Fair and reasonable charges for fixed geographic call termination

Statement and final guidance
(✂ Redacted for publication)

Statement

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Section 1

Summary

1.1 This Statement sets out our guidance on how communications providers ("CPs") other than British Telecommunications plc ("BT") can set fair and reasonable wholesale charges for termination of calls to geographic telephone numbers.

1.2 When a customer of one CP calls a UK geographic telephone number[1] on another network, the calling customer's CP pays a wholesale charge to the called customer's network to complete the call. This charge is calculated based on the rate per minute for the service, referred to as a 'fixed geographic call termination rate' or 'fixed termination rate' ("FTR").

1.3 We regulate FTRs because a CP whose network originates a call to a geographic number of a customer of another CP's network has no alternative but to purchase a call termination service from the CP of the called customer. In our most recent review of fixed narrowband wholesale markets ("the 2009 WNMR") [2], consistent with previous wholesale market reviews, we concluded that this means that the terminating CP has Significant Market Power ("SMP") in the termination of calls on its network. To address this, we imposed SMP obligations on every CP which terminates calls to geographic numbers to protect other CPs, and hence the consumers they serve, from paying high prices for calls to such numbers and to facilitate effective competition between networks. One of these obligations, SMP Condition BC1, requires CPs other than BT (and KCOM[3] in the Hull area[4]) to provide call termination on fair and reasonable terms, conditions and charges[5].

1.4 We have held the view for several years that CPs can set fair and reasonable FTRs by basing them on BT's charges – an approach known as reciprocal charging. In the 2009 WNMR, we stated that we continued to hold that view. Whilst we recognised that reciprocal charging is not necessarily the only way in which a CP can fulfil the requirement to set fair and reasonable termination charges, we also stated that FTRs not based on BT's charges are unlikely to be fair and reasonable. This was in significant part because BT's charges are set by a charge control[6], and are therefore likely to be close to the costs of an efficient operator. This Statement provides guidance on how reciprocal charging should be applied in the future. Our view remains that FTRs higher than those based on BT's charges are unlikely to be fair and reasonable.

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[1] A geographic telephone number is an ordinary number of a fixed phone. It starts with either '01' or '02'.

[2] A statement on the markets, market power and remedies including further consultation called *Review of the fixed narrowband services wholesale market*s of 15 September 2009 at http://stakeholders.ofcom.org.uk/binaries/consultations/wnmr_statement_consultation/summary/main.pdf

[3] KCOM Group plc was formed from Kingston Communications and Affiniti. Ofcom set a cost orientation obligation on KCOM for the Hull area only. Outside Hull, KCOM is subject to the same regulation as other CPs, including SMP Condition BC1, as set out in paragraph 4b at http://stakeholders.ofcom.org.uk/binaries/consultations/wnmr_statement_consultation/corrections.pdf

[4] BT and KCOM in the Hull area are subject to other specific SMP obligations that control their rates for fixed geographic call termination.

[5] SMP Condition BC1 in the 2009 WNMR (see footnote 2).

[6] See Review of BT's Network Charge Controls of 15 September 2009 at http://stakeholders.ofcom.org.uk/binaries/consultations/review_bt_ncc/statement/nccstatement.pdf

1.5 For over a decade, FTRs of CPs other than BT have been based on a mix of BT's Local Exchange ("LE") and Single Tandem ("ST") call termination rates. This reflected a view, set out by Oftel in 1997[7] that, since a local switch in BT's competitors' networks typically had a larger geographic coverage than a BT local switch, the service provided by BT's competitors corresponded to two switching and conveyance services on BT's network – LE and ST. The industry decided to reflect Oftel's view in an agreement (known as the Reciprocity Agreement) which included a formula for deriving each CP's FTR using a blend of BT's LE and ST rates based on proportions of each CP's outbound geographic call traffic delivered to BT's tandem and local switches (measured by periodic sampling). The Reciprocity Agreement was renewed periodically, and the last one expired in September 2009[8].

1.6 On 16 September 2010, we published a consultation document[9] ("the September 2010 Consultation") inviting views from stakeholders on proposed guidance as to how reciprocal charging should be applied to determine fair and reasonable FTRs in the future. We did this because the industry had been unable to reach consensus on FTRs since the last Reciprocity Agreement expired, due to divergent views of different operators on a range of issues. We recognised that the resulting uncertainty could cause disputes and be disruptive to the industry and said, in January 2010[10], that we would clarify how reciprocal charging should be applied to FTRs.

1.7 In the September 2010 Consultation we set out and analyzed options for guidance on reciprocal charging. We indicated our preference for the option (Option 3 in September 2010 Consultation) under which all CPs' FTRs would ordinarily be no higher than BT's termination rate ("the Benchmark FTR") [11] irrespective of the scale, topology or technology of their networks. We proposed that we would be likely to consider such symmetric FTRs as fair and reasonable, as required by SMP Condition BC1, unless a CP can demonstrate why, in its particular case, a higher FTR would be fair and reasonable. To help assess potential claims for higher FTRs, we proposed the following three-stage test, all stages of which a CP would need to satisfy to support its claim:

- charging a FTR equal to the Benchmark FTR would deny the CP recovery of its actual costs of providing geographic call termination; and
- its actual costs of providing fixed geographic call termination are efficiently incurred; and

[7] Oftel statement called *Network Charges from 1997* published in July 1997 at http://www.ofcom.org.uk/static/archive/oftel/publications/1995_98/pricing/nccjul97.htm. See Annex C entitled *Oftel's approach to the reciprocal charges for call termination on OLO networks*.
[8] The expired Reciprocity Agreement can be found on the BT Wholesale Carrier Price List at http://www.btwholesale.com/pages/static/service_and_support/service_support_hub/online_pricing_hub/cpl_hub/cpl_pricing_hub/reciptory_offer.html
[9] Consultation entitled *Fair and reasonable charges for fixed geographic call termination: a consultation on draft guidance* published 16 September 2009 at http://stakeholders.ofcom.org.uk/binaries/consultations/778516/summary/condoc.pdf
[10] Paragraph 3.51 of a Statement called *Next Generation Networks: Responding to recent developments to protect consumers, promote competition and secure efficient investment* published 28 January 2010 at http://stakeholders.ofcom.org.uk/binaries/consultations/ngndevelopments/statement/ngn_statement.pdf
[11] Paragraphs 2.53 to 2.55 of this document defines this rate more precisely with reference to BT's current Wholesale Carrier Price List.

- charging a higher FTR than the Benchmark FTR would be offset by demonstrable consumer benefit.

1.8 Having carefully considered stakeholders' responses[12] to the September 2010 Consultation, we have concluded that our guidance, subject to transitional arrangements, is that FTRs for wholesale fixed geographic call termination are presumed to be fair and reasonable where they are symmetric – i.e. no higher than the Benchmark FTR (currently BT's LE rate). Central to this decision is our conclusion, confirmed by several respondents, that differences in network topology between BT and other fixed operators are not necessarily reliable indicators of efficiently incurred costs of termination in today's environment of differing fixed network technologies and the availability of wholesale inputs from BT to provide customers with access to networks.

1.9 We have concluded that FTRs above the Benchmark FTR are only likely to be consistent with SMP Condition BC1 where a CP is able to show that it meets the three-stage test included in our guidance.

1.10 We have decided on this guidance because:

- Consistent with our objectives, symmetric FTRs are likely to:
    - provide strong incentives for CPs to minimise the costs of termination;
    - remove distortions, inherent in the previous industry-agreed regime, to efficient interconnection arrangements with BT; and
    - promote competition in transit markets.
- The presumption that symmetric FTRs are fair and reasonable is consistent with the EC Recommendation of 7 May 2009 on the regulatory treatment of fixed and mobile termination rates in the EU (2009/396/EC)[13];
- With regard to our principal statutory duty to further the interests of consumers, it is likely to be favourable to consumers, in particular those who call geographic telephone numbers, insofar as reduced FTRs are passed through to retail call prices; and
- It is practical to implement and is not prone to the potential gaming inherent in the previous regime.

1.11 In reaching these decisions, we took into careful consideration our role in the wider context of the evolution of network technologies in which there could be widespread adoption of Next Generation Networks ("NGNs") using the Internet protocol ("IP"). While we consider that interconnected NGNs are likely to be the most efficient *ultimate* outcome, at this stage we have not determined the complex questions of either the industry's optimal migration path to that outcome or its timing. In the meantime, we consider that either the established Time Division Multiplexing ("TDM")

[12] Non-confidential stakeholder responses are published at http://stakeholders.ofcom.org.uk/consultations/fair-reasonable-charges/?showResponses=true

[13] See paragraphs 1 and 9 of the *Commission Recommendation of 7 May 2009 on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU (2009/396/EC)* which is published in the Official Journal of the European Union, 20.5.2009, L 124, pages 67-74 at http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:124:0067:0074:EN:PDF

technology or NGN could be efficient ways for different operators to provide fixed-line voice services, and consider that our proposed guidance on fair and reasonable charging for termination will provide reasonably efficient signals for investment in NGNs until the next review of the wholesale narrowband market.

1.12 We recognise that operators of TDM networks and of NGNs need to interwork the two technologies during their co-existence and to incur the costs that arise. However, we would be concerned if FTRs were used to recover those costs in a way which would result in higher prices for consumers without a compensating benefit. Our guidance is therefore that FTRs should be presumed to be fair and reasonable where they are no higher than the Benchmark FTR, even where technology conversion is provided at the terminating node. Where a CP seeks to justify a higher rate, it would need to do so by showing how each of the criteria of the three-stage test, set out in the final guidance in Section 6, were met.

1.13 We recognise that termination charges that apply in the interconnection of TDM networks and NGNs could be set in ways which could influence the extent to which different operators take interworking costs into account in making their respective technology choices and which could hence affect the industry's migration path from TDM networks to NGNs. However, for the reasons we summarise below, we consider that it would not be appropriate for us to intervene now in setting such charges beyond providing guidance that symmetric termination charges would be presumed to be fair and reasonable:

- The extent of any improvement in the industry's migration path from TDM to NGN that could be achieved by regulatory intervention in setting termination rates is uncertain. We consider that the complex interaction of incentives and the appropriate regulatory arrangements which could help deliver an improved migration path may be more appropriately considered in the broader policy framework of a market review than in the context of guidance on how FTRs in the UK excluding the Hull area should be set by CPs other than BT.

