{i=1}^n R_i}$$

where:

$C_t$  is the Percentage Change in the aggregate of charges for the products and services in the category specified in paragraph GG4.1(b) at a particular time  $t$  during the Relevant Year;

$n$  is the number of products and services in the specified category;

$R_i$  is the revenue accrued during the Relevant Financial Year in respect of the specific product or service  $i$ , calculated to exclude any discounts offered by the Dominant Provider;

$p_{0,i}$  is the published charge made by the Dominant Provider for the specific product or service  $i$  at the beginning of the Relevant Year excluding any discounts offered by the Dominant Provider; and

$p_{t,i}$  is the published charge made by the Dominant Provider for the specific product or service  $i$  at time  $t$  during the Relevant Year excluding any discounts offered by the Dominant Provider.

GG4.5 The Percentage Change for the purposes of the category of products and services specified in paragraph GG4.1(e) shall be calculated by employing the following formula:

$$C_t = \frac{(p_t - p_0)}{p_0}$$

where:

$C_t$  is the Percentage Change in charges for the specific product or service in the category specified in paragraph GG4.1(e) at a particular time  $t$  during the Relevant Year;

$p_0$  is the published charge made by the Dominant Provider for the specific product or service at the beginning of the Relevant Year excluding any discounts offered by the Dominant Provider; and

$p_t$  is the published charge made by the Dominant Provider for the specific product or service at the time  $t$  during the Relevant Year excluding any discounts offered by the Dominant Provider.

GG4.6 Subject to paragraphs GG4.7 and GG4.8, the Controlling Percentage in relation to any Relevant Year means RPI reduced:

(a) for the category of products and services specified in paragraph GG4.1(a), by 6.5 percentage points;

(b) for the category of products and services specified in paragraph GG4.1(b), by 8.9 percentage points;

(c) for the category of products and services specified in paragraph GG4.1(c), by 0 percentage points;

(d) for the category of products and services specified in paragraph GG4.1(d), by 0 percentage points; and

(e) for the category of products and services specified in paragraph GG4.1(e), by 3 percentage points.

GG4.7 Where the Percentage Change in any Relevant Year is less than the Controlling Percentage, then for the purposes of the categories of products and services identified in paragraphs GG4.1(a) and GG4.1(b) the Controlling Percentage for the following Relevant Year shall be determined in accordance with paragraph GG4.6, but increased by the amount of such deficiency.

GG4.8 Where the Percentage Change in any Relevant Year is more than the Controlling Percentage, then for the purposes of the categories of products and services identified in paragraphs GG4.1(a) and GG4.1(b) the Controlling Percentage for the following Relevant Year shall be determined in accordance with paragraph GG4.6, but decreased by the amount of such excess.

GG4.9 Where the Dominant Provider makes a material change (other than to a charge) to any product or service which is subject to this Condition or to the date on which its financial year ends or there is a material change in the basis of the Retail Prices Index, paragraphs GG4.1 to GG4.8 shall have effect subject to such reasonable adjustment to take account of the change as Ofcom may direct to be appropriate in the circumstances. For the purposes of this paragraph, a material change to any product or service which is subject to this Condition includes the introduction of a new product or service wholly or substantially in substitution for that existing product or service.

GG4.10 The Dominant Provider shall, no later than three months after the end of each Relevant Year, supply Ofcom, in writing, the data necessary to perform the calculation of the Percentage Change.

GG4.11 Paragraphs GG4.1 to GG4.10 shall not apply to such extent as Ofcom may direct.

GG4.12 The Dominant Provider shall comply with any direction Ofcom may make from time to time under this Condition.

GG4.13 In this Condition:

(a) "Relevant Financial Year" means the period of 12 months ending on 31 March immediately preceding the Relevant Year;

(b) "Controlling Percentage" is to be determined in accordance with Condition GG4.6;

(c) "Relevant Year" means any of the four periods of 12 months beginning on 1<sup>st</sup> October starting with 1<sup>st</sup> October 2004 and ending on 30 September 2008;

(d) "Retail Prices Index" means the index of retail prices compiled by an agency or a public body on behalf of Her Majesty's Government or a governmental department (which is the Office of National Statistics at the time of publication of this Notification) from time to time in respect of all items; and

(e) "RPI" means the amount of the change in the Retail Prices Index in the period of twelve months ending on 30<sup>th</sup> June immediately before the beginning of a Relevant Year, expressed as a percentage (rounded to two decimal places) of that Retail Prices Index as at the beginning of that first mentioned period.

GG4.14 In the Annexes to this Condition:

(a) "Partial Private Circuit" or "PPC" means a circuit provided pursuant to the PPC Contract and in accordance with any directions made by Ofcom pursuant to SMP services conditions GG1, GG3 or GG7 under section 49 of the Act; and

(b) "PPC Contract" means the Dominant Provider's Standard PPC Handover Agreement as at 24 June 2004.

## **Annex A to Condition GG4**

### **Products and services subject to charge control pursuant to paragraphs GG4.1(a), GG4.1(c) and GG4.1(d)**

Part 1: Connection services in respect of the provision of a Partial Private Circuit in each of the following bandwidths:

- 34 Mbit/s – 45 Mbit/s
- 140 Mbit/s – 155 Mbit/s

Part 2: Rental and maintenance services in respect of the provision of a Partial Private Circuit in each of the following bandwidths:

- 34 Mbit/s – 45 Mbit/s
- 140 Mbit/s – 155 Mbit/s.

## Annex B to Condition GG4

### Products and services subject to charge control pursuant to paragraphs GG4.1(b) and GG4.1(e)

Part 1: Each of the following point of connection equipment products used in the provision of a Partial Private Circuit:

(a) Customer Sited Handover (CSH) products:

(i) in respect of CSH Configuration SMA-16:

- SMA-16 ADM with no trib interfaces (single fibre working) – existing site
- SMA-16 ADM with no trib interfaces (dual fibre working 1300nm) – existing site
- SMA-16 ADM with no trib interfaces (dual fibre working 1550nm) – existing site
- Additional charge for new site
- Standby batteries if required
- STM-1 electrical trib interface (2 ports)
- STM-1 optical (1300nm) trib interface (1 port)
- STM-1 electrical trib card (2 ports), required for 1+1 card protection
- STM-1 optical (1300nm) trib card (1 port), required for MSP protection
- STM-4 optical (1300nm) trib interface (1 port)
- STM-4 optical (1300nm) trib card (1 port), required for MSP protection

(ii) in respect of CSH Configuration SMA-4:

- SMA-4 ADM with no trib interfaces (single fibre working) – existing site
- SMA-4 ADM with no trib interfaces (dual fibre working 1300nm) – existing site
- SMA-4 ADM with no trib interfaces (dual fibre working 1550nm) – existing site
- Additional charge for new site
- Standby batteries if required
- STM-1 electrical trib interface (1 port)
- STM-1 optical (1300nm) trib interface (1 port)
- STM-1 electrical trib card (1 port), required for 1+1 card protection

- STM-1 optical (1300nm) trib card (1 port), required for MSP protection
- STM-4 optical (1300nm) trib interface (1 port)
- STM-4 optical (1300nm) trib card (1 port), required for MSP protection

(iii) in respect of CSH Configuration MSH51:

- MSH51 ADM with no trib interfaces (single fibre working) - existing site
- MSH51 ADM with no trib interfaces (dual fibre working 1300nm) - existing site
- MSH51 ADM with no trib interfaces (dual fibre working 1550nm) - existing site
- Additional charge for new site
- Per km from serving exchange to MSH node - single fibre working
- Per km from serving exchange to MSH node - dual fibre working
- Standby batteries if required
- STM-1 electrical trib interface (4 ports)
- STM-1 optical (1300nm) trib interface (2 ports)
- STM-1 electrical trib card (4 ports), required for 1+1 card protection
- STM-1 optical (1300nm) trib card (2 ports), required for MSP protection
- STM-4 optical (1300nm) trib interface (1 port)
- STM-4 optical (1300nm) trib card (1 port), required for MSP protection
- STM1 - legacy equipment

(b) In Span Handover (ISH) products:

(i) in respect of ISH Configuration STM-16:

- SMA –16 ADM with single STM-16 handover (1300nm)
- Optional STM-16 1550nm handover

(ii) in respect of ISH Configuration STM-4:

- SMA-4 ADM with single STM-4 handover (1300nm)
- Optional STM-4 1550nm handover

(iii) in respect of ISH Configuration STM-1:

- SMA-4 ADM with single STM-1 handover (1300nm)

- Additional cost for STM-1 1550nm handover
- Additional STM-1 handovers (1300nm) – max 3
- Additional STM-1 handovers (1550nm) – max 3

(iv) in respect of ISH Configuration MSH51:

- MSH51 ADM with single STM-16 handover (1300nm)
- Optional STM-16 1550nm handover

(v) where MSH51 ISH is provided at nearest MSH node to customer:

Part 2: Each of the following third party equipment products used in the provision of a Partial Private Circuit:

(a) in respect of third party customer sited SMA-1 ADM:

- SMA-1 ADM with no trib interfaces (single fibre working) - existing site
- SMA-1 ADM with no trib interfaces (dual fibre working 1300nm) - existing site
- SMA-1 ADM with no trib interfaces (dual fibre working 1550nm) - existing site
- Additional charge for new site
- Standby batteries if required
- 34Mbit/s trib card (3 ports)
- 45Mbit/s trib card (3 ports)
- STM-1 electrical trib card (1port)
- STM-1 optical (1300nm) trib card (1 port)
- 140Mbit/s electrical trib card (1 port)

(b) in respect of third party customer sited SMA-4 ADM:

- SMA-4 ADM with no trib interfaces (single fibre working) - existing site
- SMA-4 ADM with no trib interfaces (dual fibre working 1300nm) - existing site
- SMA-4 ADM with no trib interfaces (dual fibre working 1550nm) - existing site
- Additional charge for new site
- Standby batteries if required
- 34Mbit/s trib card (3 ports)

- 45Mbit/s trib card (3 ports)
- STM-1 electrical trib card (1port)
- STM-1 optical (1300nm) trib card (1 port)
- 140Mbit/s electrical trib card (1 port)
- STM-4 optical (1300nm) trib card (1 port)

(c) in respect of third party customer sited SMA-16 ADM:

- SMA-16 ADM with no trib interfaces (single fibre working) - existing site
- SMA-16 ADM with no trib interfaces (dual fibre working 1300nm) - existing site
- SMA-16 ADM with no trib interfaces (dual fibre working 1550nm) - existing site
- Additional charge for new site
- Standby batteries if required
- 34Mbit/s trib card (3 ports)
- 45Mbit/s trib card (3 ports)
- STM-1 electrical trib card (1port)
- STM-1 optical (1300nm) trib card (1 port)
- 140Mbit/s electrical trib card (1 port)
- STM-4 optical (1300nm) trib card (1 port)

(d) in respect of third party customer sited MSH-51C ADM:

- MSH51 with no trib interfaces (single fibre working) - existing site
- MSH51 with no trib interfaces (dual fibre working 1300nm) - existing site
- MSH51 with no trib interfaces (dual fibre working 1550nm) - existing site
- Additional charge for new site
- Per km from serving exchange to MSH node - single fibre working
- Per km from serving exchange to MSH node - dual fibre working
- Standby batteries if required
- STM-1 electrical trib card (4 ports)
- STM-1 optical (1300nm) trib card (2 ports)

- 140Mbit/s electrical trib card (1 port)
- STM-4 optical (1300nm) trib card (1 port).”

## Annex B

# Ofcom's forecasting Model

## Introduction

B.1 As set out in Section 4, Ofcom has developed a cost forecasting model in order to calculate a value of X for the PPC charge control. The X is the amount each year by which BT will be required to reduce charges within each charge control basket. This Annex:

- sets out Ofcom's methodology;
- provides an overview of the model;
- provides details of the construction of the model and the model's calculations; and
- provides results based on different assumptions of key inputs.

## Ofcom's methodology

B.2 Ofcom's methodology for forecasting BT's costs of providing PPC terminating segments is consistent with that used for other charge controls on BT. Within the cost forecasting model there are three broad categories of costs: cost of capital, depreciation and operating expenditure.

B.3 Ofcom's methodology involves forecasting how costs will change over the period of the charge control for different categories of products and services. This is done on the basis of grouping these products and services and associated costs into different baskets, as explained in Section 3. From understanding how costs change over the period of the charge control it is possible to calculate the necessary reductions in charges required to ensure that charges are at the forecast efficient level at the end of the control.

## Overview of the model

B.4 The following sections outline how the model is structured and provide details of the data inputs and main calculations in the model.

B.5 The objective of the cost forecasting model is to forecast how BT's costs for PPC terminating segments will change over the period of the charge control. This then allows different groups of costs to be combined into different possible charge control baskets. The model also has functionality to determine the values of X for different charge control periods as well as to adjust the input values for the model parameters which influence the value of X, to facilitate sensitivity analysis.

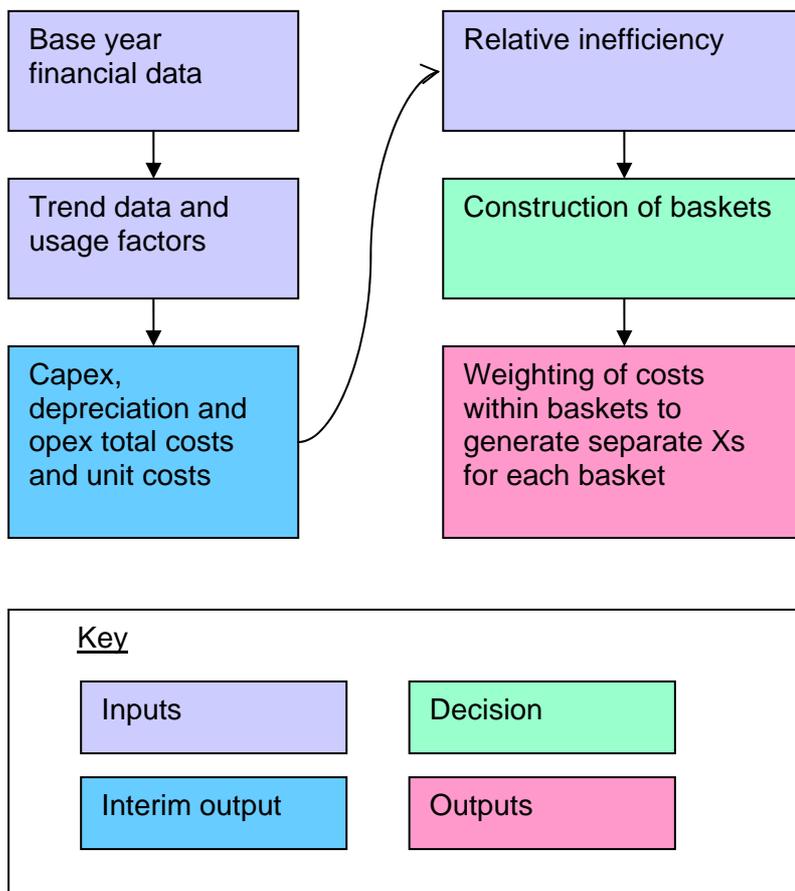
B.6 The model can be described in four blocks. These are:

- inputs, in the form of base year financial data, trend data, usage factors and an assumption as to the extent of BT's relative inefficiency;

- interim outputs, in the form of total and unit costs;
- the construction of the charge control baskets; and
- application of appropriate weightings to the forecast costs to calculate the value of X for each basket.

B.7 It is useful to understand in broad terms how these different blocks within the model are related and the calculation flow to determine the values of X. The calculation flow involving these blocks is represented simply in Figure B1.

**Figure B1 – Ofcom’s PPC terminating segments cost forecasting model**



B.8 From Figure B1 it can be seen that the starting point of the forecasting model is the base year data. Following this, the various trend data is applied to the base year data in an appropriate manner. The mechanics of this is explained in further detail below. This process generates interim outputs in the shape of total and unit costs for the cost of capital and depreciation and for operating expenditure.

B.9 The model consists of three different dimensions:

- component types, which are taken from BT’s Regulatory Financial Statements;
- bandwidths and;

- forecast years.

B.10 Additionally, some data is provided by asset types. Where this is the case, Ofcom has restated this data by component type. This conversion is achieved by weighting the data by asset type by the gross replacement cost (GRC) by asset type to provide the data by component type.

B.11 The final block of the model manipulates the data into an appropriate format to allow different options of charge control baskets to be modelled. Once the data is in the appropriate format, the figure used to account for BT's relative inefficiency compared to the US LECs<sup>18</sup> is factored into the X calculations.

B.12 The inputs to each of these blocks set out above and the source of the data used are described in the following section.

### **Ofcom's PPC terminating segments cost forecasting model**

B.13 Ofcom's PPC terminating segments cost forecasting model is contained in one stand alone workbook. Ofcom's forecasting model is used to generate values of X for the two of the three charge control baskets (low bandwidth and high bandwidth).

B.14 There are three broad categories of worksheet contained in the model. These are:

- input worksheets, which contain either raw data provided by BT or manipulated inputs (which consist of the raw data provided by BT being reformatted for the purposes of the model);
- trend data worksheets, which set out the trends in the model parameters that can change over time; and
- calculation worksheets, which forecast BT's costs (using the input data and the trend data in the other worksheets) and calculate the values of X for the charge control baskets.

### **Input worksheets**

B.15 The inputs to the model are described in Table B1.

**Table B1 – Description of the contents of the input worksheets in the PPC terminating segments cost forecasting model**

<b>Name</b>	<b>Description</b>
Financial information	This data is based on the outputs from BT's regulatory costing systems and relates to 2001/02 and 2002/03. There is separate data for Gross Replacement Cost (GRC) Accumulated Depreciation, Net Replacement Cost, Supplementary Depreciation, HCA Depreciation, Capital

<sup>18</sup> This is from the conclusions of the NERA efficiency study, discussed in Section 4. As set out there, Ofcom assumes a measure of BT's relative efficiency of 7.5%.

	Expenditure and Operating Expenditure (definitions are included in the Glossary in Annex G.
Volumes	This sets out BT's forecasts of demand for PPC terminating segments to 2006/07. These forecasts are provided separately for "BT to Altnets", "BT to BT" and "BT to mobile operators". These forecasts are also provided at different bandwidths. The volume input worksheets also include the option of generating forecasts of volumes to 2008/09, based on different assumptions.
Asset price changes	This worksheet sets out BT's view of how the price of each of its asset types is likely to change on an annual basis to 2006/07. The data used to forecast the values of X is linked to the scenarios worksheet to allow different input assumptions to be modelled.
AVEs	This worksheet sets out BT's estimate of its AVEs, by asset type. BT calculates this as the LRIC:FAC ratio. The data used to forecast the values of X is linked to the scenarios worksheet to allow different input assumptions to be modelled.
CVEs	This worksheet sets out BT's estimate of its CVEs, by operating cost category. The data used to forecast the values of X is linked to the scenarios worksheet to allow different input assumptions to be modelled.
Relative usage factors	These worksheets reformat BT's raw data provided for its relative usage factors. Usage factors are factors provided by BT and show how different PPC terminating segments circuits use different network components. There are two separate blocks of relative usage factors: those for BT to Altnet PPC terminating segments and those for BT to BT (and BT to mobile operators) PPC terminating segments. The relative usage factors are provided by bandwidth and by component type. As these are relative usage factors they do not measure the absolute extent to which each PPC terminating segments at each bandwidth uses each component type. Instead usage is expressed relative to an index normalised at 1.
Asset lives	This worksheet sets out BT's view of the lifetime of each of its asset types. BT has two approaches to estimating the lifetime of its asset types. These are the weighted book life and the effective life. <sup>19</sup>

B.16 As explained in Section 4, Ofcom does not agree that the values of the inputs provided by BT are necessarily the most appropriate values. Therefore, Ofcom

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<sup>19</sup> The weighted book life takes BT's book life of assets and produces an average weighted life according to the GBV of each asset grouping. The effective life is the remaining life of the assets to the common expiry date (CED).

has assumed alternative values for the inputs for some of the parameters of the model. In particular, as noted in table B1 BT has provided its view of assets lives using the weighted book life and the effective life of its assets. Ofcom does not agree that this is the appropriate measure of asset lives for use within the forecasting model. The asset lives to be used in the forecasting model should be calculated to be consistent with other data in the model, in particular, the depreciation data and the asset base data , which is provided from BT's Regulatory Financial Statements. This means that the default assumption in the forecasting model is to set asset lives equal to GRC divided by operating capability maintenance (OCM) depreciation. The impact on the value of X of different input assumptions is shown in the final section of this annex.

### **Trend data worksheets**

B.17 As noted above the model also contains trend data worksheets. These are described below.

#### *Component volume trends*

B.18 The first trend data worksheet calculates the component volumes that are used in the calculation of unit costs and sets out how these component volumes change over the period of the control. This is done by taking the volume input data described above, separately for BT to Altnet, BT to BT and BT to mobile operator circuits (which are provided by bandwidth) and multiplying this by the relative usage factor data, which is provided by bandwidth and component type. As noted in table B1 above there are separate relative usage factors for PPC terminating segments sold to Altnets and PPC terminating segments sold to BT and mobile operators. In order to generate component volumes by bandwidth it is necessary to sum the volumes in order to produce a single set of component volumes by bandwidth, for each year of the charge control. It is with these volumes that the forecasting model forecasts costs over the period of the control.

B.19 The second trend summary worksheet includes forecasts of component volumes by bandwidth over the period of the charge control. In addition, it also includes the trend data set out in Table B2.

**Table B2 – Data included in the trend data worksheet**

<b>Trend data</b>	<b>Description</b>
Component volumes by bandwidth	This is the data generated by the first trend data worksheet.
Component volume change	This is the year on year change in component volumes, at an aggregate level.
RPI inflation	This is historic and forecast rates of inflation. Ofcom's inflation forecasts are based on the expected rate of inflation referenced against government bonds.
Real pre-tax cost of	This is an estimate of BT's nominal pre-tax cost of capital adjusted for inflation. A detailed summary of Ofcom's

capital	approach to estimating BT's nominal pre-tax cost of capital is provided at Annex D.
Average asset life	This is the average asset life data from the asset life data input worksheet described in Table B1 presented by component type.
Nominal price change	This is the data generated in the asset price change input worksheet described in Table B1 presented by component type.
Real price change	This is the nominal price change data from above adjusted for inflation.
AVEs	This is the AVE input data described in Table B1 presented by component type.
CVEs	This is the CVE input data described in Table B1 presented by component type.
Opex price trends	This is an assumption about the trend in operating costs, split into pay and non-pay related costs.

### The calculation worksheets

B.20 This is where the input data and the trend data is used to forecast the change in costs over the period of the charge control. Each of the calculation worksheets are described in turn below.

#### *Capital and depreciation forecast*

B.21 This worksheet forecasts how the capital and depreciation costs associated with the provision of PPC terminating segments changes over the period of the charge control.

B.22 This is done in two stages. First the "steady state" i.e. no volume growth, level of costs are forecast. Second the "additional" i.e. with a change of volume, level of costs are forecast. The output of this worksheet is the sum of these two stages.

### **Table B3 - The steady state capital and depreciation costs**

<b>Calculation</b>	<b>Description</b>
GRC	The base year GRC is taken from BT's base year Regulatory Financial Statements data. The forecast is calculated by multiplying the previous year values by the nominal price trend, described in Table B2. In the steady state it is implicitly assumed that disposals and capital expenditure are equal.
Operating capability maintenance (OCM)	The base year OCM depreciation is calculated by summing the HCA depreciation and the CCA depreciation in the base

depreciation	year. The forecasts are calculated by dividing the GRC in the relevant year by the average asset life, described in Table B1.
Capital expenditure	The base year capital expenditure is equal to the OCM depreciation. The forecasts are calculated by multiplying the previous year value by the nominal asset price change.
Cumulative OCM depreciation	The base year cumulative OCM depreciation is the GRC minus the net replacement cost (NRC). The forecast cumulative OCM depreciation is calculated by multiplying the previous year value by the nominal price change and adding on the current year OCM depreciation.
NRC	The base year NRC is taken from BT's base year Regulatory Financial Statements data. The forecasts are calculated by adding to the previous year NRC the product of half of the difference between the previous year capex and OCM depreciation and the nominal price trend plus half of the difference between the current year capex and the current year OCM depreciation. This allows for the cost of capital to be earned on the mean capital employed for the year.
Net current assets	The base year data is taken from BT's base year Regulatory Financial Statements data. The forecasts are calculated by multiplying the previous year net current assets by the inflation rate.

*The additional costs*

B.23 For the additional costs, the base year data is always equal to zero because by definition, there is no additional volume growth in these years.

**Table B4 – Additional capital and depreciation costs associated with volume growth**

Calculation	Description
Additional capex	The forecast is calculated by multiplying the previous year total GRC by the current year asset price trend, multiplying this by the current year AVE and multiplying this by the component volume change.
Additional GRC	The forecast is calculated by multiplying the previous year additional GRC by the sum of the asset price trend plus half of the previous year additional capex plus half of the current year additional capex. This is calculated over two years because this makes the calculation consistent with a mid-year value.
Additional OCM	The forecast is calculated by dividing the current year

depreciation	additional GRC by the average asset life.
Additional cumulative OCM depreciation	The forecast is calculated by multiplying the previous year additional cumulative depreciation by the nominal price trend, and then adding the current year additional depreciation.
Additional NRC	The forecast is calculated by subtracting the additional cumulative depreciation from the additional GRC.

B.24 From this point it is possible to calculate the total capital and depreciation costs. The model does this in the way described in Table B5.

**Table B5 – Total capital and depreciation costs**

<b>Calculation</b>	<b>Description</b>
Total GRC	This is the sum of steady state GRC and additional GRC.
Real return on capital	This is the sum of steady state net current assets plus steady state NRC plus additional NRC, all divided by the compound rate of RPI and then all multiplied by the real pre tax cost of capital. The first three components of this calculation represent the working capital, the fixed assets. The fourth and fifth components calculate the real return on these assets.
Real depreciation	This is calculated by dividing the sum of steady state depreciation and additional depreciation by the compound rate of RPI.
Real total holding loss	This is calculated by multiplying the real price change by the real steady state additional NRC minus half the difference between the additional real capital expenditure and the additional real depreciation. The real total holding loss calculates the decline in the value of the asset base due to asset price changes.
Real total capital and depreciation cost	This is calculated by summing the real return on capital plus the real depreciation plus the real total holding loss.
Real unit capital cost	This is calculated by dividing the real total capital and depreciation cost by the component volumes.