- We consider that an NGN seeking to convert its outbound traffic from IP to TDM protocols before sending it for termination to a TDM network has some commercial options, including self-provision, procurement of conversion services at a small number of locations from providers of transit services or from the terminating TDM network. We therefore do not consider it appropriate to intervene in setting charges for the IP to TDM conversion of outbound traffic from an NGN.

- We consider it appropriate for a terminating TDM network to charge the same price for TDM termination to an originating operator with an NGN as to an originating operator with a TDM network. We note that an NGN and a TDM network need to perform similar functions in sending TDM traffic for termination to a TDM network[14].

- In considering how an NGN operator could set a fair and reasonable charge for terminating calls from a TDM network, we do not consider it desirable that the

[14] We distinguish in this regard between the different functions presented to us by NGN operators as interworking functions. We recognise that the need for conversion between TDM and IP protocols arises where TDM networks and NGNs (or other IP-based networks) interconnect. However, in our view, the need for outbound transmission to numerous TDM termination points and for the operation of TDM infrastructure arises in interconnection of any network with TDM networks generally, and is not specific to interconnection of NGNs and TDM networks.

introduction of new technology should cause the price of existing services (in this case termination) to rise. In our view, this principle is more important than the uncertain effect on the migration path which we might achieve by determining an apportionment of conversion costs between IP and TDM networks. We therefore consider that the IP operator should seek to recover the costs of such conversion within its termination charge, and presume that the NGN operator should charge no more than the Benchmark FTR, unless it can demonstrate using the three-stage test that it would be fair and reasonable for it to charge a higher rate.

1.14 We recognise that the efficient path of migration is a complex issue. Amongst a wide range of factors, the relevant considerations include the effects of one operator's choices on other operators as well as itself. For example, those that migrate from TDM to NGN may save conversion and interworking costs for NGN operators, but will introduce conversion costs for interconnection with parties which have not migrated and may incur other interworking costs in interconnecting with such parties.

1.15 We note that NGN operators could consider commercially whether to set charges for IP termination on their networks at a level lower than the Benchmark FTR in order to signal to TDM networks, in considering their migration plans, to take into account opportunities for reducing interworking costs.

1.16 In relation to BT's investment incentives to migrate to NGN, we considered the impact of using a hypothetical ongoing (TDM) network approach in our 2009 Network Charge Controls Statement[15]. In it we concluded that if the investment in NGN is overall likely to be profitable to BT, compared to delivering the same services on its existing network, then BT will be incentivised to make the investment. If, in our next review of the wholesale narrowband markets we consider a wholesale charge control on BT's FTR remains an appropriate remedy, we will consider the basis of such a control afresh. If we were then to decide that a new technology is sufficiently established to replace TDM as the modern equivalent asset on which to base the charge control, it may then no longer be appropriate for IP networks to ordinarily bear the costs of protocol conversion. TDM networks may then be required to offer IP termination for a charge ordinarily no higher than the Benchmark FTR.

1.17 We further conclude that it is appropriate for our guidance to take into account a reasonable transition period required by some or all CPs to make adjustments to their businesses. The substantive reason for providing for any transition period is one of fairness to CPs, some of whom would lose out (having had their previous arrangements legitimately incentivised by the expired Reciprocity Agreement) in higher termination out-payments to BT if we did not provide for a period of adjustment. Consumer benefits would be affected by our decision on a transition period to the extent that any such period would delay the potential benefits to them of lower wholesale termination charges being passed on through reduced retail prices. Consumers could also be affected adversely if too short a transition period gave rise to disruption in the industry, however the risk of this is difficult to substantiate. Therefore, in deciding what transition period is appropriate we need to balance the need to be fair on CPs on the one hand with the delay in delivering consumer benefits on the other.

1.18 Stakeholders generally supported our proposed approach of a common transition period across the industry but had very different views on the appropriate duration of

[15] See paragraph 4.20 of the statement *Review of BT's Network Charge Controls* of 15 September 2009 at http://stakeholders.ofcom.org.uk/binaries/consultations/review_bt_ncc/statement/nccstatement.pdf

a reasonable adjustment period. Having reviewed stakeholders' submissions, we have decided in favour of our preferred option in the September 2010 Consultation, a transition period now of around 17 months ending 1 October 2012 (aligning with the start of the BT charge control year). We consider that this will provide a reasonable period of time for CPs to make any adjustments to their interconnection arrangements (including, for example, commercial negotiations, installation of new physical circuits and re-routing traffic) to take account of our guidance, and to reflect the impact of the changes in their business plans more generally. We urge CPs who believe that it would be fair and reasonable for them to charge a higher rate than the Benchmark FTR to set out their reasoning before 1 April 2012 so that originating CPs have a reasonable opportunity to assess whether they consider the higher rate to be fair and reasonable and, where relevant, for us to consider any disputes in accordance with statutory timescales.

1.19 In the interim, and as we provisionally set out in the September 2010 Consultation, we consider that, unless a party's circumstances have materially changed since the expiry of the last Reciprocity Agreement, it is unlikely to be fair and reasonable to charge for fixed call termination at higher prices or on terms and conditions that are less favourable for purchasers of termination than those provided for under the expired Reciprocity Agreement.

1.20 Our final guidance on fair and reasonable FTRs is set out at Section 6.

Section 2

Introduction

2.1 In this section we summarise the background, scope and objectives which provide context to our consideration of fixed termination rates ("FTRs"). Sections 2 and 3 of our consultation document published on 16 September 2010 ("the September 2010 Consultation")[16] cover these areas in further detail.

2.2 Later in this section we also summarise the proposals and provisional conclusions set out in our September 2010 Consultation.

Background

2.3 The UK has a convention whereby the calling party pays the total retail price for calls to fixed geographic telephone numbers[17].

2.4 When a customer of a fixed or mobile communications provider ("CP") calls a UK geographic telephone number, the calling customer's CP pays the called customer's CP a wholesale termination charge for completing the call. This charge is part of the cost base of calls to geographic numbers. Increasing the wholesale termination charge may therefore lead to higher retail call prices. However, the called party does not contribute to the cost of terminating calls so it is unlikely that a customer choosing a particular network provider will consider different providers' wholesale termination charges when making that choice.

2.5 The called customer's CP may therefore have an incentive to raise its wholesale termination charge to maximise profitability. Since this may cause its rivals to have to increase their retail prices to their customers, there is a further incentive to increase wholesale termination charges to gain a competitive advantage in the retail market.

2.6 We estimate that the aggregate gross annual wholesale revenue from fixed geographic call termination of the larger fixed CPs (excluding British Telecommunications plc ("BT")) is approximately £60m[18]. In comparison, annual retail geographic call revenues for fixed CPs other than BT are around £648m[19].

Market review

2.7 In our most recent review of fixed geographic call termination, part of our review of wholesale fixed narrowband markets in September 2009 ("the 2009 WNMR")[20], we

[16] Published at http://stakeholders.ofcom.org.uk/binaries/consultations/778516/summary/condoc.pdf
[17] Unless the calling party accepts responsibility for payment e.g. reverse charge calls.
[18] Source: Ofcom, based on information about CPs' 2009 geographic call termination revenues gathered under formal powers.
[19] Source: Ofcom, UK Communications Market 2009, Telecoms market data tables – see http://stakeholders.ofcom.org.uk/binaries/research/cmr/q1_2010.pdf
[20] In accordance with the EU common regulatory framework for electronic communications networks and services, we carry out periodic market reviews to assess competition. The findings of our most recent review of wholesale fixed geographic call termination markets were set out in a statement on the markets, market power and remedies including further consultation called *Review of the fixed narrowband services wholesale markets* of 15 September 2009 ("the 2009 WNMR") at http://stakeholders.ofcom.org.uk/binaries/consultations/wnmr_statement_consultation/summary/main.pdf

imposed regulatory obligations to address the adverse effects that could arise from CPs exercising Significant Market Power ("SMP") in call termination. We concluded that the definition of the market is:

> "Wholesale fixed geographic call termination on each individual network. Call termination in this context includes the conveyance of all signals (including relevant control signals) required to terminate calls on a customer's exchange line from the first point in the network where those signals can be accessed by another communications provider."

2.8 For the reasons set out in the 2009 WNMR, we have found that each CP has SMP in fixed geographic call termination on its network.

2.9 The review set out our conclusions on remedies for CPs other than BT and imposed SMP Condition BC1[21]:

> **"Condition BC1 – Requirement to provide Network Access on reasonable request**
>
> BC1.1 Where a Third Party reasonably requests in writing Network Access, the Dominant Provider shall provide that Network Access. The Dominant Provider shall also provide Network Access as Ofcom may from time to time direct.
>
> BC1.2 The provision of Network Access in accordance with paragraph BC1.1 shall occur as soon as reasonably practicable and shall be provided on fair and reasonable terms, conditions and charges and on such terms, conditions and charges as Ofcom may from time to time direct.
>
> BC1.3 The Dominant Provider shall comply with any direction Ofcom may make from time to time under this Condition."

2.10 In reaching this decision, we referred to the 2003 Market Review[22] carried out by Oftel which, whilst not mandating reciprocal charging, took the view that charges that were not based on BT's charges were unlikely to be 'fair and reasonable', as BT's network costs are taken as a proxy for an efficient network. We said that we continue to be of the view that this interpretation of 'fair and reasonable' taking into account network topology and technology differences remains relevant as BT's charges are likely to be close to the costs of an efficient network.

[21] Ofcom published a Statement on 5 February 2010 at http://stakeholders.ofcom.org.uk/binaries/consultations/wnmr_statement_consultation/statement/statement.pdf which imposed SMP Condition BC2 requiring all CPs to also publish their fixed geographic call termination rates on their respective websites.

[22] *Review of fixed geographic call termination* published 28 November 2003 at http://stakeholders.ofcom.org.uk/binaries/consultations/wnmr_statement_consultation/statement/statement.pdf

Reciprocal charging and the Reciprocity Agreement

2.11 Oftel set out the rationale for reciprocal charging in 1997[23]. Because of the characteristics of call termination explained above, Oftel concluded that the distortion that may arise from CPs' setting excessive FTRs can be removed if the charges for call termination on other CPs' networks are based on the charges for call termination on BT's network.