*Operating cost forecast worksheet*

B.25 This worksheet forecasts how the operating costs associated with the provision of PPC terminating segments changes over the period of the charge control.

**Table B6 – Operating costs**

<b>Calculation</b>	<b>Description</b>
Component volumes	This is a repeat of the data set out in the component volumes summary sheet, showing the component volumes over the period of the control.
Component volumes change	This is the year on year change in the component volumes data above.
CVEs	This is the CVE data from the trend summary worksheet. This is split by pay and non-pay cost categories.
Factor productivity gains	These are assumed year on year gains in factor productivity, split by pay and non-pay cost categories before volume changes.
Operating expenditure price trends	These are assumed trends of operating expenditure prices, split by pay and non-pay cost categories.
Productivity adjusted operating expenditure trends	This is the operating expenditure price trends data from above, adjusted for factor productivity gains, split by pay and non-pay cost categories.
Non-pay component cost change	This is calculated by multiplying the component volume change data by the CVE for the non-pay cost category. The cost change for 2002/03 is 0% as there is zero volume change in this year.
Pay component cost change	This is as above for the non-pay component cost change but the component volume change data is multiplied by the CVE for the pay cost category.
Total operating costs (non-pay)	The base year data is taken from BT's base year Regulatory Financial Statements data. The forecast is calculated by multiplying the previous year value by the productivity adjusted operating cost trend and by the non-pay component cost change.
Total operating costs (pay)	The base year data is taken from BT's base year Regulatory Financial Statements data. The forecast is calculated by multiplying the previous year value by the productivity adjusted operating cost trend and by the pay component cost change.
Total operating expenditure	This is calculated by summing the total operating costs (non-pay) with the total operating costs (pay).
Unit operating expenditure	This is calculated by dividing the total operating expenditure by the component volumes.
Unit operating expenditure percent	This is the difference between the current year unit operating expenditure and the previous year unit operating expenditure, divided by the previous year unit operating

change	expenditure.
Real unit operating expenditure	This is calculated by dividing the unit operating expenditure by the inflation rate.

*Capital, depreciation and operating expenditure worksheet*

B.26 This worksheet combines the capital and depreciation unit costs and the operating expenditure unit costs to generate total costs.

**Table B7 – Total costs**

<b>Calculation</b>	<b>Description</b>
Real unit capital and depreciation costs	This is the real unit capital and depreciation costs included in the capital and depreciation forecast worksheet.
Real unit operating expenditure costs	This is the real unit operating expenditure costs included in the operating cost forecast worksheet.
Real unit costs	This is the sum of the real unit capital and depreciation costs and the real unit operating expenditure costs.
Real unit costs percent change	This is calculated by dividing the difference between the current year real unit cost and the previous year real unit cost by the previous year real unit cost.
Real total costs	This is calculated by multiplying the real unit costs by the component volumes.

*Capital, depreciation and operating expenditure costs by bandwidth worksheet*

B.27 This worksheet calculates the aggregate real total costs and splits these by bandwidth, using the relative usage factor data provided by BT.

**Table B8 – Total costs by bandwidth**

<b>Calculation</b>	<b>Description</b>
BT to Altnet relative usage factor	This is the relative usage factor data provided by BT.
Real unit costs by bandwidth	This is calculated for each year by multiplying the real unit costs in the capital, depreciation and operating expenditure worksheet by the relative usage factors.
Real total costs by bandwidth	This is calculated for each year by multiplying the total costs in the capital, depreciation and operating expenditure worksheet by the relative usage factors.

*Calculation of baskets worksheet*

B.28 This worksheet calculates the values of X for each of the charge control baskets. This worksheet includes the option of constructing separate baskets for the rental charges and the connection charges as well as for low bandwidth circuits and high bandwidth circuits. However, Ofcom has not proposed separate baskets for rental charges and connection charges.

**Table B9 – Values of X**

<b>Calculation</b>	<b>Description</b>
Real unit costs by bandwidth	This is the real unit costs by bandwidth from the capital, depreciation and operating expenditure costs by bandwidth worksheet.
Real total costs by bandwidth	This is the real total costs by bandwidth from the capital, depreciation and operating expenditure costs by bandwidth worksheet.
Real unit costs	This sums the real unit costs by bandwidth, separately for rental costs and connection costs.
Real total costs	This sums the real total costs by bandwidth, separately for rental costs and connection costs.
Basket weights	This calculates the weight of each bandwidth within each of the individual possible baskets. That is, it calculates the weights of the individual bandwidths for the low bandwidth rental, the low bandwidth connection, the high bandwidth rental and the high bandwidth connection. The weights are calculated on the basis of prior year costs.
Inefficiency factor	This is the assumed level of BT's relative inefficiency compared to the US LECs.
Basket unit costs	This is the product of the sum of the real unit costs and the basket weights, adjusted if necessary for the inefficiency factor. This is provided separately for the low bandwidth rental, the low bandwidth connection, the high bandwidth rental and the high bandwidth connection.
Compound annual growth rate (CAGR)	This is provided separately for the low bandwidth rental, the low bandwidth connection, the high bandwidth rental and the high bandwidth connection.
Aggregate basket weights	This calculates the relative weights of the rental and connection costs for the low band width and the high bandwidth separately, for each year of the control, based on prior year costs. This allows two separate baskets, combining rental and connection costs to be combined.
Aggregate basket unit costs	This calculates the weighted unit cost of the rental and connection costs for the low band width and the high bandwidth separately, for each year of the control, based on

	prior year costs.
Compound annual growth rate	This is provided separately for the low bandwidth and the high bandwidth costs.
Adjustment for RPI-7	This allows for the fact that the model is forecasting costs to the end of the charge control period i.e. 2008/09, from a point prior to the start of the charge control i.e. from 2002/03. This adjustment calculates the change in the charge required in the final four years of the charge control, given the RPI-7 price reductions implemented in the first two years and two months of the cost forecast period.

### Results from the forecasting model

- B.29 Using the parameter values in Ofcom's cost forecasting model as set out and explained in Section 4 generates values of X for the low bandwidth basket of 4.0 and for the high bandwidth basket of 6.5.
- B.30 To aid transparency and understanding of how changes to the key parameters affect the values of X, set out below are a number of sensitivities that illustrate the effects on the values of X of changing the parameters.
- B.31 For this purpose, Ofcom has set out the effect on the values of X of amending the following forecast parameters:
- volume changes:
    - a decline in low bandwidth volumes;
    - a modest growth in low bandwidth volumes;
    - a decline in high bandwidth volumes from 2006/07;
  - asset price changes – the values for cable and for duct used in the consultation document; and
  - BT's relative inefficiency:
    - 5%; and
    - 10%.
- B.32 The revised values of X for the low and the high bandwidth baskets, if each of the parameters are amended individually in the way described, are shown in Table B10.

**Table B10 – Impact on the values of X of individually adjusting the values of the main model parameters**

Model parameter	Low bandwidth	High bandwidth
Value of X	4.0	6.5
decline in low bandwidth volumes	1.0	6.25
Modest growth in low bandwidth volumes	4.25	6.5
Decline in high bandwidth volumes from 2006/07	4.0	5.5
Asset price changes for cable and for duct used in the consultation document	4.5	6.75
Inefficiency measure of 5%	3.5	5.75
Inefficiency measure of 10%	4.5	7.0

## Annex C

# Analysis of charges at start of control

## Introduction

C.1 This Annex explains the analysis undertaken by Ofcom to review the updated financial information provided by BT in the course of Ofcom's project on the introduction of a long term charge control. The first part discusses the revised pricing model provided by BT with 2002/03 cost data and the second part considers BT's profitability on the sale of PPC terminating segments.

## BT's Pricing Model

C.2 BT provided Ofcom with a new pricing model for PPC terminating segments using Excel workbooks populated with the latest audited financial information (2002/03) ("BT's Pricing Model"). The model derives individual charges for each service that is covered by the proposed PPC terminating segments charge control. Ofcom has scrutinized that model as part of its assessment of whether current charges should be used as the starting charges for the charge control. During the course of Ofcom's investigation into BT's Pricing Model, BT made a number of modifications to that model and the comments set out below relate to the version received by Ofcom on 30 April 2004 populated with 2002/03 cost information.

## Overview of BT's Pricing Model

C.3 In outline, BT's model derives prices from BT's accounting costs, expressed on a unit volume basis, and the prices it has contracted with its suppliers for equipment. Inputs into BT's model comprise primarily of:

- total operating costs, mean capital employed and volume totals as published in BT's Regulatory Financial Statements;
- contract prices for items of capital equipment; and
- other operational and cost information.

C.4 The inputs into BT's model differ in respect of the different types of PPC terminating segments charges. The outputs of BT's model consist of a series of unit charges for each charge controlled service, including variants of each service. The charges have been categorised into 3 principal types and an explanation of how each of these have been handled within BT's model is set out below.

## PPC terminating segments rental and maintenance charges

C.5 PPC terminating segments rental and maintenance charges are designed to recover the ongoing costs of supplying the service in question, including, amongst other things, any depreciation charges and capital costs for fixed assets used in providing these services except to the extent the costs of these assets are recovered by way of upfront equipment and infrastructure charges. The charges are as follows:

- Local end fixed charge
- Main link fixed charge
- Main link per km charge

### **Equipment and infrastructure charges**

C.6 Equipment and infrastructure charges are designed to recover the purchase price of the asset in question and other directly attributable costs required to bring the asset into working condition for its intended use. These charges relate to; points of connection (POC), equipment connection charges, third party customer link infrastructure single charges, and any additional duct/fibre/copper. For POC equipment there is an additional rental charge to cover the maintenance costs associated with that equipment.

### **Circuit connection charges**

C.7 Circuit connection charges are designed to recover the one-off set up costs associated with the provisioning of a circuit through BT's network on an end to end basis. These charges should primarily comprise of labour costs and spares and not relate to costs either recovered by rental or upfront equipment & infrastructure charges.

C.8 In respect of each and every wholesale charge BT includes an element to recover its wholesale selling costs.

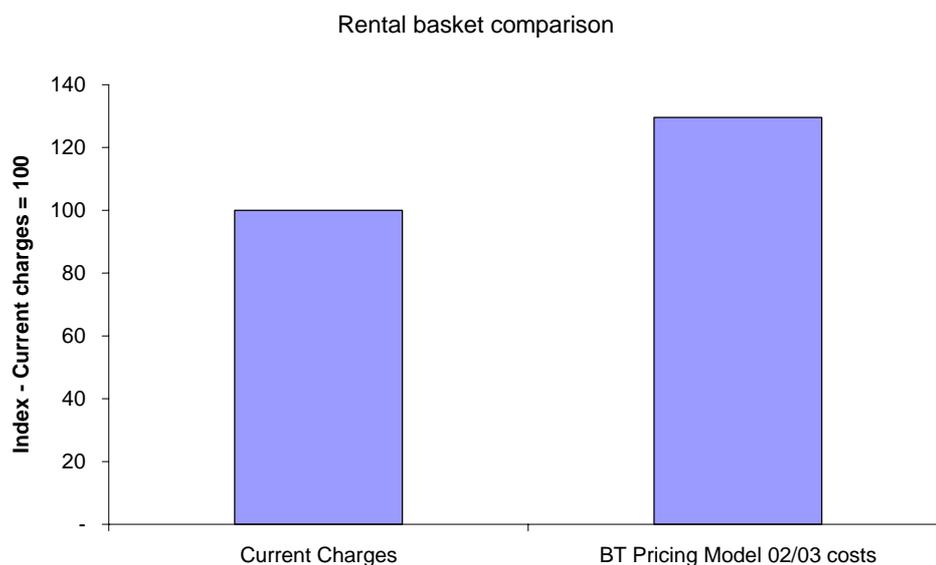
### **Assessment of BT's Pricing Model's Outputs**

C.9 BT's Pricing Model, populated with 2002/03 cost data, produces a set of hypothetical PPC terminating segments charges which Ofcom has compared with current charges ie those prevailing in 2002/03. This comparison reveals two main trends:

- a significant increase in many charges, most notably local end fixed charges, main link fixed charges, and main link per km charges;
- small reductions (1%–7%) in POC and third party customer link equipment connection charges, but significant increases (12%-40%) in POC equipment rental charges;
- a 40% increase in the circuit connection charge for sub 1mb/s circuits, but a 50% decline in the circuit connection charge of circuits with bandwidth greater than 1mb/s.

C.10 Ofcom requested that BT provide some analysis to identify the impact on Altnets of the charges derived from BT's Pricing Model. BT did this by using actual PPC terminating segments volumes for circuits and made some assumptions about the proportion of total PPC terminating segments kms that were in the distribution network by circuit capacity. The calculated rental basket excludes equipment and connection charges and the trunk segments of a PPC terminating segments. According to BT's analysis the charges generated by the BT's Pricing Model were 30% above current charges.

**Figure C1 – Rental basket analysis, BT’s Pricing Model compared to current charges**



#### Review of BT’s Pricing Model

C.11 Ofcom has carried out a detailed review of BT’s Pricing Model to assess whether or not BT’s model accurately reflects the cost of provision of PPC terminating segments in the year 2002/03. It has concluded for the reasons set out below that it does not.

C.12 Ofcom’s review of BT’s model identified a number of specific concerns regarding the robustness of the data and the methodology employed. The principle issues which have the largest impact on PPC terminating segments prices generated by BT’s model and which are discussed in turn below are:

- route to radial factors; and
- the calculation of local end charges

#### Route to Radial Factors

C.13 The terminating per km charge incorporates ‘route to radial’ factors which are used to cover the per km costs from a route provisioned distance to a crow-flies or radial distance. Route to radial factors also account for the requirement for an additional standby link and should therefore always be greater than 2 on all protected routes. There are separate route to radial factors for each different bandwidth but not for the different types of circuits of the same bandwidth.

C.14 BT has used data from its CTCS (Core Transmission Costing System) on which to base its estimate of the route to radial factors. This CTCS is not used

in the production of figures published in BT's Regulatory Financial Statements. The CTCS data indicates that Altnet PPC terminating segments have the highest route to radial factors of all circuits. Whilst recognising that it is possible that different types of circuits may utilise those levels of the network with high route to radial factors to a greater or lesser extent, it was of concern that the route to radial factors for Altnet PPC terminating segments should be the highest at all bandwidths.

- C.15 BT argues that the route to radial factors for PPC terminating segments sold to Altnets should be used to estimate PPC terminating segment route to radial factors. This is because if BT retail circuits are included, this would inappropriately lower the route to radial factors. Retail circuits are sold "end to end" and include trunk segments, which are more direct than terminating segments and therefore, in theory, should have lower route to radial factors. However, after analysing BT's data, Ofcom notes that the route to radial factors do not appear to be strongly correlated to distance, and thus the data set provides little support for the assertion by BT that the route to radial factors for Altnet PPC terminating segments should be highest at all bandwidths.
- C.16 Furthermore, the route to radial factors used in BT's Pricing Model were considerably higher than those used in Phase 2 (see Table C1 below), and while they may reflect a more accurate view of the appropriate route to radial factors, it is Ofcom's view that the data set from which BT has derived the route to radial factors is not sufficiently robust.

**Table C1: Route to radial factors**

<b>Bandwidth</b>	<b>Route to Radial factor, Phase 2</b>	<b>Route to Radial factor, BT's Pricing Model</b>
n*64kb/s	1.00	1.50
2mb/s	2.79	5.42
34mb/s	2.79	4.66
15mb/s	2.79	3.36

### **Local end charges**

- C.17 BT makes an adjustment to the costs of private circuit local ends to derive the costs for PPC terminating segments local ends. This reflects the fact that for the purpose of PPC terminating segments pricing the cost of the POC end is recovered at the third party local end and needs to be calculated separately. The POC end is assumed to have a different cost profile than the third party or teail local end reflecting a higher level of aggregation. The relative cost adjustment appears to use un-sourced cost data, and questionable assumptions regarding the proportion of aggregated local ends. The proportion of PPC terminating segments local ends and retail circuit local ends which are aggregated are based on assumptions which appear to be at odds with data regarding total local end and circuit volumes.
- C.18 In addition to the review of the model methodology, Ofcom has carried out a financial review of BT's model which was designed to:

- ascertain whether all the costs and associated volume inputs into the model have been properly reconciled by BT, either directly or indirectly by intermediate reconciliations, to figures appearing in the Regulatory Financial Statements (or supplementary supporting information);
- identify any assumptions used for deriving cost inputs or volumes for use in BT's model are consistent with the way the cost inputs or volumes have been derived; and
- reach a view regarding whether the inputs (for example the network components and volumes) into BT's model are appropriate for the derivation of individual PPC terminating segments charges primarily from an accounting perspective.

C.19 Ofcom sought to establish whether the total operating costs, mean capital employed and volume totals for each of the network components used by BT in its model have been properly extracted from the Regulatory Financial Statements. This analysis highlighted the following areas of concern:

- BT's adjustments to its local end components' costs and volumes; and
- scrutiny of BT's volume figures.

#### **BT's adjustments to its local end components' costs and volumes**

C.20 The local end volumes published in the Regulatory Financial Statements reflect the number of instances of local end equipment by bandwidth (i.e. 64kb/s, 2mb/s, 34mb/s 140mb/s etc) utilised by leased line circuits etc. These volumes along with the associated costs are used as inputs into its model. BT has made a series of adjustments to these costs and volumes with the intention of deriving the cost of supplying a local end for a leased line of a particular bandwidth.

C.21 BT has made an adjustment to reflect the fact that circuits of a certain bandwidth may terminate on local end equipment of a different bandwidth (e.g 64kb/s circuits terminating on 2mb/s equipment). However, this adjustment is only made for 64kb/s and n\*64kb/s circuits terminating on 2mb/s equipment. Ofcom feels that it is inconsistent to apply this adjustment of 64kb/s and n\*64kb/s circuits only.

C.22 BT's local end costs and volumes relate to both third party local ends and the POC end. BT makes an assumption about relative costs to calculate the cost of a POC end. The total local end charge for an Altnet is the sum of the third party local end and the POC end. BT claimed that this treatment reflected the fact that the unit cost of such a POC end would on average be lower than the cost of a third party local end due to the higher levels of aggregation.

#### **Ofcom's scrutiny of BT's volume figures**

C.23 BT's pricing model converts absolute cost totals into unit costs by dividing total costs by the total associated volumes. These unit costs are a key influence on BT's proposed PPC terminating segments circuit rental and connection

charges. Ofcom therefore scrutinised the volume data to understand their appropriateness, and their sensitivity, to the outputs from BT's model.

- C.24 The volume measures for BT's trunk and distribution transmission network components were not measured on the same basis as the costs included in its regulatory financial statements. The distinction between reported trunk and distribution costs is based on BT's network layers – the Mesh network tier 1 and MSH costs were included in trunk transmission whilst Mesh network tiers 2, 3 and 4 were included in distribution transmission – while the volume measures reflected the '15 km rule' whereby the first 15km of any leased line circuit, on a radial basis, was deemed to be distribution with the remainder of length of the circuit being deemed trunk. BT acknowledged that this 'rule' would systematically undercount the total route kms of circuits carried over the distribution part of its PPC terminating segments transmission network.
- C.25 In the absence of BT being able to provide actual volumes on a consistent basis with the reported costs it provided an estimate of the revised split between trunk and distribution of the combined transmission route lengths.
- C.26 Further, the reported local end volumes were calculated using assumptions as to how many local ends the different types of leased line based products had. BT's inland private circuit network component costs (and volumes) not only relate to the costs of providing PPC terminating segments supplied to Altnets but also the aggregate network cost of the leased-line element of all leased-line based products supplied by BT in downstream markets. The suggestion that there may be a disparity between the actual volumes of local ends and the number reported casts some doubt on whether these volumes were reliable.
- C.27 BT did make the series of adjustments to costs and volumes as described in outline above. However, BT has not adequately demonstrated to Ofcom that the individual volume adjustments were transparently consistent with each other or that they reflect wholly consistent assumptions as regards the potential for circuits of a particular bandwidth to be terminated on equipment of a higher bandwidth.

### **BT's PPC profitability analysis**

- C.28 In addition to review BT's Pricing Model, Ofcom has considered whether there is any evidence that current PPC terminating segments charges either are or have been too low such that BT had not been fully recovering costs. At face value the outputs of BT's Pricing Model would appear to suggest that this is the case. Ofcom considers that this would be reflected in BT's rate of return.
- C.29 BT provided a financial schedule<sup>20</sup> for 2002/03 in a form that disclosed the profitability of each individual regulated PPC terminating segments service, rather than these being reflected within overall totals for revenues, costs and mean capital employed for the inland private circuit network component.

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<sup>20</sup> BT provides privately to the regulator a suite of financial information (AFI) which supplements the published Regulatory Financial Statements. One of these additional financial schedules (#27) is a profitability analysis of its Network Business by individual regulated services.

- C.30 According to this profitability analysis BT disclosed a return on mean capital employed of 39%, 10% and 17% for 2001/02, 2002/03, and 2003/04 (draft results) respectively. It should be noted that these figures include the results for trunk transmission which is not subject to the proposed PPC terminating segments charge control. As discussed above the reported volumes split between trunk and distribution proved inconsistent with the costs. In the absence of a reliable volume split and recalculation of the transfer charge revenues from BT's downstream activities, results for trunk transmission has been included in the overall profitability analysis.
- C.31 Based on the above profitability information available Ofcom concludes that there is insufficient evidence to suggest that BT is substantially under-recovering its costs in terms of supplying PPC terminating segments services to its downstream operations and to the Altnets combined over a sustained period.

## **Conclusion**

- C.32 Ofcom needs to be satisfied that in making decisions affecting cost-orientated prices it has available robust and reliable data. Given the uncertainties and concerns with BT's pricing model as explained above, a preference for the gradual realignment of relative prices if so required, and profitability information which questions the justification of increased prices, Ofcom cannot currently endorse BT's model or its outputs.
- C.33 Ofcom therefore has decided to use current charges as the starting charges for the PPC charge control in the absence of persuasive evidence from BT on the robustness of model and evidence demonstrating that BT is under recovering costs in its controlled PPC terminating segments charges.

## Annex D

# Cost of Capital

### Introduction

- D.1 Annex B sets out Ofcom's approach to forecasting the values of X for the low and high bandwidth charge control baskets. Ofcom, in setting the charge control, also requires an estimate of BT's weighted average cost of capital (WACC). This annex sets out Ofcom's approach to estimating BT's WACC.
- D.2 There are a variety of methods for estimating a firm's WACC. It is usually calculated as a weighted average of the costs of debt and equity finance.
- D.3 The cost of capital can be expressed in real terms (after adjusting for inflation) or nominal terms. It can also be expressed in post or pre-tax terms. A pre-tax cost of capital should be compared with returns calculated on a pre-tax basis and, similarly, a post-tax cost of capital with post-tax returns. Ofcom's view is that the two methodologies are equivalent in the case of calculating an allowable return on capital employed. In other circumstances, such as DCF analysis, they may not be.
- D.4 Ofcom's chosen approach is to use a pre-tax nominal cost of capital as a basis for setting charge controls. The following sections outline Ofcom's approach and the values of the key variables it has used in estimating BT's cost of capital.

### Estimating the Cost of Capital: the Capital Asset Pricing Model (CAPM)

- D.5 In paragraphs G5 – G6 of the June consultation Ofcom explained its reasoning for using the Capital Asset Pricing Model (CAPM) to estimate the cost of capital for BT.

### Responses

- D.6 None of the respondents disagreed with the use of the CAPM as proposed in the December consultation.

### Ofcom's view

- D.7 A number of different asset pricing models exist for calculating the cost of capital. In addition to the CAPM, which measures market risk via a single beta coefficient measured relative to a market portfolio, there are, for example, multifactor models which measure market risk using multiple risk coefficients estimated relative to different factors.
- D.8 Ofcom's preferred approach is to use the CAPM. The CAPM has a clear theoretical foundation and its implementation is simple and well established relative to that of other asset pricing models. This results in the continued wide use of the CAPM by the UK's economic regulators, and its wide use amongst all practitioners.
- D.9 Under the CAPM methodology, the cost of equity is built up from three main factors. These are:

- the risk free rate;
- the market equity risk premium; and
- the value of beta for the company in question.

D.10 The relationship between these factors can be summarised by the following formula:

$$\text{Cost of equity} = \text{RFR} + (\text{ERP} \times \text{beta}),$$

where RFR = the risk free rate, ERP = the equity risk premium.

D.11 The risk free rate is simply the expected rate of return on a risk free investment. The equity risk premium is the expected return on equities over and above the risk free rate (that is, it is the expected reward for holding equities compared with the reward for holding risk free assets). The value of beta reflects the variability of returns of the equity of the company in question compared with the variability of returns on the equity market represented by an index.

D.12 Similarly, the cost of debt can be expressed as:

$$\text{Cost of debt} = \text{RFR} + \text{Debt premium},$$

where the debt premium is the company specific risk premium for corporate debt above the risk free rate.

D.13 The WACC takes account of the cost of equity and the cost of debt by weighting each of these by the proportion of equity and debt respectively in a company's financial structures in the following way:

$$\text{WACC} = (\text{Cost of equity} \times (1 - \text{Gearing})) + \text{Cost of debt} \times \text{Gearing},$$

where Gearing = Debt / (Debt + Equity).

D.14 The following sections discuss each of these major components in turn.

## **Risk Free Rate**

### **Introduction**

D.15 As explained in paragraphs G13-G17 of the June consultation, Ofcom proposed a value of 4.75% for the risk free rate. This estimate was based on data relating to the yield on 5 year gilts for the period January-April 2004.

### **Responses**

D.16 In its response BT suggested that Ofcom should make use of the most up to date information available on the risk free rate. It suggested that the use of such data would imply a risk free rate in the region of 5.1%.

### **Ofcom's view**

D.17 The risk free rate of interest is an input into the calculation of both the cost of debt and the cost of equity. For an investment to be truly free of risk, the risk of

default needs to be zero, and additionally there must be no reinvestment risk. The first condition can be approximately satisfied by using the yields on UK government debt, where the risk of default can be taken to be negligible. Strictly speaking, to satisfy the second condition, risk free rates should be estimated based on a *series* of short run risk free investments. This second condition is difficult to satisfy in practice, meaning that the nominal risk free rate is usually proxied by the yield on fixed term government debt of certain maturity. There is a range of maturities on government debt that could be used as the basis for an estimate of the risk free rate. These maturities range from less than 1 year to over 30 years.