2.12 Oftel observed that reciprocal charging could mean that the charges between CPs for call termination should be the same so that competitive neutrality is achieved. However, it argued that differing topologies of networks were relevant. Since other CPs' switches tended to have larger catchment areas than BT's local switches, Oftel viewed call termination on other CPs' networks as corresponding to two interconnection services on BT's network – local exchange segment ("LES") and single tandem segment ("ST"). Oftel concluded that other CPs' FTRs should therefore be a mix of BT's charges for these two services and that it was a matter for BT and other CPs to negotiate and agree an approach to set other CPs' FTRs.

2.13 The industry adopted an approach which used the split of a CP's outbound traffic between BT's local and tandem switches as a proxy for the proportions of that CP's (inbound) termination service which corresponded to BT's LES and ST services. The approach set a specific rate for each CP by computing a blend of LES and ST rates based on the proportion of outbound traffic sent to BT's local and tandem switches. This mechanism was defined by an algebraic formula in an agreement known as the 'Reciprocity Agreement' which was re-negotiated every four years in line with BT's Network Charge Controls ("NCC").

2.14 Since 2005, the Reciprocity Agreement distinguished between single-switched calls (those calls handed over to the terminating network at the switch serving the called subscriber and calculated as described above) and multi-switched calls (those calls handed over to the terminating network at a different switch and requiring some additional switching and conveyance over and above call termination). This allowed CPs to charge a higher rate, if they received sufficient geographic call traffic from BT at their higher level switch, calculated using a weighted average of the single-switched rate and BT's inter-tandem conveyance charge, Double Tandem (short).

2.15 The most recent Reciprocity Agreement[24] expired on 30 September 2009. Since then, negotiations between BT and CPs have failed to identify a way forward because of a range of diverging views about how the principle of reciprocal charging should be applied in practice. Some CPs were concerned that the linkage between a CP's FTR and how it configures its interconnection with BT for its own outbound traffic undermined incentives in making efficient "build or buy" decisions. Some CPs were also concerned that this linkage gives rise to a distortion in transit markets. There were also concerns that the arrangements under the expired Reciprocity Agreement were susceptible to gaming and/or that they were prone to disputes.

[23] Oftel statement called *Network Charges from 1997* published in July 1997 at http://www.ofcom.org.uk/static/archive/oftel/publications/1995_98/pricing/nccjul97.htm. See Annex C entitled *Oftel's approach to the reciprocal charges for call termination on OLO networks.*

[24] The expired Reciprocity Agreement can be found on the BT Wholesale Carrier Price List at http://www.btwholesale.com/pages/static/service_and_support/service_support_hub/online_pricing_hub/cpl_hub/cpl_pricing_hub/reciptory_offer.html

Interconnection between NGNs and TDM networks

2.16 Our consideration of fair and reasonable FTRs raises broader questions about Ofcom's policy in relation to the interconnection of voice services between Next Generation Networks ("NGNs") and Time Division Multiplexing ("TDM") networks. Given BT's decision, made some time ago, to step back from its plans to migrate voice services onto its NGN (known as 21CN), and the ongoing use of TDM networks by a number of other CPs, such interconnection is likely to be an important feature of competition between fixed networks for an uncertain but potentially considerable period of time.

2.17 Stakeholders' views on the policy positions that we should take vary widely. Some would prefer that we do not intervene and leave operators to reach agreement over interconnection arrangements through commercial negotiation. Others argue that such negotiations are unlikely to reach agreement without our intervention and that regulatory guidance is required. In particular, some stakeholders view NGNs as the efficient technology choice and argue that regulation should incentivise (or at least should not act to disincentivise) TDM operators to migrate more quickly to NGNs – whether by requiring TDM operators to bear some of the costs of interworking the two types of network or by requiring them to provide IP interconnection into their networks on terms which mimic their having migrated to NGNs.

2.18 In considering these questions, we have been mindful of our principal policy objectives in relation to NGNs. We set these out in our statement on Next Generation Networks in January 2010 ("the January 2010 Statement on NGNs")[25]. They are:

- to provide incentives for efficient investment in NGNs;
- to promote effective competition based on NGN infrastructure; and
- to protect consumers from disruption during the transition to NGNs.

2.19 Whilst we consider that interconnected NGNs are likely to be the most efficient *ultimate* outcome, at this stage we have not determined the complex questions of either the industry's optimal migration path to that outcome or its timing. In the meantime, we consider that either TDM or NGN could be efficient ways for different CPs to provide fixed-line voice services. While NGN may be the efficient technology choice for a new entrant, it may at the same time be efficient for the operator of a TDM network to migrate to NGN over an extended timescale.

2.20 Our approach so far in addressing the potential wider benefits of the industry's migration to NGN technology has been to facilitate improved co-ordination between industry participants (such as the NGNuk forum). We have taken this approach because we are mindful of the risk that more direct intervention might over-engineer the specifics of that transition and lead to inefficient migration, whether too fast or too slow. However, we do not discount the possibility that more direct intervention may be appropriate. The next review of fixed narrowband service wholesale markets and any associated NCC in 2013 will provide an appropriate opportunity to consider, amongst other things, our broad approach to incentivising efficient migration to NGNs.

[25] A statement called *Next Generation Networks: Responding to recent developments to protect consumers, promote competition and secure efficient investment* published 28 January 2010 at http://stakeholders.ofcom.org.uk/binaries/consultations/ngndevelopments/statement/ngn_statement.pdf

2.21 In this Statement we are concerned with guidance on fair and reasonable FTRs for BT's competitors in the context of our findings and decisions of the 2009 WNMR. In proposing symmetry with the Benchmark FTR (derived from the hypothetical ongoing network model used for the 2009 NCC), we note our conclusion in the 2009 NCC[26] on the impact on investment incentives of this approach as opposed to that based on using an NGN model. We took the view that, if the investment in an NGN is overall likely to be profitable for BT compared to delivering the same services on its existing network, then BT will always be incentivised to make the investment.

Purpose and scope

2.22 Following our conclusions on FTRs set out in the 2009 WNMR and in the subsequent knowledge of industry's failed efforts to negotiate a new Reciprocity Agreement, we recognised that fixed CPs may find it difficult to reach satisfactory agreement on future FTRs by commercial agreement alone. The resulting uncertainty could be disruptive to the industry and result in a number of disputes between CPs. We therefore signalled in our January 2010 Statement on NGNs[27] (and confirmed in our Annual Plan 2010/11[28]) that we would provide guidance to clarify our interpretation of the 'fair and reasonable' obligation in the termination markets for voice calls to geographic numbers hosted on different networks.

2.23 Our aim is therefore to issue guidance on how we would normally interpret 'fair and reasonable' charges in accordance with SMP Condition BC1 in order to assist CPs other than BT in setting their FTRs in the future.

2.24 The purpose of our guidance is:

- to settle current uncertainty about FTRs;
- to facilitate the resolution of any disputes; and
- as far as possible, to avoid unnecessary disputes.

2.25 While our guidance sets out the presumptions on which we would consider FTRs to be fair and reasonable, we would nevertheless consider any dispute about a particular CP's rates on a case-by-case basis, taking into account the specific circumstances of the case. It may be appropriate for us to depart from this guidance in resolving such disputes where circumstances warrant doing so. However, we would normally expect to have regard to this guidance when resolving a dispute.

2.26 The scope of our guidance is the termination of calls to geographic numbers. It is confined to guidance on SMP Condition BC1, which requires that charges for call termination services in the UK should be fair and reasonable. It should be noted that our guidance specifically excludes call termination in the Hull area. KCOM has additional regulatory obligations in the Hull area in setting its FTRs. In addition to the

[26] See paragraph 4.20 of the statement called *Review of BT's Network Charge Controls: Explanatory Statement and Notification of decisions on charge controls in wholesale narrowband markets* published 15 September 2009 at http://stakeholders.ofcom.org.uk/binaries/consultations/review_bt_ncc/statement/nccstatement.pdf

[27] See paragraph 1.21 of the January 2010 Statement on NGNs at http://stakeholders.ofcom.org.uk/binaries/consultations/ngndevelopments/statement/ngn_statement.pdf

[28] See paragraph A1.41 of a Statement published on 31 March 2010 called *Annual Plan 2010/11* at http://www.ofcom.org.uk/files/2010/06/annplan1011.pdf

obligation that they be fair and reasonable its charges must also be cost-orientated. We set out our reasons for this exclusion further in Section 5 with regard stakeholder responses to our September 2010 Consultation.

2.27 The guidance applies to call termination as defined in the 2009 WNMR. It does not apply to services which fall outside the defined geographic call termination market that a fixed network may provide in switching and conveying calls from other networks to its customers (such as wholesale transit services).

Policy objectives

General regulatory objectives

2.28 Our principal duty in carrying out our functions is to further the interests of citizens in relation to communications matters and to further the interests of consumers in relevant markets, where appropriate by promoting competition.

2.29 In doing so, we are required to secure a number of specific objectives and have regard to a number of matters, as set out in section 3 of the Communications Act 2003 ("the Act"). We consider the objective of securing availability throughout the UK of a wide range of electronic communications services as particularly relevant to our work.

2.30 Section 4 of the Act requires us to act in accordance with the six European Community requirements for regulation. The following requirements are particularly relevant to this Statement:

i) s4(3) to promote competition in the provision of electronic communications networks and services, associated facilities and the supply of directories;

ii) s4(6) to take account of the desirability of Ofcom in carrying out its functions in a manner which, so far as practicable, does not favour one form of or means of providing electronic communications networks, services or associated facilities over another;

iii) s4(7)(8) to encourage, to such extent as Ofcom considers appropriate for certain prescribed purposes, the provision of network access and service interoperability, namely securing efficient and sustainable competition and the maximum benefit for customers of communications providers.

2.31 Section 4(11) provides that where it appears to us that any of the above Community requirements conflict with each other, we must secure that the conflict is resolved in the manner we think best in the circumstances.