D.18 There are arguments in favour of both short and long-term gilts as the best estimate of the risk free rate for the purposes of the proposed charge control. For example:

- a maturity of 4 years may be appropriate, as the review is concerned with charge controls to be applied over a 4-year period; and
- BT is required to make investments (for example regarding network infrastructure) that will have economic lifetimes in excess of a 4 year period, and hence a longer term gilt may be appropriate.

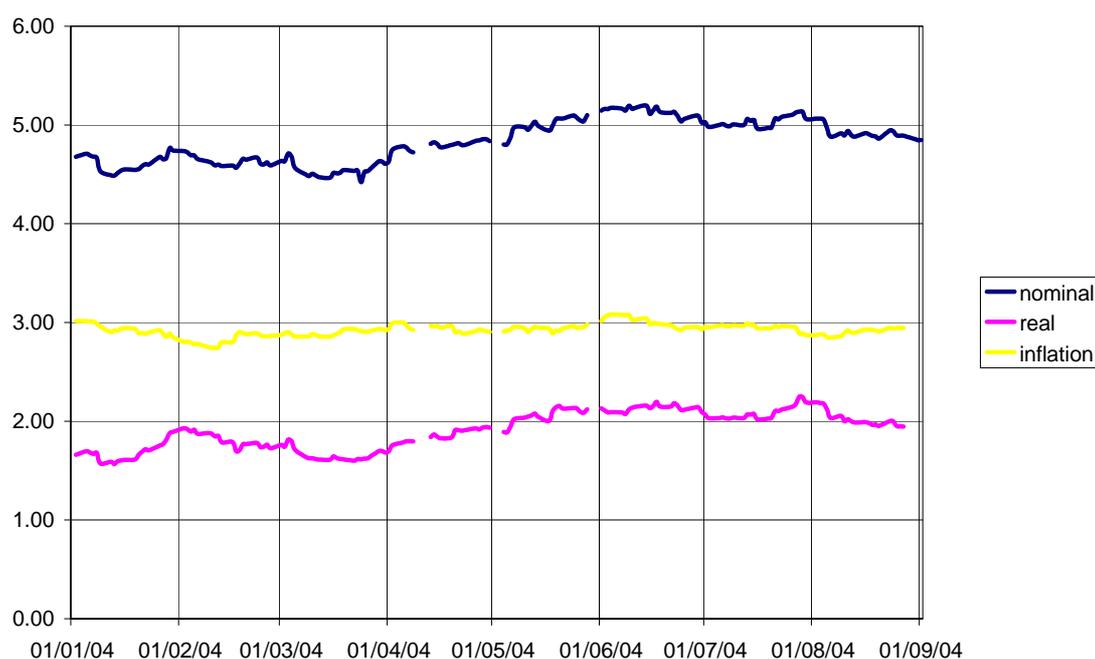
D.19 On balance, Ofcom's view is that weight should be given to a number of considerations, and that the use of 5-year gilts to be a reasonable compromise between the above two arguments. The gilt curve is currently relatively flat, meaning that using the yield on longer term gilts would produce only marginally higher estimates.

D.20 Ofcom uses current estimates of yields on nominal gilts as a proxy for the risk free rate. The objective is to obtain a forward-looking estimate of the risk free rate. The nominal risk free rate for 5-year gilts in May-August 2004 ranged from 4.8% to 5.2%<sup>21</sup>, with an average of 5.0%. This rate compares with a real rate of return of 2.1% for similar term index-linked gilts. This difference between the real and nominal rate implies an inflation rate of approximately 2.9%. The implied inflation rate is calculated on a geometric basis:  $(1 + \text{nominal rate}) / (1 + \text{real rate}) - 1$ . The changing nominal rate since the beginning of 2004, together with inflation and real gilt rates calculated by the Bank of England are shown in the Figure D1 below.

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<sup>21</sup> Source: Bank of England, <http://www.bankofengland.co.uk/statistics/yieldcurve/>

**Figure D1– UK Nominal spot rate, Jan 2000-Q1 2004**



Source: Bank of England

D.21 Based on the new data made available to it since the June consultation was published, Ofcom proposes to use a value of 5% for the risk free rate. As explained in the June consultation, there are arguments to suggest that using interest rates calculated based on current returns on government securities may provide an inappropriate benchmark for a risk free investment in the WACC calculation. However, these factors are hard to quantify, and given that the yield curve is currently relatively flat (the return on gilts with a longer, e.g. 10 years, maturity has been virtually identical to that of 5 year gilts throughout 2004), Ofcom's view is that the use of a rounded value of 5% is appropriate.

## Equity Risk Premium

### Introduction

D.22 The explained in paragraphs G18-G22 of the June consultation, Ofcom proposed a value of 5% for the equity risk premium. This was based on giving weight to a wide range of estimates calculated using different estimation techniques.

### Responses

D.23 In its response BT provided its own estimate of its WACC, which was calculated using an estimate of the equity risk premium of 5%, i.e. the same value as that used by Ofcom in the June consultation. Its response did, however, suggest that 5% was towards the lower limit of a reasonable range of estimates, and concluded that the evidence, viewed objectively, firmly supports a value of at least 5%.

## Ofcom's view

D.24 The equity risk premium is the difference between the overall return on equities and the nominal risk free rate. Its value in the UK reflects the risk of investing in UK equities generally. There is considerable debate about the appropriate method of estimating the value of the equity risk premium, this estimation being problematic because different methods produce different values. In particular, methods based on an analysis of current market expectations tend to give lower values than those based on analysis of historical estimates from stock market data. But determining current market expectation is a difficult and controversial task.

D.25 The UK's economic regulators and competition authorities have adopted a range of measures of the ERP in recent years. Some examples are given below:

- OFWAT, in Final Determinations: Future water and sewerage charges 2000-05 25 November 1999<sup>22</sup>, assumes an equity risk premium of 3.0%–4.0%, based primarily on survey forecast evidence;
- The CAA, in Economic Regulation of BAA London Airports (Heathrow, Gatwick and Stansted) 2003 – 2008, February 2003, decided to use the then-recent Competition Commission range of 2.5% to 4.5%;
- In its report on calls to mobile in December 2002, the CC estimated a nominal range of 2.6%-4.6%. However, in paragraph 7.265 of its report, the CC noted that the extent of uncertainty concerning the downward trend in recent years made a degree of caution appropriate when implementing this decline, in part to help prevent volatility in the short term. It felt that this factor was most appropriately taken account of not by modifying their judgement of the range for the equity risk premium but by increasing the overall level of the WACC by 0.25% in real terms; and
- Ofgem, in its Electricity Distribution Charge control Review, March 2004<sup>23</sup>, assumes a range for the equity risk premium with a midpoint of 3.5

D.26 As stated above, estimating the equity risk premium based on historical data typically leads to higher values. Historical estimates is that they can vary markedly depending on the period used – this is shown in the table below, based on research by Dimson, Marsh, and Staunton.

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<sup>22</sup>[http://www.ofwat.gov.uk/aprix/ofwat/publish.nsf/AttachmentsbyTitle/finaldets99part11.pdf/\\$File/finaldets99part11.pdf](http://www.ofwat.gov.uk/aprix/ofwat/publish.nsf/AttachmentsbyTitle/finaldets99part11.pdf/$File/finaldets99part11.pdf)

<sup>23</sup>[http://www.ofgem.gov.uk/temp/ofgem/cache/cmsattach/6579\\_COST%20OF%20CAPITAL%20Final.pdf](http://www.ofgem.gov.uk/temp/ofgem/cache/cmsattach/6579_COST%20OF%20CAPITAL%20Final.pdf)

**Table D1 – UK mean equity risk premiums over various periods (relative to risk-free rate (“bills”))**

Period	Geometric mean	Arithmetic mean
1900 to 1949	2.1	
1900 to 2000	4.8	6.5
1990 to 2000	0.4	
1900 to 2001	4.5	6.2
1900 to 2002	4.2	5.9

Source: *Triumph of Optimists*, Dimson, Marsh and Staunton, Princeton University Press, 2002 and subsequent updates

D.27 The differences shown in this table reflect the wide range of factors that impact bond and stock returns, for example bond returns from 1990 to 2000 were relatively high given the movements of inflation and interest rates over this period.

D.28 It should be noted that the authors of this report provide estimates of “expected risk premiums” that are lower than the unadjusted historical premia, e.g. in a recent update<sup>24</sup> they argue that, a plausible, forward-looking risk premium for the world’s major markets would be on the order of 3% on a geometric mean basis, while the corresponding arithmetic mean risk premium would be around 5%.

## Conclusions

D.29 In deciding the appropriate value for the equity risk premium, Ofcom has taken into account a range of evidence, both historical and forward-looking. This judgement reflects its recognition of the need to balance both short and long term interests of consumers. A low rate of return on capital can bring benefits to consumers in the short term in the form of lower prices. However, it could damage consumer’s longer term interests. The telecommunications industry depends on high levels of discretionary investment to support innovation and rapid market growth. The funds for such investment are often internationally mobile. Too low a figure for the cost of capital could deter such investment, thus disadvantaging consumers in the longer term.

D.30 Ofcom’s current view is that 5% is an appropriate value for the ERP. In its response BT argued that this value was towards the lower end of a reasonable range. Ofcom’s view is that BT’s arguments were somewhat unbalanced, since it appears to place much more weight on a single type of estimate than others – specifically it appears to be based on extrapolating the arithmetic mean of historical returns, as done by Dimson et al. Ofcom believes that is appropriate to give weight to other estimation methods, e.g.:

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<sup>24</sup> <http://wehner.tamu.edu/finc.www/finc-cuny/equity%20premium.pdf>

- those based on forward-looking estimates (as used by the UK's other economic regulators);
- survey-based estimates; and
- extrapolating the geometric mean of historical returns. As outlined in an independent study, *A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the UK*, carried out on behalf of Of tel and the UK's other economic regulators by Stephen Wright, Robin Mason, and David Miles in February 2003 (<http://www.ofcom.org.uk/static/archive/oftel/publications/pricing/2003/cofk0203.htm>), contrary to the assertion made by BT in its response to the June consultation there is no strong academic consensus that arithmetic returns are preferable to geometric returns as a basis for estimating a forward-looking risk premium (see section 2.4.2.3). Given this uncertainty, Ofcom considers that it is appropriate to give weight to estimates based on both arithmetic and geometric averages.

D.31 In the light of the above factors, Ofcom currently believes that there are no strong grounds for revising its equity risk premium estimate of 5%, although it notes that this value is at the higher end of a reasonable range.

## Equity Beta

### Introduction

D.32 As explained in paragraphs G25-G45 of the June consultation, Ofcom proposed a value of 1.3 for BT's equity beta. This was based primarily on a regression analysis carried out on Ofcom's behalf by The Brattle Group.

### Responses

D.33 In its response BT provided its own estimate of its WACC, which was calculated using an estimate its equity beta of 1.3, i.e. the same value as that used by Ofcom in the June consultation. Its response did, however, suggest that this was a conservative estimate, stating that:

*We... believe that the balance of evidence supports an equity beta for the purposes of the current calculation of at least 1.3.*

D.34 Ofcom's view on this issue is set out below.

### Ofcom's view

#### *Introduction*

D.35 The value of a company's equity beta measures the movements in returns (as measured by the sum of dividends and capital appreciation) from its shares relative to the movement in the return from the equity market as a whole. It increases with a company's debt to equity ratio (gearing), since a higher level of gearing implies higher volatility in the returns to shareholders.

D.36 The value of a company's equity beta measures the movements in returns (as measured by the sum of dividends and capital appreciation) from its shares relative to the movement in the return from the equity market as a whole. It

increases with a company's debt to equity ratio (gearing), since a higher level of gearing implies higher volatility in the returns to shareholders. Equity beta values for a company are typically calculated by regressing its returns against those of an appropriate market index.

D.37 Beta estimation can be a difficult exercise. There are a number of potentially contentious issues involved in beta estimation. Three significant ones are:

- choice of data frequency (daily , weekly, or monthly);
- estimation period (how many years' worth of data to use, and which period to choose); and
- the need to measure risk relative to an appropriate index (i.e. regressing BT's returns against either a domestic or international market index).

D.38 The choice between these methods can have a very significant impact on beta estimation.

D.39 Another problem, not discussed in this document in any detail, is that of isolating relevant activities, i.e. calculating a beta that will relate to the activity covered by the proposed charge control, but also any other activities to which WACC estimates based on this beta will be applied (e.g. future competition cases).

D.40 Ofcom's view on each of the three key issues identified above is outlined below.

#### *Data frequency*

D.41 A key issue in beta estimation is the choice of daily or monthly (or indeed weekly) returns. The relative merits of these estimation techniques are summarised in the Competition Commission's 2003 report on mobile call termination<sup>25</sup>, and discussed at some length in a paper written by The Brattle Group on behalf of Oftel, *Issues in Beta Estimation for UK Mobile Operators*, The Brattle Group, July 2002.