EC Recommendation

2.32 We must also take utmost account of recommendations from the European Commission (EC). Relevant to this matter is the EC's Recommendation on the regulatory treatment of fixed and mobile termination rates in the EU (2009/396/EC) (the "EC Recommendation") which, amongst other things, states that termination rates should be set at a level of costs incurred by an efficient operator and should normally be symmetric (i.e. set at a uniform level across providers) with any deviation

being based on objective cost differences outside the control of the operators concerned[29].

Impact assessment

2.33 Section 7 of the Act requires that we generally have to carry out impact assessments where our proposals would be likely to have a significant effect on businesses or the general public, or where there is a major change in our activities. As a matter of policy we are committed to carrying out and publishing impact assessments in relation to the majority of our decisions.

2.34 The analysis presented in the September 2010 Consultation and in this Statement represents an impact assessment as defined in section 7 of the Act.

Equality impact assessment

2.35 We are also required to assess the functions, policies, projects and practices on Equality groups such as age, race, religion, disability, maternity, gender equality and sexual orientation. Equality Impact Assessments ("EIAs") also assist us in making sure that we are meeting our principal duty of furthering the interests of citizens and consumers.

2.36 We do not consider the impact of the guidance set out in this Statement to be to the detriment of any group within society; in particular, we do not consider that our guidance will have a differential impact on consumers in different parts of the UK or consumers with low incomes. This is because our guidance will primarily affect wholesale markets and we do not believe that it will have a different impact in relation to people of different Equality groups or consumers in Northern Ireland compared to consumers in general.

Regulatory principles

2.37 We must also have regard to the principles under which regulatory activities should be transparent, accountable, proportionate, consistent, and targeted only at cases in which action is needed, as well as acting in the interests of consumers in respect of choice, price, quality of service and value for money.

September 2010 Consultation

2.38 Taking all the above into account and having consulted informally with stakeholders, we published a Consultation Document on 16 September 2010 ("the September 2010 Consultation")[30].

General application of reciprocal charging

2.39 In the September 2010 Consultation we set out three options for the general application of reciprocal charging. They were:

[29] See paragraphs 1 and 9 of the *Commission Recommendation of 7 May 2009 on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU (2009/396/EC)* which is published in the Official Journal of the European Union, 20.5.2009, L 124, pages 67-74 at http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:124:0067:0074:EN:PDF

[30] Published at http://stakeholders.ofcom.org.uk/binaries/consultations/778516/summary/condoc.pdf

- Option 1: Continue with individual FTRs for each CP calculated on the same basis as the expired Reciprocity Agreement where each CP receives a rate which is a mix of BT LE and ST rates, determined by the proportions of its outbound traffic to BT's tandem and local switches.

- Option 2: Set the FTR of all CPs based on an industry-averaged blend of BT LE and ST rates determined on the industry's total geographic call traffic to BT's tandem and local switches.

- Option 3: Set all FTRs equal to BT's termination rate (currently LE).

2.40 Our provisional assessment favoured Option 3 which would mean that all fixed CPs would ordinarily receive, for the provision of call termination on their networks, the same FTR as BT (currently the LE rate) irrespective of scale, network topology or technology. This was because we considered that:

- Consistent with our policy objectives, Option 3 would create strong incentives for CPs to minimise costs and would avoid potential distortions that resulted from the expired Reciprocity Agreement in the "build or buy" decisions faced by CPs (including the choice to use transit providers);

- It is consistent with the EC Recommendation;

- With regard to our principal duty to further the interests of consumers, it is likely to be the most favourable to consumers, in particular to those who call geographic numbers; and

- It is simpler to apply than Options 1 and 2, and removes the possibility that CPs' FTRs can be inflated based on decisions made in relation to the routing of traffic to BT (that is, it is not prone to the potential for gaming inherent in the expired Reciprocity Agreement highlighted by a number of CPs).

2.41 We also proposed and sought views on a framework for assessing claims from CPs for higher FTRs based on the consideration of actual and efficiently incurred costs and the delivery of demonstrable consumer benefits[31]. We referred to this as the 'three-stage test'.

Issues regarding interconnection between an NGN and a TDM network

2.42 We proposed that our preferred approach, in which all FTRs should ordinarily be the same or no higher than BT's LE rate, should also apply to NGNs. Further, we proposed that NGNs should not be able to charge more for call termination to recover the costs they incur in interworking with TDM networks (unless they met the proposed three-stage test referred to in paragraph 2.41 above). NGN operators used the collective term "interworking costs" to describe the functions required where NGNs and TDM networks interconnect, including:

- Outbound transmission – sending traffic to hundreds of local switches in BT's network;

- Protocol conversion – converting traffic from TDM to IP on ingress to NGNs and from IP to TDM on egress;

[31] See paragraphs 5.42 to 5.48 of the September 2010 Consultation.

- TDM operation – operating TDM infrastructure (such as an SDH[32] network for example) for the sole purpose of interconnection with TDM networks.

2.43 We assessed how the costs of protocol conversion (on which we produced high-level analysis which suggested that such costs were unlikely to be material[33]) should be recovered, using the six principles of pricing and cost recovery (which were developed by Oftel in the context of number portability, endorsed by the Monopolies and Mergers Commission[34], and have subsequently been used by Ofcom in analysing various pricing issues[35]). Our assessment pointed to the particular importance in this case of the principles of cost minimisation, effective competition and distribution of benefits[36], and led us to propose that we should not allow terminating networks an uplift to the LE rate in order to recover conversion costs. We provisionally concluded that:

- We would expect firms to invest in NGNs only if their relevant unit costs, including interworking and conversion costs, were lower than the corresponding costs of TDM networks. Data gathered from operators indicated that this was likely to be the case. The application of the presumption that a fair and reasonable FTR for NGNs should ordinarily be the same as for TDM operators would therefore be unlikely to deny NGN operators the ability to compete effectively insofar as IP technology offers genuine cost savings and other benefits.

- Consumers should, in any case, not be expected to pay more for making calls to a network which uses a more efficient technology to deliver the same service.

- Under our proposed guidance, the three-stage test would apply in cases where operators of NGNs might claim that higher FTRs would be fair and reasonable.

2.44 In relation to other interworking costs - of operating TDM infrastructure and providing outbound transmission to BT's TDM network - we provisionally concluded that it was not appropriate to seek to adjust the FTRs of NGNs to compensate for the fact that BT has not rolled out its NGN. The need to extend networks to BT's local layer in order to secure the lowest out-payments to BT is the same irrespective of the technology choice of originating operators.

2.45 We also considered the provision of IP interconnection on TDM networks (i.e. where the conversion from IP to TDM is undertaken by the terminating TDM network), in

[32] Synchronous Digital Hierarchy ("SDH") is a method of digital transmission. One of its key features is that its transmission streams are packed in such a way as to allow simple multiplexing and de-multiplexing, and the addition or removal of individual streams from larger assemblies. SDH is a TDM based technology that requires very accurate timing across the network.
[33] See paragraphs 5.119 to 5.123 of the September 2010 Consultation.
[34] *Telephone Number Portability: A Report on a reference under s13 of the Telecommunications Act 1984* (MMC, 1995).
[35] See, for example, *Determination under Section 190 of the Communications Act and Direction under Regulation 6(6) of the Telecommunications (Interconnection) Regulations 1997 for resolving a dispute between Orange Personal Communications Services Ltd. and BT concerning the cost sharing arrangements for CSI links connection and rental charges*, 19 November 2003. See also *Direction concerning ADSL Broadband Access Migration Services* and a *Draft Determination to resolve a dispute between Tiscali, Thus and BT concerning ADSL Broadband Access Migration Services*, both 9 August 2004; *Determination to resolve a dispute between BT and Telewest about geographic call termination reciprocity agreement*, June 2006; *Dispute between C&W and T-Mobile about mobile termination*, May 2009; and *Determination to resolve a dispute between Stour Marine and O2 about termination rates*, June 2010.
[36] See paragraph 5.136 of the September 2010 Consultation.

particular, by BT. Insofar as such a service could be characterised as part of the termination market, we provisionally concluded whilst our guidance on fair and reasonable FTRs would be applicable, the LE rate may not be sufficient to recover both the costs of conversion and TDM termination. For these reasons, we provisionally considered the three-stage test could be appropriate in determining a fair and reasonable FTR for such a service.

Transitional issues

2.46 We also sought views on options for minimising disruption to CPs if we did conclude that our guidance should be that rates should be presumed to be fair and reasonable if they were symmetric with BT's LE rate. In particular, we considered whether it would be reasonable to take into account, in interpreting what is fair and reasonable, an appropriate period required by some or all CPs to make adjustments to their businesses in order to minimise transition costs and disruption to investment plans.

2.47 We considered the following options in relation to transition:

- Option 1: A straight switch to symmetric FTRs for all CPs from the date we publish our final guidance.
- Option 2: A straight switch to symmetric FTRs for all CPs at the end of the current NCC period (30 September 2013) - a period of adjustment then of around 32 months.
- Option 3: A straight switch to symmetric FTRs for all CPs following an adjustment period of 12 to 18 months. We further proposed that there may be merit in aligning the adjustment period with the start of the BT charge control year on 1 October 2012 (an adjustment period, at the time, of around 20 months).

2.48 We provisionally favoured Option 3.

2.49 We also consulted on other related issues, namely:

- the application of the definition of termination in the 2009 WNMR which refers to the first point where the required signals can be accessed by a CP in today's environment of differing fixed network technologies;
- the mapping of termination points; and
- routing constraints in some networks.

Consultation responses

2.50 We received ten responses to our September 2010 Consultation. These were from:

- British Telecommunications plc ("BT")
- British Sky Broadcasting Group PLC ("Sky")
- Cable & Wireless Worldwide ("C&W")
- Colt Technology Services ("Colt")
- Internet Telephony Services Providers' Association Ltd ("ITSPA")

- Magrathea Telecommunications Limited ("Magrathea")
- Talk Talk Group ("TTG")
- Verizon Business ("Verizon")
- Confidential responses from [✂] and [✂].

2.51 We also received letters from TTG on 17 February 2011, and from [✂] on 27 March 2011, which we have taken into account.

2.52 Non-confidential responses are published on Ofcom's website[37].

Clarification of terminology

2.53 In the September 2010 Consultation, we referred to the rate charged by BT for termination at its local exchanges as local exchange segment ("LES"). The BT Wholesale Carrier Price List ("CPL") and the expired Reciprocity Agreement refer to Call Termination Local Exchange ("LE")[38] rate, of which BT call termination local exchange segment is a component part as detailed in the CPL under Network Charge Control - Network Services[39]. LE also includes a charge for Product Management, Policy and Planning ("PPP") also detailed in the CPL under Network Charge Control - Network Services.

2.54 For the avoidance of doubt, references to LES or BT's call termination rate in the September 2010 Consultation means LE which is equal to LES + PPP.

2.55 Hereafter in this document we refer to BT's current call termination rate as "LE" (as described in the previous paragraph) and, in the context of our guidance on fair and reasonable FTRs of BT's competitors in compliance with SMP Condition BC1, refer to BT's call termination rate as "the Benchmark FTR".

Structure of this Statement and final guidance

2.56 The remainder of this Statement is structured as follows:

- Section 3 discusses stakeholders' responses to our proposals regarding the general application of reciprocal charging, our final decisions and reasoning;
- Section 4 discusses stakeholders' responses to the issues around NGN and TDM interconnection, our final decisions and reasoning;
- Section 5 discusses stakeholders' responses to other related issues such as transitional arrangements and routing constraints, our final decisions and reasoning; and

[37] See http://stakeholders.ofcom.org.uk/consultations/fair-reasonable-charges/?showResponses=true
[38] See BT Wholesale CPL, Section B1 Telephony, 1.01 Bt Telephony Calls to the BT System http://www.btwholesale.com/pages/cmsjsps/service_and_support/service_support_hub/online_pricing_hub/cpl_hub/cpl_pricing_hub/cpl_browsable_sections/cpl_browsable_sectionb_1.jsp
[39] See BT Wholesale CPL, Section C Network Charge Control – Network Services at http://www.btwholesale.com/pages/cmsjsps/service_and_support/service_support_hub/online_pricing_hub/cpl_hub/cpl_pricing_hub/cpl_browsable_sections/cpl_browsable_sectionb_c.jsp

- Section 6 details our final guidance on fair and reasonable charges for fixed geographic call termination services.

Section 3

General application of reciprocal charging

Introduction

3.1 In this section we discuss our approach to the general application of reciprocal charging. In particular we focus on the following issues raised in response to our proposals in the September 2010 Consultation.

- Justification for change and legitimate expectations;
- Differences in network topology;
- Impacts of sending traffic to numerous termination nodes;
- Impacts on Local-to-Tandem Conveyance ("LTC") and Local-to-Tandem Transit ("LTT") markets; and
- The three-stage test.

3.2 We discuss each of these below, setting out our proposal in the September 2010 Consultation, respondents' views and our final position.

Justification for change and legitimate expectations

3.3 In Section 2 of the September 2010 Consultation, we provided a detailed account of the background to FTRs including relevant market reviews, the history surrounding reciprocal charging and industry's Reciprocity Agreements and the decisions we had taken in determining several relevant termination rate disputes (summarised at Annex 6 of the September 2010 Consultation).

3.4 In Section 3 of the September 2010 Consultation we explained in detail why we are now providing guidance on fair and reasonable charges for fixed termination, the scope of our considerations and the statutory duties, policy objectives and regulatory principles relevant to our consideration of these issues.

3.5 Our proposed guidance would result in departures from the previous arrangements in several key respects:

- It would remove the linkage between the FTRs a CP can charge for terminating calls on its network and the locations at which that CP delivers its outbound geographic call traffic to BT for termination;
- It would generally reduce FTRs; and
- It would generally result in a range of reductions in termination revenues for different CPs which may be summarised as follows[40]:

[40] A more detailed assessment of financial impacts is set out in paragraphs 5.49 to 5.62 of the September 2010 Consultation.

- Large CPs interconnected at BT's local switches – the net revenue impact is likely to be small and potentially marginally positive.

- Large CPs sending outbound traffic to BT's tandem switches – the net negative revenue impact is likely to be the most significant (although small in relation to total revenues).

- Small CPs – the net revenue impact is likely to be negative. Since their volumes are lower than those of large CPs, they may see a lower absolute decrease in revenues from inbound calls although this may not mitigate the proportional impact.

Respondents' views

3.6 BT believed that it is essential that there is a consistent method for determining fixed geographic rates in the wholesale market. It strongly supported our initiative to produce definitive guidelines given that industry was unable to achieve consensus.

3.7 BT further considered that 13 years of reciprocity agreements had given CPs sufficient time to achieve efficient termination cost levels reflected in BT's LE rate. In its view, asymmetry is no longer justified in a mature market, and therefore BT supported the setting of all fixed geographic termination rates equal to BT's termination rate.

3.8 BT stressed that "doing nothing" is not a viable solution. The lack of guidance and absence of agreements on a common basis across the industry will result in CPs seeking termination rates that simply best suit them. This would inevitably drive disputes and tend towards higher termination rates to the detriment of the consumer. BT added that our guidelines must adopt only one of the three options and that it should be adopted universally by all CPs across industry. Applying more than one option would lead to further disputes over which option should be used.

3.9 C&W believed our intervention to consult on guidelines over the level of future geographic termination rates to be a sensible use of resources and one which will save time and effort for the industry and Ofcom in reducing the number of disputes that would likely arise in the absence of guidelines. It believed the recently expired Reciprocity Agreement was significantly flawed resulting in CPs adopting illogical routing choices in an effort to 'game' the regime to maximise their own economic benefit. C&W considered that this arrangement can no longer continue and CPs should adopt sensible routing choices and be free to route traffic to other providers (including transit providers) without consequences for their own termination rates, which should have no relationship with call origination choices.

3.10 Verizon, [✂] and Colt all welcomed the consultation on FTRs and sought changes in the way their FTRs are determined from that set out in the expired Reciprocity Agreement.

3.11 Magrathea and ITSPA argued that CPs should be able to levy termination rates closer to BT's ST rates until BT offers an IP interconnect product at fewer points of interconnect at which CPs could obtain the LE termination rate (or slightly uplifted to cover interworking costs).

3.12 [✂], Sky and TTG argued that we have failed to produce adequate justification for changing the long-standing policy which led to CPs receiving a mix of BT's LE and

ST rates and that, in proposing to do so, we are breaking with the principles of regulatory certainty and legitimate expectations.

3.13 Sky observed that the combination of Ofcom's decisions upholding the reciprocity regime allied to the industry's shared view of optimal interconnection to BT's proposed new network at up to 27 points of service interconnection nationally, led it to build its network with the legitimate expectation that its design (in particular, interconnecting with BT's TDM network at the tandem layer rather than extending its network to BT's local layer) was efficient, future proof and underpinned by regulatory certainty. Sky believed that in breaking with the principles of regulatory certainty and consistency, Ofcom's actions would deter future investment and market entry.

3.14 Sky further argued that there has been no dramatic change in market conditions or evidence of consumer harm which warrants such a sudden reversal of policy of the type proposed. It believed that Ofcom should be sure that the preferred approach is materially better, that it does not discriminate between CPs and that the economic costs are outweighed by the benefits. In this case, Sky asserted that the new guidance would simply reward BT (and possibly a sub-set of CPs who are already interconnected at BT's local layer using legacy technology) without these CPs having to make any changes to their networks. BT would simply pay less to CPs interconnected at its tandem layer when the guidance takes effect.

3.15 Whilst [✂] agreed that our review is timely in light of the expiry of the Reciprocity Agreement, the emergence of IP-based networks and the prospect of disputes, it did not consider that radical reform is required or justified.

3.16 [✂] argued that given the substantial legacy surrounding the regime for fixed geographic call termination, around which CPs have invested time, resource and money tailoring their interconnection arrangements, any fundamental change risks disruption and unintended consequences. [✂] believed that we have not taken sufficient account of the impact of Option 3 and that our approach is at odds with our enduring support for the principles setting FTRs that have applied to date. [✂] made arguments supporting its assertions relating to the 2009 WNMR, the EC Recommendation, consumer impact and disputes. We discuss these specific comments in more detail below.

3.17 TTG maintained that, since 1997, BT and the industry had been in agreement over the formula for determining reciprocal FTRs until the Reciprocity Agreement expired on 30 September 2009. The formula, which resulted in CPs' termination rates set between BT's LE and ST rates, was agreed between the parties to result in fair and reasonable FTRs which both BT and operators were prepared to pay. TTG argued that Ofcom is now saying that this formula does not result in fair and reasonable FTRs. TTG did not understand why Ofcom feels that it is appropriate to "go against industry consensus". TTG further argued that a reciprocal termination rate should mean that a CP should receive the same rate as it pays to BT and that our proposal does not achieve this since no CP achieves LE rate on all calls that it sends to BT for termination on its network.

2009 WNMR

3.18 [✂] argued that Ofcom supported the existing application of reciprocity in its 2009 WNMR, in particular that differences in networks should be taken into account. Whilst it did not dispute the need to consider how differences in networks should be taken into account, particularly as CPs migrate to NGNs, [✂] did not believe that the rate of

such migration has been sufficiently material to warrant altering our approach to reciprocity so fundamentally.

3.19 [✂] further argued that it was reasonable to infer from the 2009 WNMR that the approach to reciprocity would prevail for the forward-looking period of the review and that changing our view now would be disruptive and could distort the market.

EC Recommendation

3.20 Whilst recognising the need for Ofcom to take the utmost account of Recommendations made by the EC, [✂] noted that they are not binding. [✂] considered that specific national circumstances within the UK provide an objective justification to deviate from the EC Recommendation and believed that the EC Recommendation anticipates a greater prevalence of NGN deployment than is the case in the UK. In summary [✂] made the following points in support of its assertion:

- Since the publication of the EC Recommendation on 7 May 2009, Ofcom had determined a number of disputes and made a number of policy decisions and Directions, on a forward looking basis, that are not fully consistent with it. In particular, in the 2009 WNMR, Ofcom chose not to impose specific cost orientation and non-discrimination obligations on CPs.

- That the 2009 WNMR definition of fixed call termination is not entirely consistent with the corresponding definition in the EC Recommendation on Relevant Product and Service Markets within the Electronic Communications Sector Susceptible to Ex Ante Regulation.

- Ofcom's decision to benchmark termination rates on BT's termination rate uses a cost model based on the costs of a hypothetical ongoing TDM network, not those of an NGN, contrary to the EC Recommendation.