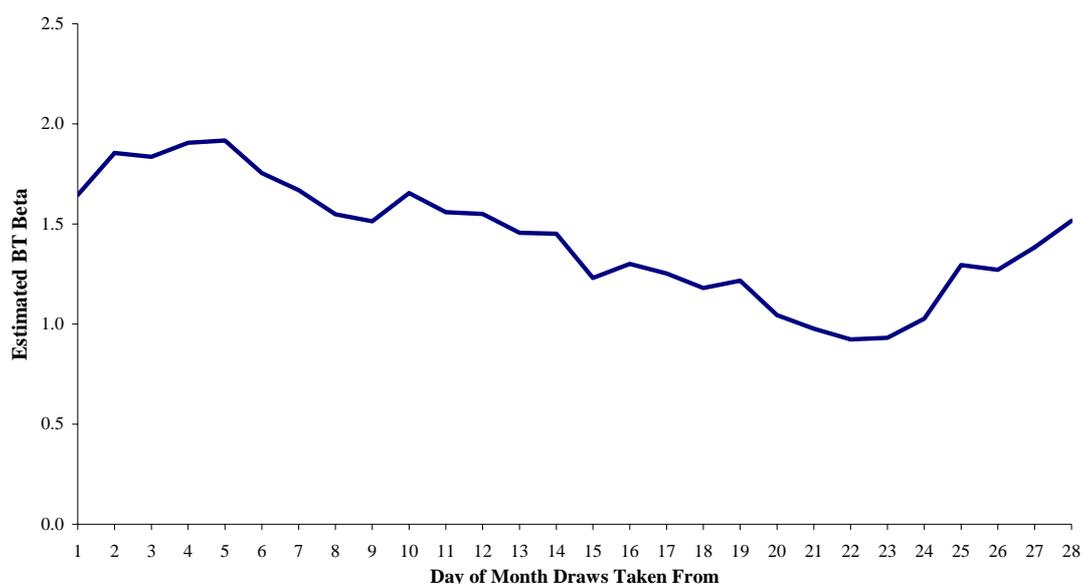
D.42 Advantages of using daily data in beta estimation include:

- obtaining greater statistical accuracy (shown by lower standard errors); and
- the fact that beta estimates based on monthly returns are often sensitive to the day of the month on which data points are taken (eg see the Figure G2below, in which beta estimates fluctuate widely across values in the interval of 1 and 2 depending on which day of the month is used)

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<sup>25</sup> [http://www.ofcom.org.uk/static/archive/oftel/publications/mobile/ctm\\_2003/index.htm](http://www.ofcom.org.uk/static/archive/oftel/publications/mobile/ctm_2003/index.htm)

Figure D2 - Beta calculated from 5 years of Monthly Data, Jan 1999 - December 2003



Source: The Brattle Group

D.43 Disadvantages of using daily data in beta estimation include:

- statistical problems that may result from using daily data, notably “non synchronous trading bias” (see the Brattle Group’s 2002 paper for details). However, these problems can be mitigated by the use of statistical corrections, eg a “Dimson adjustment”; and
- the fact there is no widely recognised published source of beta estimates using daily data (such as the LBS RMS beta which is based on monthly data).

D.44 Given the degree of uncertainty involved (caused, for example, by being unable to precisely isolate the relevant components of BT’s overall activities, and ensuing difficulties in interpreting statistical tests), a degree of judgement is involved. Ofcom’s view is therefore that a prudent approach is to place a degree of weight on all estimation methods, subject to statistical robustness of estimates. The most appropriate estimation method will very much be dependent on the statistical properties of the data set used, and may depend (see below) on the data window used – in cases where a short data window is appropriate, the use of monthly data will not be appropriate, since there will be insufficient data points available for calculating robust estimates.

#### *Data window*

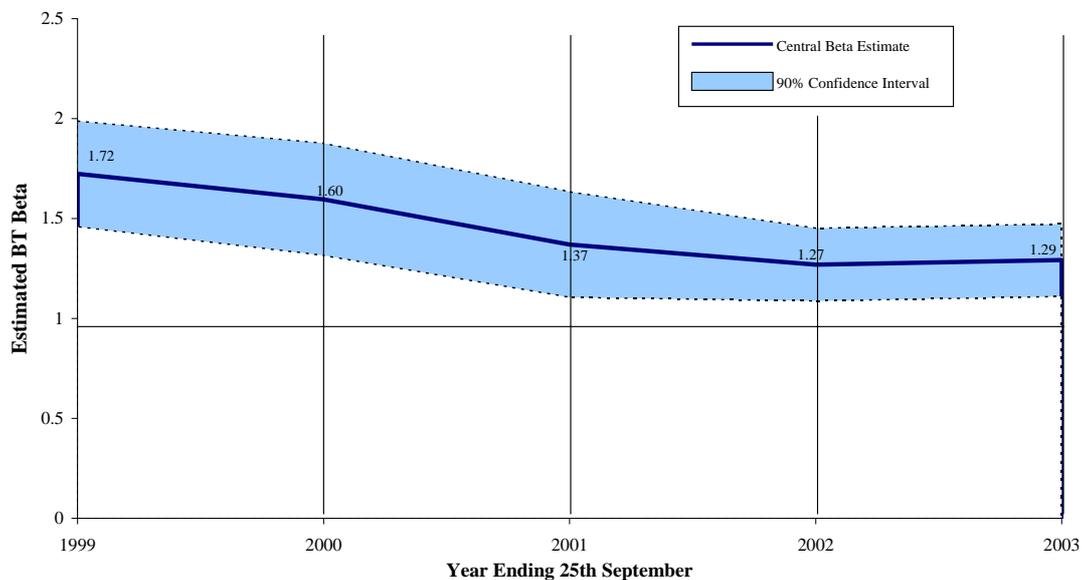
D.45 An issue closely related to that of data frequency is that of the appropriate data window to use for estimation. For example, the published LBS RMS beta estimates are based on 5 years of monthly data, whereas, using data of a higher frequency, it is perfectly possible to estimate betas based on a single year’s worth of data or less.

D.46 The trade-off involved in selecting the appropriate data window is between:

- the need to reflect the most recent possible data in order to proxy future values (which favours the use of shorter estimation periods); and
- the desirability of obtaining low standard errors of estimation by including many observations (which favours the use of longer estimation periods).

D.47 Ofcom's view is that, (at least when using daily data) the most appropriate time period to use is, at present, a relatively short window. This is because the beta for BT has emphatically not remained at a roughly constant level in recent years. This is illustrated below.

**Figure D3 - 90% Confidence Intervals for Annual BT Beta vs. All Share Daily Data)**



Source – The Brattle Group

D.48 Beta estimates for the 12 months up to the end of 2001, 2002, and 2003 are all relatively close together. However, the betas corresponding to earlier periods fall well outside the 90% confidence intervals for the beta calculated for the 12 months up to the end of 2003. These changes are very significant, and may relate to, e.g. changing market sentiment and the changing nature of BT's business such as the sale of its mobile network operation business. Ofcom's view is therefore that, estimates based on data windows going back more than 3 years are, at present, unlikely to be robust. This is confirmed by The Brattle Group, which (based on the results of a series of statistical tests) recommends that, where daily data is used, beta estimates based on the last full year of data. Ofcom's view is that this seems like a reasonable compromise between a sufficiently large sample size and the need to use up-to-date information. It is important to note that future changes in market conditions could mean that the Ofcom might feel it appropriate to use a longer, or perhaps even shorter, data window for beta estimation.

### *Appropriate index*

D.49 Traditional cost of capital analysis has estimated the risk of a stock relative to its domestic market. However, given the increasing prevalence of non-UK investment within the portfolios of UK investors, there are increasingly strong grounds for estimating risk relative to an international portfolio (see *Issues in Beta Estimation for UK Mobile Operators*, The Brattle Group, July 2002). Ofcom's view is that some weight should therefore be given to beta estimates measured against international indices in addition to domestic ones.

D.50 A beta estimate for a stock that has been measured against an international index is typically lower than one measured against a domestic index, since returns of the stock will in general be most highly correlated with those of its domestic index. This is reflected in the values in the table below.

### **Conclusions**

D.51 The Brattle Group has carried out an extensive regression analysis on Ofcom's behalf. Details of this are provided in the report alluded to above. This work, together with publicly available estimates, has provided Ofcom with a range of beta estimates. The most significant of these results are shown in the table below.

**Table D2 - Equity beta estimates for BT (all at actual gearing levels)**

<b>Estimated by/ description</b>	<b>Data Frequency</b>	<b>Index</b>	<b>Period</b>	<b>Estimate (range)</b>
The Brattle Group	Daily	UK	2002-03	1.29
The Brattle Group	Daily (+ Dimson adjustment)	UK	2002-03	1.29
LBS RMS	Monthly	UK	1998-2003	1.51
The Brattle Group	Daily	World	2002-03	0.89

D.52 Ofcom's view is that, in the light of these estimates, an equity beta value of 1.3 at BT's actual gearing level is appropriate. This is based on putting a large amount of weight on a central estimate based on daily (domestic) data, and a smaller amount of weight on published results that have been estimated using monthly data; and on estimates measured against an international index.

D.53 Ofcom disagrees with BT's suggestion that more weight should be given to the LBS RBS estimates. Whilst Ofcom recognises that there is some merit in using a single published source, its view is that the shortcomings of the LBS estimate (the use of monthly data and of a long data window) are such that very little weight should be put on the LBS estimates.

## Debt Premium

### The Introduction

D.54 As outlined in paragraphs G42-G45 of the June consultation, Ofcom proposed a value of 1% for BT's debt premium. This was based on data on the average promised yield of BT debt and the risk free rate used by Ofcom.

### Responses

D.55 In its response to the June consultation, BT agreed with Ofcom's use of a debt premium of 1%.

### Ofcom's view

D.56 The cost of corporate debt is made up of a risk free component and a company specific risk premium. Historical evidence suggests that blue chip corporate debt, such as that of BT, commands a small risk premium, although estimates of this premium vary considerably.

D.57 Ofcom's estimate of BT's cost of capital is based on beta of debt of zero for the first one percent of the debt premium and increasing by 0.2 for every one percent of debt premium above one percent. The debt beta measures the riskiness of the returns on debt. Ofcom's estimate of the debt beta implies that the first one percent of premium on BT's debt is due to liquidity risk rather than default risk. Any increase in debt premium beyond that level is attributed to the risk of default.

D.58 Given that no respondent disagreed with the value of 1% set out in the June consultation, Ofcom proposes to base its charge control on this value.

## Optimal gearing

### Introduction

D.59 As outlined in paragraphs G46-G49 of the June consultation, Ofcom proposed to put equal weight on gearing ratios (calculated on a  $D/(D+E)$  basis) of 35% and 30%. The first of these figures was based on the current book and market values of BT's debt and equity respectively, whereas the second was based on a target level of debt that BT has publicly announced an intention of achieving.

### Responses

D.60 In its response to the June consultation, BT agreed with the range used by Ofcom.

### Ofcom's view

D.61 Under the standard Capital Asset Pricing Model a firm can potentially lower its overall cost of capital by increasing its gearing. This is because debt is generally cheaper than equity as a result of tax advantages to debt.

D.62 The analysis of data for the second half of 2004 shows that Ofcom's estimates of BT's current gearing ratio, as set out in the June consultation, remains valid. With this in mind, together with BT's agreement with the approach used by

Ofcom in the June consultation, Ofcom intends to continue to put equal weight on gearing ratios of 35% and 30% in the charge control.

## Effective Corporate Tax Rate

### Introduction

D.63 As outlined in paragraph G50 of the June consultation, Ofcom proposed to base its WACC calculations on the headline corporate tax rate of 30%.

### Responses

D.64 In its response to the June consultation, BT agreed with the approach taken by Ofcom.

### Ofcom's view

D.65 Ofcom proposes to continue to base its calculation of BT's WACC on a corporation tax rate of 30%.

## Continuity of estimates

### Responses

D.66 In its response to the June consultation, BT argued that the WACC estimate calculated by Ofcom for the purpose of the PPC price control should be applied to all of BT's activities and that Ofcom should commit to continuing to using its estimate of BT's WACC for a fixed period of time. It argued that:

*[...] we believe that the conclusions reached by Ofcom as a result of the present PPC review should be used as the cost of capital rate for other reviews in the foreseeable future, and for the assessment of business cases. A reasonable interval between revisions of the regulatory cost of capital would be four or five years, consistent with the regime under Oftel, and similar to the approach used in all other regulated industries in the UK. For the avoidance of doubt, Ofcom should make their intention in relation to the use and review of the cost of capital clear*

### Ofcom's view

D.67 In setting the PPC price control, Ofcom chose to revise the estimate of BT's WACC calculated by Oftel in early 2001 since over three years had elapsed since the earlier calculation, with conditions in the communications market having changed significantly in the intervening period.

D.68 The calculations made by Ofcom in 2004 do not represent a significant change in methodology to those made previously by Oftel. Rather, they are an update of the Oftel approach made in the light of new evidence on the key input parameters, i.e. the risk free rate, debt and equity market returns, and BT's financial leverage. Ofcom proposes to consider methodological issues relating to the cost of capital, including the optimal frequency of review, in the coming months, and as such is not currently in a position to commit to any particular approach.

## Conclusion

D.69 Overall, using a broad range of parameters, Ofcom estimates the pre-tax nominal cost of capital for BT to be **13%**. This rate is somewhat higher than the one consulted on in June. This is because, whilst Ofcom has retained the same methodology as that used previously, new data on the risk free rate suggests that the use of a higher rate is appropriate. The table below shows Ofcom's calculations, which produce an average value that Ofcom has rounded up to 13%.