- That the submission by Ofcom and BERR[41] to the consultation on the EC Recommendation argued against some of the principles that the EC advocated. In particular, [✂] points out Ofcom's comments about the dangers of redistributing the burden of cost recovery away from callers toward call recipients and disrupting a charge control mid-term.

- [✂] disagreed with the EC Recommendation's assertion that no objective cost differences outside the control of fixed operators had been identified. Whilst [✂] did not dispute in principle that CPs will directly connect customers (and hence provide termination services) where this is more profitable than buying wholesale inputs from the incumbent, it argued that this was not the situation which existed when legacy networks were deployed in the UK. Such CPs made decisions on network topology (including larger switch footprints) based on the fact that they were never likely to enjoy BT's economies of scale or scope. CPs with long-standing legacy TDM networks or those who have chosen to extend or add to their networks during the period of the Reciprocity Agreement, will have based their business decisions in part on the payment they would receive for termination.

[41] The Department for Business, Enterprise and Regulatory Reform ("BERR") was a United Kingdom government department. The department was created on 28 June 2007 on the disbanding of the Department of Trade and Industry ("DTI"), and was itself disbanded on 6 June 2009 on the creation of the Department for Business, Innovation and Skills ("BIS").

Consumer impact

3.21 [✂] argued that our assumption that reductions in FTRs (and thus the costs originating CPs incur) will be passed onto consumers is flawed and unsubstantiated. It agreed that originating CPs would experience a reduction in costs as a result of Option 3, but it does not automatically follow that these savings would be passed through to consumers. [✂] suggested that reductions in retail charges from reductions in wholesale charges have been arbitrary and insubstantial. In any case, calls to fixed geographic numbers are commonly charged on an unmetered basis. [✂] therefore questioned how Ofcom can substantiate its claims over consumer benefits.

3.22 [✂] further argued that we have failed to consider the prospect of consumer detriment emerging from Option 3. It argued that, under this option, it is unlikely that terminating CPs would be able to recover the shortfall in their termination revenues by re-routing traffic alone and may consider increasing charges for other services they provide or diverting capital away from projects designed to enhance consumer benefit.

3.23 [✂] believed that there is a very real likelihood that Option 3 would result in an overall detriment to consumers.

Disputes

3.24 TTG argued that Ofcom has consistently upheld the validity of the formula set out in the Reciprocity Agreement in disputes and what it now proposes clearly contradicts its earlier dispute determinations. Sky and [✂] also referred to past dispute decisions as examples of how Ofcom has perpetuated regulatory certainty to the reciprocity regime (around which network operators have optimised their interconnections arrangements).

Ofcom's position

3.25 We recognise that the previous arrangements for setting individual FTRs have been in place, in much the same form, for 13 years. They were developed by industry consensus following Oftel's July 1997 Statement on Network Charges (and subsequently renegotiated and agreed in 2001 and 2005 respectively).

3.26 During the period in which the Reciprocity Agreement was in place, we determined several disputes (and determined one fixed termination rate dispute since the last Reciprocity Agreement expired). We agree that, with regard to the facts of those particular disputes, whilst not determining that the Reciprocity Agreement was the only means by which CPs could comply with the SMP obligation to set fair and reasonable FTRs, nevertheless we found certain claims for higher FTRs not to be fair and reasonable and that business should be conducted by reference to the relevant industry Reciprocity Agreement. These disputes were summarised in Annex 6 of the September 2010 Consultation.

3.27 In the 2009 WNMR, we re-affirmed the view that it is appropriate for the industry to establish a basis for meeting the obligation to set fair and reasonable rates, based on reciprocity with BT's charges, rather than Ofcom setting it as a regulatory requirement. We further observed that the Reciprocity Agreement was then being renegotiated and set out our expectation that this negotiation would address the migration between TDM networks and NGNs in such a way that CPs which migrate at different speeds are not unduly penalised.

3.28 However, the last Reciprocity Agreement expired on 30 September 2009 and the industry, despite undertaking negotiations, has been unable to reach any consensus on what should replace it. Our view is that this is a significant and material change in circumstances. The precedents of the past were based around the existence of an agreement. Now there is no agreement between CPs and we have sought to provide guidance in order provide certainty as to how fair and reasonable FTRs should be determined in the future. Our approach, as detailed in the September 2010 Consultation, was to consider this matter taking account of this lack of industry consensus.

3.29 TTG suggested that it is inappropriate for Ofcom to propose a departure which goes against industry consensus over a formula which Ofcom has historically upheld and supported. We disagree with TTG and consider that it is evident from the industry's failure to agree a new Reciprocity Agreement that the formula previously used by industry to derive fair and reasonable FTRs no longer has consensus support within the fixed operator community. This is also evident from the responses from stakeholders to the September 2010 Consultation.

3.30 In such circumstances we consider that it is appropriate for us to seek to provide guidance on fair and reasonable FTRs in order to provide regulatory certainty to CPs on setting FTRs in compliance with SMP Condition BC1 and to minimise costly and avoidable disputes. Furthermore, in considering this matter it is both appropriate and reasonable for us to carry out a fundamental review of how the principle of reciprocal charging should be applied in the future and to do so in accordance with our statutory duties and policy objectives summarised in Section 2 of this Statement.

3.31 As explained in the September 2010 Consultation, we recognised in our January 2010 Statement on NGNs (four months after the publication of the 2009 WNMR and the expiry of the Reciprocity Agreement) that operators may find it difficult to reach satisfactory agreement on a new Reciprocity Agreement by commercial negotiation alone. We observed that this was not just due to issues concerning interconnection between NGNs and TDM networks but because we were also aware of issues between interconnecting TDM networks such as the disincentive to interconnect at BT's local switches. We therefore said in paragraph 3.51 of our January 2010 Statement on NGNs that we would aim to clarify our interpretation of the obligation to set fair and reasonable termination charges for voice calls to geographic numbers hosted on different networks. This work was subsequently included in our Annual Plan 2010/11 published on 31 March 2010.

3.32 As regards market reviews (including the most recent 2009 WNMR) Ofcom has maintained a consistent policy approach to the SMP remedies for CPs other than BT and KCOM (in the Hull area) for charging for fixed geographic call termination. In summary that policy is[42]:

3.32.1 Whilst we have not mandated that fair and reasonable FTRs should be based on BT's charges, we consider that charges that are not based on BT's (whose regulated charges are likely to be close to the costs of an efficient operator), taking into account network topology and technology differences, are unlikely to be fair and reasonable and, in any case, charges would have to be competitively neutral;

[42] See paragraphs 12.71 to 12.73 of the 2009 WNMR published at http://stakeholders.ofcom.org.uk/binaries/consultations/wnmr_statement_consultation/summary/main.pdf

3.32.2 Ofcom would need to consider any dispute over FTRs on its relative merits; and

3.32.3 The industry was best placed to negotiate and agree an approach to set other CPs' FTRs.

3.33 We disagree that the preferred option set out in our September 2010 Consultation amounts to a radical reversal of long-standing policy as suggested by some respondents. Indeed, the only policy position where we have proposed change from what existed previously concerns the way in which network topology differences are taken into consideration i.e. our view that a FTR for call termination on a CP's network should be presumed to be fair and reasonable where it is the same as the Benchmark FTR (unless otherwise shown to be fair and reasonable based on our three-stage test). The reasoning for this change is discussed in the following sub-sections. However, we recognise that such a change has several impacts which we summarise in paragraph 3.5 above including different financial impacts arising from the range of current individual FTRs between BT's LE and ST rates.

3.34 We further disagree that, in proposing Option 3, we did not take into due consideration that CPs had sought to optimise their interconnection arrangements under a regime for setting FTRs which had existed for some considerable period of time. We recognise and have taken into account that CPs may have optimised their interconnection arrangements under the previous, long-standing, regime and have assessed the scale of likely impacts on stakeholders. However, having carried out a review of how reciprocal charging should be applied in compliance with SMP Condition BC1, we have reached the view that Option 3 is preferable to either Options 1 or 2 and that the impacts of this option on stakeholders can, to some degree, be mitigated. We take the mitigation of any disruption into particular account in considering transitional arrangements (discussed further in Section 5).

3.35 We note TTG's suggestion that a reciprocal termination rate should mean that a CP should receive the same rate as it pays to BT and that TTG implies that this is what Oftel proposed in 1997. For the reasons set out below, we disagree with TTG on both these points.

3.36 In 1997, Oftel explained that it defined call termination on a non-BT network in the same way as call termination on BT's network i.e. from the terminating switch to the customer (noting that call termination costs exclude all access costs). Oftel explained that the application of reciprocal charging led to the implication that charges between operators for call termination (as defined) should be the same so that the distortion of competition is removed and competitive neutrality is achieved.

3.37 However, Oftel took the view that differences in network topology were relevant and that call termination on CPs' networks at that time corresponded to LE and ST interconnection services on BT's network due to the larger catchment areas of other CPs' switches compared to BT's local switches. In discussing various options as to how the weights could be computed to derive a mix of LE and ST rates to set other CPs' FTRs, Oftel observed that certain options resulted in outcomes where the payments between BT and the interconnecting CP would be equal if the traffic sent for termination were balanced. Oftel commented on this feature saying:

> "This is not rigorously derived from the theoretical approach to competitive neutrality, but it has some attractions in that context."

3.38 We consider that reciprocal charging remains an appropriate and practical approach to set other CPs' fair and reasonable fixed geographic call termination rates on their own networks by removing distortion to effective competition and providing strong incentives to minimise costs. We discuss the question of network topology differences at paragraph 3.52 below.

EC Recommendation

3.39 As set out in paragraph 3.20 above, [✂] suggests that we have deviated from certain aspects of the EC Recommendation in other decisions we have made.

3.40 With regard to previous decisions where we may have deviated from the EC Recommendation, in each case the approach we have taken has been based on the specific circumstances being considered at the time and we have set out our reasoning for our approach in our decision.

3.41 [✂] further suggests that we have deviated from a particular view we expressed during consultation prior to the EC Recommendation coming into effect.

3.42 We do not consider that views expressed during the EC's consultation before the EC Recommendation came into force in any way obviates our obligation to take the utmost account of the subsequently published EC Recommendation. Whilst the EC Recommendation is not binding, in examining the question of differences in network topology under the principle of cost causation in paragraphs 5.11 to 5.20 of the September 2010 Consultation, we explained why we reached the provisional conclusion that it was more appropriate to adopt a presumption that CPs should ordinarily be able to recover their efficiently-incurred costs if they were to charge the same FTR as BT. We noted in paragraph 5.20 of the September 2010 Consultation that Option 3 was more consistent than other options with both the principle of cost causation and taking the utmost account of the EC Recommendation.

3.43 [✂] set out why it disagreed with the EC Recommendation's assertion that no objective cost differences outside the control of fixed operators had been identified. It suggested that some legacy TDM operators may arguably not be able to recover their efficiently incurred costs if they were to charge an FTR equal to BT's LE rate.

3.44 We consider that choices of technology or topology are not reliable indicators of whether efficiently incurred costs can be recovered by the Benchmark FTR. Therefore, we do not consider that the possibility that the Benchmark FTR may not allow some operators to recover costs would, in and of itself, provide a sufficient argument to deviate from the position set out by the EC in its Recommendation that fixed termination rates should be set on the basis of symmetry. We do provide for the possibility that a CP could demonstrate that a higher FTR is required to recover its costs via the three-stage test. We also note that [✂] was the only TDM operator to suggest the efficiently incurred costs of TDM networks may not be recovered by the Benchmark FTR.

Consumer impacts

3.45 We provisionally concluded in our September 2010 Consultation that Option 3 was likely to be the most favourable to consumers, in particular, those who call geographic numbers. This provisional view was informed by the analysis, set out in paragraphs 5.49 to 5.53 of the September 2010 Consultation, in which we estimated

that the net annual impact[43] of Option 3 on operators of larger fixed networks (other than BT) would be a reduction in annual revenue of about £6.7m (assuming CPs take no action in response to our final guidance to reduce their out-payments to BT by, for example, routing more traffic to BT's local switches and/or using transit providers). To provide some context to this financial impact, we compared this to fixed retail calls and access revenues for CPs other than BT which totalled £3.94bn in 2009 (a relative reduction of around 0.2%) and CPs' (excluding BT) national and local call revenue of £648m in 2009 (i.e. a relative reduction of around 1%)[44].

3.46 [✂] argued that if its (net) termination revenues are reduced, it will increase its prices to consumers elsewhere. Although [✂] does not use the term, this is similar to the mobile operator's "waterbed"[45] argument used in relation to Mobile Termination rates ("MTRs"). There is little empirical evidence on the extent of the waterbed effect in fixed telecommunications. We note that evidence which exists from research in mobile markets found the waterbed effect to be strong but not full.[46] However, should a fixed CP seek to raise the price of other services to compensate for the loss of (net) termination revenue, this is likely to involve increasing prices in a competitive market. Where other competitors, such as BT for example, are not subject to the reduction in FTRs, or where they choose not to increase prices in reaction to lower (net) termination revenues, it is unlikely that [✂] or others could successfully raise retail charges without losing market share.

3.47 Separately, [✂] also argued that the reduced termination charges that other CPs pay will not be passed onto their subscribers. Again in competitive markets we would expect changes in marginal costs to be passed through to downstream prices. Where services are sold as part of a bundle, a change in the upstream price (in this case, of termination) may no longer directly and fully feed-through to the corresponding downstream price (in this case, of calls to fixed geographic numbers), but we would expect over time any (net) reduced termination payments to be reflected into lower prices for subscribers in the competitive fixed retail markets.

3.48 It is not clear to us how, in view of the arguments set out above, in commenting on the difficulties in predicting what effects changes in wholesale charges have on downstream retail prices, [✂] concluded that Option 3 is likely to result in a net detriment to consumers.

Disputes

3.49 We have resolved a few disputes concerning fixed termination rates prior to the expiry of the last Reciprocity Agreement (summarised at Annex 6 of the September 2010 Consultation). In these cases, we determined that terms proposed by CPs for higher FTRs than those derived under the prevailing Reciprocity Agreement were not fair and reasonable.

[43] By "net annual impact" we mean the annual difference between termination revenue received and termination out-payments.
[44] See footnote 64 of the September 2010 Consultation.
[45] The "waterbed" effect, simply put, is pressing down prices in one part of CPs business causes another set of prices to rise. In summary the argument is that when considering its overall pricing policy, a CP will take termination revenues into account. The higher its revenues, the lower the total price the CP would charge its subscribers in order to attract more subscribers which in turn increases the termination revenues earned. If regulation reduces termination charges and hence revenues, operators will have to raise their prices to subscribers.
[46] See for example, Genakos and Valletti (2008) "Testing the "Waterbed" Effect in Mobile Telephony" who use data from 20 countries over 2 years. http://www.nerec.es/documents/research-papers/testingwaterbedeffect_tcm4-29162.pdf

3.50 We have further resolved a dispute concerning Colt's FTRs[47] since the expiry of the last Reciprocity Agreement and the publication of September 2010 Consultation. We determined that Colt's proposal to change the formula used in the expired Reciprocity Agreement to derive its FTR was not fair and reasonable. We required the parties to revert to the terms on which they did business unless or until other terms are agreed.

3.51 As we set out in the Colt dispute[48], it is appropriate in dispute resolution to take existing regulatory policy as a given, and we do not consider it appropriate for dispute resolution to be used as a tool to change regulatory policy. We disagree therefore that policy proposals for fair and reasonable FTRs in the future (as set out in this Statement) are inappropriate insofar as they are "contradictory" with the way we have determined disputes between CPs in the past.

Network topology differences

3.52 As we described in paragraph 2.19 of the September 2010 Consultation, Oftel observed in 1997 that a switch in the local tier in BT's competitors' networks often had a larger geographical coverage area than a typical local switch in BT's network. It considered therefore that the termination service provided by such networks corresponded to two conveyance services on BT's network: local exchange segment and single tandem. It concluded that in such circumstances it would be appropriate for BT's competitors to charge a mix of BT's LE and ST rates for termination of calls on their networks.

3.53 In paragraphs 5.11 to 5.20 of the September 2010 Consultation document we reviewed the position reached in 1997 by Oftel and questioned whether it continues to be appropriate for an operator of a fixed network competing with BT to charge a mix of BT's LE and ST rates for termination of calls to its network. We considered that, in the current environment of diverse technologies and multiplicity of networks, coverage of a greater area by a network's local switch than by a corresponding local switch in BT's network does not necessarily indicate reliably either the network's actual costs of call termination or that those costs are incurred efficiently. Following further analysis, we provisionally concluded that fair and reasonable charges for fixed geographic call termination should ordinarily be equal to BT's LE rate. This reflected our view that network topology differences between the areas covered by BT's local switches and those of its competitors should no longer lead to an automatic presumption that fair and reasonable FTRs charged by BT's competitors should be higher than BT's.

Respondents' views

3.54 BT agreed with our view that the justification, based on differences in network topology, for CPs receiving a termination rate above LE is not a reliable indicator either of the actual or efficiently incurred costs of geographic call termination in today's environment. It believes that after 13 years of reciprocity agreements, CPs have had sufficient time to achieve the efficient termination cost levels reflected in BT's LE rate. BT believed that for the mature UK call termination market to operate

[47] *Determination to resolve a dispute between Colt and BT about Colt's fixed geographic call charges* published 22 December 2010 at http://stakeholders.ofcom.org.uk/binaries/consultations/dispute-colt-bt-termination/statement/determination.pdf

[48] See paragraphs 4.85 to 4.87 of http://stakeholders.ofcom.org.uk/binaries/consultations/dispute-colt-bt-termination/statement/determination.pdf.

efficiently, CPs should no longer be able to charge more than the costs of an efficient operator.

3.55 C&W agreed with our analysis of the facts. It considered that BT's LE rate is the most appropriate and transparent cost benchmark for the efficient provision of call termination. It pointed out that, while BT's network typically has smaller termination footprints than most other CPs' networks, it also has to serve parts of the UK that have low population densities, with local switches that have higher average footprint distances, and that these increase its cost base.

3.56 TTG said that NGNs have inherently fewer points of interconnection, and hence that a call is conveyed over a longer distance in an NGN than in a TDM network before it is delivered to the called end-user. Consequently, it considered that termination on an NGN is more akin to single tandem termination on BT's TDM network and is not the same as local exchange termination on BT's network. It argued that competition would therefore be most effective if NGN operators were to charge a single-tandem rate for termination, since this would represent the same price for the same service.

3.57 Magrathea noted in its response that, while regulated conveyance rates have remained relatively stable in recent years, equipment costs have been falling. Consequently, it considered that CPs charging the LE rate for termination of calls should be able to recover their termination costs. ITSPA similarly accepted that the LE rate would allow most of its members to recover their termination costs.

3.58 In its confidential response, [✂] considered that we have taken too general a view of the current circumstances in the UK, and that we have based this view on a misguided perception of the prevalence of NGNs. Whilst not disputing our reasoning in principle, it nevertheless considered that for the vast majority of TDM networks, differences in network topology remains a true indicator of efficiently incurred costs as we have accepted in the past. [✂] noted that there has been no substantive change in the configuration of legacy TDM networks (their switches continue to serve the same footprints and incur the same costs) and that, notwithstanding the entry to market of some sub-scale CPs who have deployed NGNs and a modest level of migration to IP technology, the vast majority of fixed geographic calls originate and terminate on TDM networks. [✂] concluded that whilst it may be appropriate to presume that TDM networks can recover their costs by charging the BT LE rate in the future, it believed that this should occur only when NGNs are proven to be the substantive prevailing technology.

Ofcom's position

3.59 One respondent, which submitted a confidential response, suggested that some networks may incur higher termination costs than BT's. Other responses either support the view that CPs should generally be able recover their termination costs by charging the Benchmark FTR or do not comment on this aspect. We note also that most UK operators of fixed-line services built their infrastructure after BT's, using more recent equipment and technologies, and are therefore likely to enjoy lower equipment costs than BT. Furthermore, where operators have chosen network designs in which the most local tier of exchanges have larger footprints than BT's, we consider that they are likely to have done so with a view to minimising their own unit costs. We consider therefore that it is appropriate to presume that fixed networks whose efficiently incurred costs of termination exceed the Benchmark FTR are likely to be exceptional. In these exceptional cases, it may be appropriate for a CP to consider whether it would be fair and reasonable to charge a higher FTR than the

Benchmark FTR. We would expect the three-stage test[49] to be used to assess any claims for such higher FTRs.