**Table D3 - Estimates of BT's pre-tax nominal WACC**

	<b>Current gearing</b>	<b>Future gearing</b>
	<b>35%</b>	<b>30%</b>
Risk-free rate	5.00	5.00
ERP	5.00	5.00
Equity beta	1.30	1.22
Cost of equity (post tax)	11.50	11.11
Debt premium	1.00	1.00
Cost of debt (pre tax)	6.00	6.00
Corporate tax rate	30%	30%
Cost of debt (post tax)	4.20	4.20
Gearing	35%	30%
WACC (post tax)	8.95%	9.04%
WACC (pre tax)	12.78%	12.91%

## Annex E

# NERA Report Executive Summary

- E.1 This report compares the cost efficiency of BT's network with that of the US LECs. The US LECs were chosen as comparators because a significant amount of detailed cost data is available for these operators, and because the better-performing LECs are generally regarded as providing the international benchmark for efficiency.
- E.2 The study uses data for the US LECs for the years 1996 to 2001<sup>26</sup> to model the determinants of total network costs. Based on this model, the study then makes use of accounting and other data produced by BT, to assess BT's comparative efficiency in 2000/01 to 2001/02.
- E.3 There are a variety of statistical and mathematical programming methods that can be used to assess comparative efficiency, each of which has strengths and weaknesses. As a result, NERA considers it appropriate not to rely on any one technique when making such comparisons. If more than one technique is used, the different results can then be reviewed in the light of the relative strengths and weaknesses of the different methods in order to provide a more informed view of comparative efficiency.
- E.4 The techniques used in this study are:
- Multi-year SFA (estimated using LEC data for 1996-2001);
  - Multi-year least squares (estimated using LEC data 1996-2001);
  - Single-year OLS (estimated using LEC data for 2001);
  - Single-year SFA (estimated using LEC data for 2001); and
  - Single-year DEA (estimated using LEC and BT data for 2001)<sup>27</sup>.
- E.5 This report expands and develops the comparative efficiency analysis which NERA has previously carried out for Oftel. The previous comparative efficiency study of BT, completed in 2000, estimated that BT's network activities in 1999/00 were in the region of 3% less efficient than those of the best performing US operators.

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<sup>26</sup> Extensive data on the US LECs is published by the Federal Communications Commission (FCC).

<sup>27</sup> BT data is not included in the regression analysis (SFA, Multi-year least squares and OLS) because of the possibility of this introducing bias into the results. BT's efficiency result is then estimated using the regression coefficients produced by the LEC data. Excluding BT from the DEA analysis is not possible, nor does the same problem of potential bias exist for this mathematical programming technique.

E.6 The results of the comparative efficiency analysis completed during this study are presented in the table below. These results suggest that BT has become more inefficient since 1999/00.

**Table E1 Summary of BT's comparative efficiency**

Point of comparison	Full sample		Large LECs only	
	Best performer	Upper decile	Best performer	Upper decile
Multi-year SFA	n.a.	n.a.	16%	9%
Multi-year least squares	n.a.	n.a.	16%	10%
Single-year OLS	20%	9%	7%	3%
Single-year SFA - Exponential	1%	1%	n.a.	n.a.
Single-year DEA(compared against peer group)	17%	n.a.	13%	n.a.
Range of All Results	1%-20%	1%-9%	7%-16%	3%-10%
<b>Range Excluding Single-year Regressions</b>	<b>17%</b>	<b>n.a.</b>	<b>13%-16%</b>	<b>9%-10%</b>

**Source: NERA Analysis**

- E.7 Analysis was completed, where possible, using both the full sample of US LECs and using the large LECs only (those with over 1 million exchange lines). It was not possible to estimate the multi-year regressions with the full sample of US LECs as tests identified that, over the period 1996 to 2001 as a whole, there were structural differences between the total cost functions of the large and small LECs. However, comparable tests using data just for 2001 indicated that these structural breaks were not present in that year. Therefore it was possible to estimate the single-year regressions using both the full and large LEC only samples.
- E.8 There are no results for the single-year SFA (large LECs only) model as there was insufficient data for this technique to estimate inefficiency scores for this regression. Indeed, there were significant problems in obtaining inefficiency scores for the single-year SFA (full LEC sample) regression. Of the three distributional assumptions that can be used to estimate single-year SFA regressions, it was only the exponential distribution which was able to identify inefficiency scores.
- E.9 The results of all the single-year techniques should be treated with some caution as these regressions were estimated using relatively small samples. The single-year OLS (large LECs only) is based on a sample size of 29 and the single-year SFA and single-year OLS (full LEC sample) are based on a sample size of 46. In contrast, the multi-year regressions are both based on a sample

of 174. Hence, the results of the single-year regressions should be considered to be less reliable than those estimated using the multi-year techniques.

- E.10 Given the greater robustness of the results of the multi-year analysis, and the broad consistency between the results of the multi-year analysis and the DEA analysis using the large LECs only sample, it was concluded that BT's inefficiency is in the region of 9% to 10% compared to the upper decile point of the large LECs and of 13% to 16% compared to the best performing large LECs.<sup>28</sup>
- E.11 The results discussed above are those estimated using the NERA model specification. BT suggested an alternative model specification, which yields a much higher value for the loglikelihood function, implying that it fits the data better. Additionally, the BT model produces significantly different efficiency results. Using the multi-year SFA technique BT's inefficiency compared to the upper decile is 1% under the BT model compared to 9% under the NERA model.
- E.12 NERA assessed the suitability of the two alternative model specifications using a number of criteria (see section 5.4 for a discussion of this analysis). The aim of this assessment was to identify the model which is most appropriate for assessing BT's comparative efficiency for the purposes of Ofcom's price cap modelling. The assessment indicated that the NERA model is more appropriate for assessing BT's comparative efficiency for the purposes of deriving an efficiency factor for inclusion in a price cap model. The main reasons for this are that the NERA model is more consistent with BT's regulatory cost base, the results of the NERA model are consistent with analysis of the relative movements over time in the costs and outputs of BT and the US LECs and the NERA model allows for a comparison of how BT's efficiency has changed since the previous comparative efficiency study completed in 2000.
- E.13 The results of the NERA model imply a significant deterioration in the performance of BT since 1999/00. To assess the validity of this conclusion we investigated how the change in BT's costs relative to output compared with that for the US LECs. The table below shows how BT's network costs, total lines and call minutes changed between 1999/00 and 2001/02 and compares these changes to the average change for the US LECs.

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## **Table E2 - Analysis of cost and output changes 1999/00 to 2001/02**

<sup>28</sup> The results of the single-year OLS are not included in the range as the very limited sample size used to estimate this regression may have limited the robustness of these results.

	<b>Percentage change in network costs</b>	<b>Percentage change in total line numbers</b>	<b>Percentage change in call minutes</b>
BT	19%	2%	40%
Average of US LECs	0%	11% <sup>29</sup>	-1%

E.14 It can be seen that, while BT's network costs increased by 19% over this period, the LECs' costs, on average, remained more or less constant. Whilst BT's call minutes increased significantly faster than the LECs' call minutes between 1999/00 and 2001/02, its line numbers increased more slowly than those of the LECs. If we assume that lines account for 70% of total network costs and calls for 30% (which was the case for BT in 2001/02), then, between 1999/00 and 2001/02, BT experienced a 19% increase in costs in the face of a 13.4% increase in output while the LECs experienced no increase in costs while their output grew by 7.4%. In other words, BT costs grew faster than its output while the opposite was true for the LECs.

E.15 These figures support the view that BT has become less efficient since the previous comparative efficiency assessment carried out in 2000 (using data for the financial year 1999/00). In fact they suggest that BT's inefficiency could have increased by something in the region of 13 percentage points since 1999/00. The difference between BT's inefficiency in the previous study (approximately 3%) and the range for BT's inefficiency identified by the NERA model in this study, of between 9% and 10% relative to the upper deciles, is around 7 percentage points. The conclusion therefore is that the efficiency decline implied by the NERA model is broadly consistent with the pattern of changes in costs and output volumes over time.

E.16 To assess further the validity of this finding, the percentage change in BT's output(s) over the period, along with the coefficients on these variables in the final NERA regression, were used to estimate more formally the change in network costs that would be expected as a result of the change in outputs.

E.17 Given the functional form of the regression model estimated, each of the regression coefficients can be interpreted as the expected percentage change in costs that would occur if the variable concerned were to change by 1%. For example, the coefficient on total lines, which was estimated as 0.81 in the multi-year SFA regression, indicates that if total lines were to increase by 1%, total costs would be expected to increase by 0.82%. The coefficients on switch minutes, of 0.15, and all other variables can be treated in a similar way.

E.18 This analysis indicated that the changes in BT's outputs over the period 1999/00 to 2001/02 would suggest a 9% increase in BT's total network costs. As shown above, BT's actual network costs increased by 19% between

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<sup>29</sup> A significant driver of the increase in the number of total lines for the US LECs is the growth in the number of leased lines.

1999/00 and 2001/02. Therefore, the results of this more formal estimation of the expected change in BT's network costs supports the conclusion that BT's efficiency has deteriorated over the period 1999/00 to 2001/02.

- E.19 The conclusions reached above suggest that BT's inefficiency could have increased by something in the region of 10 to 13 percentage points since 1999/00. This magnitude of efficiency change is consistent with BT's inefficiency score increasing from 3% in 1999/00 to between 9% and 10%, when compared to the upper decile point of the large LECs, and between 13% and 16% when compared to the best performing large LECs.
- E.20 Reflecting this, it is reasonable to conclude that, for the purposes of Ofcom's price cap modelling, BT's inefficiency score in 2001 is:
- between 9% and 10% when compared with the upper decile point of the large US LECs, and
  - between 13% and 16% based on the more demanding comparison against the best performance (i.e. the most efficient large US LEC).

## Annex F

# NERA discussion of BT's response to the June Consultation

## A DISCUSSION OF ISSUES RAISED IN BT'S RESPONSE TO OFCOM'S CONSULTATION DOCUMENT "PARTIAL PRIVATE CIRCUITS CHARGE CONTROL"

### Introduction

- F.1 In its written response to Ofcom's consultation document "Partial Private Circuits Charge Control" BT raises a number of issues with the comparative efficiency assessment completed by NERA. NERA engaged in extensive discussions with BT prior to the publication of its study, and during these discussions endeavoured to answer the questions raised by BT. NERA would now like to continue this process by providing comments, where possible, on the issues raised in BT's written response.
- F.2 The issues raised in relation to the efficiency study are contained within BT's response to Question 8 in the consultation document (" Do respondents agree with Ofcom's proposed inefficiency adjustment to BT's data?" ) and in Annex D to the response, which includes comments raised by Professor Andrew Chesher.
- F.3 In the two sections below NERA provides its comments on the issues raised in these two sections of BT's written response.

### Issues raised in response to consultation document question 8

#### NERA's response to general points raised in BT's response

- F.4 In its response BT raises a general concern about NERA's choice of econometric model. NERA's choice of model was based on a number of different criteria. After discussions with Ofcom, NERA identified that in addition to statistical fit, the following additional criteria should also be used to assess the suitability of the different cost models:
- **Continuity with the models previously used to estimate BT's comparative efficiency:** the model should allow an assessment of how BT's efficiency had changed since the previous comparative efficiency study.
  - **Consistency with the movements in costs over time:** the results of the model should be sensible when compared with movements in the costs and outputs of the firms analysed.
  - **Consistency with BT's regulatory cost base:** the results of the comparative efficiency assessment are to be used by Ofcom in a financial price-cap model and, therefore, the cost function implied by the model should not be inconsistent with BT's cost base, as this

cost base will be the source of the underlying data included in the price-cap model.

- F.5 In its response BT suggests that the three criteria in the bulleted listed above should have no bearing on the choice of the model, and that model choice should therefore be based on statistical fit alone.
- F.6 NERA does not agree with this. While statistical fit is an important criterion for judging the performance of a model, there are other considerations that need to be taken into account. For example, consideration needs to be given to the reasonableness of the model from the perspective of *a priori* expectations of the key drivers of the costs of telecommunications networks, and the importance of these drivers in explaining costs (i.e. their magnitude).

#### **NERA's response to new issues raised by BT in response to Question 8**

- F.7 In its response to Question 8 of the consultation document BT raised a number of new issues that had not been mentioned during the discussions between NERA and BT. These are discussed below.

#### ***Special access and leased line quantities***

- F.8 BT indicated that it believes that NERA has overstated the quantity of leased lines and special access lines for the US LECs. NERA has completed extensive research over a number of years into the data provided by the US LECs and is unaware of any issues with this data that would result in a material overstatement. Therefore, given the absence of any explanation by BT as to the reasons for the overstatement, NERA is unable to respond further on this issue.

#### ***Alignment of BT and US LEC products and associated costs***

- F.9 Whilst BT acknowledges that NERA has made adjustments to reflect the different product portfolio and regulatory regimes faced by itself and the LECs, it considers these adjustments to be inadequate. NERA's investigation of the differences between the products provided by BT and the US LECs and the associated costs identified no material differences that were not controlled for in the study. Therefore, without more detailed information on the particular products over which BT has concerns NERA is unable to respond further on this issue.

#### ***The use of working system size as a cost driver***

- F.10 BT considers that the NERA study places over-reliance on working system size as a cost driver and underestimates the impact of churn. Additionally BT considers that NERA has not sufficiently recognised BT costs incurred outside switched and leased line maintenance. As regards the first point, NERA was not able to find any data that showed that churn rates in the US were materially different from those of BT. As far as the second is concerned, we have included for both BT and the LECs all operating costs associated with running the network. NERA is therefore unaware of any bias introduced in its study in relation to either of these issues. In the absence of information to substantiate BT's concerns NERA is unable to respond further on this issue.

## **Nera's response issues raised in response to Question 8 which BT also raised during earlier discussions**

F.11 In addition to the new issues raised in its response, BT also restated a number of concerns which it had previously raised during its discussions with NERA. NERA documents below the responses it provided to BT in relation to these concerns.

### ***Midwest telecommunication companies***

F.12 BT raised its concerns about the impact of changing regulatory regimes on the efficiency of the Midwest companies in NERA's sample. Before the publication of the study NERA provided BT with a written explanation of why it did not consider this issue to have an impact upon the results of the analysis. This explanation documented that:

*"NERA understands BT's concerns over the investment patterns evidenced in their note. However, the evidence presented is not, by itself, conclusive that the change in the regulatory environment has caused an artificially low level of investment<sup>30</sup>. It is, for example, possible that lower investment in recent periods is a direct effect of over-investment in previous periods. In addition, while the change in the regulatory environment may have reduced incentives to invest, there remains an incentive to invest for the future because of competitive pressures, which are visible in the US market<sup>31</sup>.*

*To consider the impact of the change in the regulatory environment on efficiency NERA compared the efficiency scores of the companies highlighted by BT in 1994<sup>32</sup> and 2001. If, since 1994/5, significant under-investment had occurred in these companies, compared to other US LECs, we would expect to see these companies increasing their efficiency scores over time (i.e. becoming more efficient). However, the rankings of these companies in the multi-year SFA analysis for the period 1996-2001 are broadly comparable with those obtained using SFA analysis for the period 1994."*

### ***Local switch and main switch minute quantities***

F.13 BT requested that NERA investigate the inter-LATA routing factor used for the LECs, and its reliance on the information obtained from Bellcore. In response to this request, NERA included a sensitivity test in the final report of the study which estimated the regression results using the inter-LATA routing factor from the Hatfield model (rather than from data obtained from Bellcore). The result of this sensitivity shows that the change has a minimal impact on the results.

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<sup>30</sup> Either due to the slowing down of investments or stimulating revenue with little increase in the asset base.

<sup>31</sup> In Michigan, for example, CLECs currently run over 22% of all lines in the state, as reported in the FCC's Local

Competition Report. Of the other states highlighted by BT, CLECs operated 19% of the lines in Illinois, 9% in

Indiana, 10% in Ohio, and 15% in Wisconsin.

<sup>32</sup> As reported in the BT efficiency report completed by NERA in November 1995.

## **Pension Adjustments**

F.14 During its discussion with NERA BT raised the issue of negative OG&A costs for years other than 1999. NERA investigated this issue and, prior to the publication of the study, provided the following written response to BT:

*“As described in NERA’s report, it was necessary to adjust costs for a number of the US LECs in 1999 to account for pension cost issues. These occurred at a time when a number of companies were merged, and affected the cost category 6728, “ Other General and Admin “*

*BT has expressed concern that this cost category contains negative figures for other companies in other years, and believes these instances should be adjusted in a similar way. NERA believes that this should only be the case if these figures can be identified as exceptional cost items.*

*The adjustments made to the 1999 data were based on evidence from BT which identified, in a verifiable manner (i.e. from information provided in financial statements), that the pension adjustment in this year was an exceptional item and provided an indication of the approximate size of the adjustment.*

*Therefore evidence of a negative number for cost category 6728 is not enough evidence to warrant an adjustment. In fact, the companies that have been adjusted in 1999 do not all experience negative values for the cost category 6728, since this cost category does not solely comprise of pension costs. Moreover, not every instance of a negative amount in the cost category in 1999 resulted in an adjustment (for example, GTE South in 1999).*

*Therefore, unless BT can provide specific evidence that each of the adjustments they propose are due to exceptional cost items, and can also provide verifiable evidence of the magnitude of the required adjustments, it is unreasonable to alter the US LEC data as proposed.”*

## **Efficiency improvements since 2001**

F.15 NERA accepts that BT’s costs have fallen since the period assessed in the current study. Indeed NERA raised this issue, and the impact this may have on BT’s efficiency score, during its discussions with BT. However, as extending the sample beyond 2001 was outside the scope of this study, NERA considers it to be unreasonable for BT to characterise this as a weakness in the NERA approach.

## **Issues raised in Annex D of BT’s response**

F.16 In Annex D of the response, Professor Andrew Chesher raises a number of issues with the criteria NERA used in assessing the suitability of different model specifications for assessing BT’s comparative efficiency. NERA would like to provide clarificator information with regards to some of points raised by Professor Chesher.

F.17 Professor Chesher indicated that he found NERA’s arguments in relation to the *consistency over time* criterion to be “of limited relevance as they were based on a simple one-at-a-time comparison of costs and outputs” . NERA would like to clarify that its analysis did not rely only on univariate tabulations of costs and outputs. The NERA analysis in relation to assessing consistency over time (as

presented in the final report) took account of the simultaneous effect of outputs on costs. It was not possible also to take account of changes in environmental variables when assessing movements in costs outside the study sample (i.e. prior to 2000) as this information for BT was not publicly available. However, analysis of the importance of the different explanatory variables in explaining costs indicates that the output variables are by far the most significant cost drivers.

F.18 In relation to NERA's analysis of the *consistency with the regulatory cost base* Professor Chesher raises a number of issues:

- Firstly he states that the NERA model implies more significant diseconomies of scale than the BT model as “the sum of the NERA model coefficients in Table 5.18 [of the final report] is 2.22 compared to 1.88 for the BT model”. NERA would like to clarify that the results in Table 5.18 are not model coefficients and therefore, cannot be interpreted in this manner. The results in this table show the cost volume elasticities (CVEs) rather than model coefficients. The simple sum of the CVEs presented is meaningless as these are not CVEs with respect to total costs, but are elasticities with respect to output specific costs (i.e. with respect to exchange line costs, or leased line costs).
- Secondly, Professor Chesher indicates that he finds the NERA model unrealistic because it implies that a 10% increase in minutes implies a 5% increase in cost. This statement is based on the CVEs presented in Table 5.18 of NERA's final report. Therefore, the correct interpretation of the model is that a 10% increase in switch minutes implies a 5% increase in the cost of providing these calls (not in the total cost of the operator). Assuming that the cost of calls account for in the region of 30% of total costs, the NERA model implies that a 10% increase in switch minutes will result in 1.5% increase in costs.
- Thirdly, Professor Chesher indicates that he considers the multiplicative cost model employed in the study to have no implications for cost shares. NERA is unclear about the point Professor Chesher is attempting to make here. The results of the regression model indicate that different explanatory variables are of differing importance in explaining total costs. For example, it is possible to identify from the model, for each company in the sample, the proportion of its predicted costs that is driven by the output variables, and the proportion which is driven by other explanatory variables. Therefore, it is NERA's understanding that the model does have implications for the proportions of total costs one would expect different output variables to account for (for example the proportion of total costs which is accounted for by the cost of providing lines).

## Annex G

# List of non-confidential Respondents

BT

Cable & Wireless

Energis

Thus

UKCTA

Vodafone

## Annex H

# 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.

**Add Drop multiplexor (ADM or mux)** – multiplexor equipment enabling the removal or addition of bit-streams from larger assemblies.

**Asymmetric Digital Subscriber Line (ADSL)** (also known as xDSL) – a technology that allows the use of a copper line to send a large quantity of data (eg a television picture) in one direction and a small quantity (eg a control channel and a telephone call) in the other.

**Annex II (of the ICD)** – Annex II operators are those who have rights and obligations to interconnect with each other under Article 4(1) of the Interconnection Directive for the purpose of providing publicly available telecommunication services. Also known as a Schedule 2 Public Operator in BT's licence.

**Bandwidth** – the physical characteristic of a telecommunications system that indicates the speed at which information can be transferred. In analogue systems, it is measured in cycles per second (Hertz) and in digital systems in binary bits per second (Bit/s).

**Book life** - The period over which the entity expects to derive economic benefit from that asset.

**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.

**CCA (current cost accounting) depreciation** - The measure of the cost in terms of its current price of the economic benefits of tangible fixed assets that have been consumed during a period.

**Cumulative OCM depreciation** – This is the cumulative total of the OCM depreciation.

**Customer Sited Handover (CSH)** – interconnection occurs at an OLO's premises.

**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.

**Digital Cross Connection node (DCCN)** – a node in BT's Private Circuit network where circuits at 64kbit/s and below can be cross-connected between differing 2Mbit/s tributaries.

**Digital Junction Switching Unit (DJSU)** – a tandem switch used to connect between DLEs in the London area.

**DLE (Digital Local Exchange)** – the telephone exchange to which customers are connected, usually via a concentrator.

**DMSU (Digital Main Switching Unit)** – connects calls between DLEs and also other DMSUs and form the backbone of the trunk network.

**Effective life** - the remaining life of the assets to the common expiry date.

**Financial capability maintenance** - 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 service** – a packet switched data service providing for the interconnection of Local Area Networks and access to host computers at up to 2 Mbit/s.

**Gross book value** - the original purchase price of a tangible fixed asset.

**Gross replacement cost** - 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.

**In Span Handover (ISH)** – interconnection occurs at a point between BT's premises and an OLO's premises.

**Leased line** – a permanently connected communications link between two premises dedicated to the customers' exclusive use.

**Local End Fixed Charge** - This is a flat rate charge depending on the bandwidth of the Local End but the costs of the Local End are averaged for each bandwidth so this charge is independent of the type of Local End infrastructure deployed.

**Main Link Fixed Charge** - This is a flat rate charge for PPCs with a Main Link and has no distance related element but is dependant on the bandwidth of the PPC.

**Main Link Fixed Charge** - This is a flat rate charge for PPCs with a Main Link and has no distance related element but is dependant on the bandwidth of the PPC.

**Main Link per Kilometre Charge** - This is a charge per kilometre for the Main Link and again this varies by bandwidth.

**PPC connection charge** – This is the charge levied to recover the costs incurred by BT in provisioning the PPC.

**PPC rental and maintenance charges** – These are the charges levied by BT for the ongoing rental and maintenance of the PPC. The PPC rental has three main

components; a Local End Fixed Charge, a Main Link Fixed Charge and a Main Link per kilometre Charge.

**Mbit/s** – mega bits per second. A measure of speed of transfer of digital information.

**MSH** – Marconi Synchronous Hierarchy (also known as Marconi Broadband Overlay Network). Similar to SDH method of transmission but at higher bandwidths (155Mbit/s to 2.4Gbit/s).

**Net current assets** - Total current assets less current liabilities.

**Net replacement cost** - 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.

**OCM depreciation** – This is the sum of CCA depreciation and HCA depreciation.

**Operating capability maintenance** - The maintenance of an entity's operational capability (i.e. the capacity to produce goods and services) when determining the profitability of an entity

**Operating expenditure** - Costs reflected in the profit and loss account excluding depreciation financing costs such as interest charges.

**PPC** – A generic term used to describe a category of private circuits that terminate at a point of connection between two operators' networks. It is therefore the provision of transparent transmission capacity between a customer's premises and a point of connection between the two operators' networks. It may also be termed a part leased line. It includes terminating segments.

**Plesiochronous Digital Hierarchy (PDH)** – an older method of digital transmission used before SDH which requires each stream to be multiplexed or demultiplexed at each network layer and does not allow for the addition or removal of individual streams from larger assemblies.

**PC POC (Private Circuit Point of Connection)** – BT's Link to a Point of Interconnection product. This is a private circuit from a customer's premises to point of interconnection between BT and another operator's network. It is only available at 2Mbit/s to be purchased by PTOs.

**Points of Connection (POC)** – also known as a Switch Connections ie where an operator's network interconnects with BT usually at a Digital Main Switching Unit (DMSU) or Wide Area Tandem (WAT).

**RCU (Remote Concentrator Unit)** – the lowest level of BT's PSTN hierarchy. Customer lines, which are generally copper wires, are concentrated/multiplexed and routed to a DLE.

**Supplementary depreciation** - The additional depreciation charge to convert an HCA depreciation charge into a CCA depreciation charge.

**Synchronous Digital Hierarchy (SDH)** – a method of digital transmission where transmission streams are packed in such a way to allow simple multiplexing and

demultiplexing and the addition or removal of individual streams from larger assemblies.

**Synchronous Transport Module (STM)** – transmission of bit-streams at either 155 Mbit/s, 622Mbit/s or 2.4 Gbit/s.

**Terminating segment** – a terminating segment is capacity between a customer's premises and a point of connection between two networks at the DMSU level.

**Tributary cards** – a tributary card sits in a multiplexor receiving a tributary enabling the multiplexor to combine inputs from each of the tributary cards in the multiplexor. For example, in an SMA-4 multiplexor, there can be up to 4 STM-1 tributaries connected via tributary cards. The multiplexor combines the 4 STM-1 tributaries into an STM-4 transmission bit stream.

**Weighted book life** - The average asset life of a particular network component's mix of tangible fixed assets determined by weighting each asset category's life by the gross book value.

**Wide Area Tandem (WAT)** – a tandem exchange used to connect calls between DLEs over a wide area