3.60 We acknowledge TTG's observation that, since NGNs have fewer points of interconnection than TDM networks, they often carry calls they terminate over a longer distance. However, we do not agree that competition would therefore be more effective if NGNs were to charge the single-tandem rate for termination. The services performed by an NGN in terminating a call on the one hand, and by a TDM network in single-tandem on the other, are not the same: the first only performs call termination (as defined by the 2009 WNMR), while the second switches and conveys the call from the ingress of a tandem exchange to the local exchange and, in addition, performs call termination as defined by the 2009 WNMR. In the second case, the originating network can choose whether to deliver calls either to the tandem or local exchanges, paying a lower charge if it chooses the latter, while in the first case the originating network has no such choice. In addition, our view based on the available evidence is that the costs of an NGN are not necessarily reliably indicated by differences in topology or coverage areas compared to BT's TDM network.

Costs of sending traffic to termination nodes

3.61 At paragraph 5.97 of the September 2010 Consultation we observed that the 2009 Network Charge Control ("NCC") sets BT's call termination rate for the termination of traffic handed over to BT at its local switches in accordance with the market definition. Therefore a network operator must hand over traffic to BT at its local switches in order to secure the lowest out-payments to BT and this is irrespective of the technology choice of the originating network operator.

3.62 In sending traffic to BT for termination, CPs can, in general, choose between building out their networks to BT's Digital Local Exchanges ("DLEs"), delivering traffic to BT's tandem exchanges (which would incur additional conveyance charges from BT), or using transit services from a third party CP. The scale and topology of the originating CP's network can be relevant to this choice.

Respondent's views

3.63 Several respondents (including some of those who accepted that the Benchmark FTR would cover their costs of termination) argued that setting their FTR at the LE rate would not be fair and reasonable because smaller operators and IP network operators, with few points of interconnection, have to incur the costs of extending out their networks to access BT's local switches (and hence pay BT the LE rate) or otherwise pay BT or a transit provider for the additional switching and conveyance. Conversely, they said that, under our proposal, BT could easily connect to the smaller CP's (or IP network's) few nodes to access termination charged at the LE rate. Respondents variously argued this is unfairly advantaging BT with its inherited network footprint, it is rewarding BT for doing nothing, it is not reciprocal and fails to promote competition, it fails to encourage market entry and it deters investment.

3.64 Magrathea and ITSPA argued that the wholesale termination regime will only be truly reciprocal and symmetrical if NGN operators can obtain an equivalent termination rate from fewer points of interconnect. They believed that we should take into account that many CPs, of necessity, hand calls to BT at its Next Generation Switch ("NGS") nodes[50] and pay BT's ST rate. Magrathea argued that our preferred Option 3 would

[49] See paragraphs 6.7 and 6.8 of Section 6 where we set out the three-stage test.
[50] The term "NGS node" refers to a particular type of tandem switch in BT's TDM network.

reward BT for maintaining its TDM network and would put BT at a competitive advantage, and that incentivising NGNs to interconnect at BT's local switches to get reciprocal termination rates would be inefficient. Sky made similar arguments to those of Magrathea and ITSPA.

3.65 Colt argued that the principle of recognising different geographical footprints of CPs is a matter of scale rather than the relative costs of call termination (noting that, by definition, call termination excludes access i.e. exchange lines from the customer's premises to the local/remote concentrator). Whilst noting that interconnection at the local layer costs less than at the tandem layer, there is a point at which the cost to the CP of extending its network to reach BT's local switches exceeds the savings (in terms of out-payments) from doing so. Conversely, BT's inherited ubiquitous national network can extend to other CPs' switches at low cost. For these reasons, Colt suggested that the reciprocity formula rightly recognised this inherent disadvantage and that CPs which deliver all their traffic to BT's tandem layer would receive the same termination rate from BT.

3.66 Verizon made a similar argument to Colt. In response to our proposal that CPs should receive the same charge for the same call termination service, it argued that the endeavour undertaken by BT to connect to other CPs is not equivalent to the endeavour required for CPs to connect to BT.

3.67 TTG maintained that NGNs provide savings for TDM operators which are not reflected in FTRs or other charges. It explained that the savings arise because a legacy TDM operator can hand traffic to an NGN at a few points of interconnection and so does not need to maintain an expensive far-reaching network to deliver traffic to the NGN.

Ofcom's position

3.68 We acknowledge the observation made by Magrathea and ITSPA that delivering outbound traffic to BT's local switches is only likely to be efficient for larger networks. For smaller networks, which lack the necessary scale to invest in building out to BT's local switches, it is more likely to be cost effective to deliver their outbound traffic to BT's tandem exchanges. Smaller networks are hence likely to incur a transit charge in addition to BT's termination charge of LE. However, we do not consider that it would be appropriate to adjust termination charges, either paid or charged by smaller networks, in order to compensate for the additional transit charge because this would risk encouraging inefficient entry.

3.69 Providing for higher FTRs for CPs other than BT on the grounds of scale risks inefficient market entry particularly as entrants are able to rent wholesale infrastructure from BT and benefit from such scale economies as BT has. Entrants can also target high density and low cost areas whereas BT provides full national coverage (excluding Hull). Allowing higher FTRs on the basis that CPs are smaller in scale than BT could result in calling parties paying more than the efficient costs of termination.

3.70 We also consider that BT may not necessarily gain a benefit from the fact that some networks only have a few termination points. Whilst it may cost BT less to connect its network to other CPs whose networks have few points of interconnection than to those with many such points, BT (as an originating operator) may incur higher costs in switching and conveying calls across more of its network where the terminating CP only has a few points of termination.

Impacts on LTC and LTT markets

Respondents' views

3.71 BT recognised the disincentive to the development of the use of transit providers to deliver traffic to BT's local switches and therefore strongly supports the removal of the link between CPs' FTRs and outbound geographic traffic to BT. Under the old agreements, BT noted that a CP which delivers no traffic to BT directly for call termination or used a transit provider for some traffic and the remainder delivered to BT's tandem switches, would receive a FTR at ST by default. In such circumstances, BT noted that it receives the LE rate for traffic delivered to its local switches but pays ST rate for termination in the reverse direction.

3.72 BT believed that now that the LTC market is fully competitive, any arrangement that permits CPs to charge a higher FTR than BT's LE rate will distort competition. In particular, the current arrangements distort the commercial incentive CPs have to buy from transit providers in preference to self-build.

3.73 C&W believed that the current linkage of CPs' FTRs to their outbound traffic to BT clearly distorts build/buy decisions and allows leverage between termination and transit markets. It highlighted the disincentives which currently exist whereby some CPs may be reluctant to use an alternative transit provider because of the impact on their own termination rate.

3.74 C&W also noted the adverse impact that accepting transit traffic may have on the transit providers' own termination rate. It noted that routing a mixture of its own originated traffic, together with traffic from its transit business, may reduce its own termination rate because it sends proportionally more traffic to BT's local switches and therefore discourages it from routing such traffic.

3.75 Further C&W suggested that the call termination rates offered in the transit market are set indirectly by the reciprocity arrangement between the terminating CP and BT and have no relationship to the interconnect arrangements in place between the transit provider and BT.

3.76 C&W was in favour of Option 3 and whilst it did not believe that the practical concerns we raised around Option 2 are material, it noted that it would lack the "economic rigour of Option 3".

3.77 [✂] also believed that the linkage between outgoing calls and incoming termination rates distorts investment decisions in an unhelpful way and was, in principle, content to move to a more straightforward system. [✂] preferred Option 2 since it reduces the transfer of value from CPs to BT and mobile CPs.

3.78 Verizon noted that the expired Reciprocity Agreement distorts the transit market as operators competing against BT in this market are placed at a disadvantage.

3.79 Colt also highlighted the distortion to the LTT market. It described the reverse of the effect described by BT, where a CP's FTR is calculated as close to the LE rate under the reciprocity formula if it sends traffic to BT's tandem switches via a transit provider (rather than directly) with the remainder routed directly over its own circuits to BT's local switches

3.80 Magrathea observed that transit operators in the competitive LTC market have no commercial incentive to offer rates close to BT's LE rate.

3.81 [✂] argued that the LTC market should not have been deregulated and that our consideration of the scope for terminating CPs to offset reductions in termination revenues arising from our FTR proposals are overly optimistic. It argued that CPs cannot, in practice, respond dynamically because of the engineering required to re-route geographic traffic. [✂] further argued that it is inefficient for transit CPs to provide additional capacity and that for these reasons BT's LTC prices will not be constrained. [✂] then argued that our proposed approach will distort the LTC market as BT will be able to react to loss of traffic by reducing its prices. This could make any decision to re-route traffic via increased DLE interconnection or via a transit provider uneconomic.

Ofcom's position

3.82 It is widely accepted by stakeholders that the existing FTR regime distorts CPs' build or buy decisions[51] since extending networks to reduce termination out-payments reduces a CP's own termination revenues. By removing the linkage between inbound and outbound traffic in determining rates, this distortion is removed such that CPs will face efficient price signals in making choices between investing in extending their network (buying or renting circuits at regulated prices), purchasing transit services from third party CPs or negotiating LTC from BT.

3.83 The LTC/LTT market was deregulated in the 2009 WNMR because of the high levels of interconnection to BT's local switches, so that the proportion of traffic originating or terminating on BT's network that used LTC provided by BT had significantly reduced since the previous review. De-linking FTRs from egress should promote competition in the LTC/LTT market as fixed operators can make decisions that are not impacted by the effects on their own termination rates.

3.84 [✂] argued that BT could either increase or decrease its LTC prices, although it is not clear to us how both of these apparently contradictory approaches could result from our proposal. Insofar as BT responds to the loss of traffic by reducing its prices, this is what we would expect in a competitive market. We note that even if LTC were regulated, BT would be free to reduce its prices as long as it met any SMP obligations applied in the market (for example non-discrimination, cost orientation and/or charge control).

3.85 In any case, we are not currently reviewing the LTC market. In assessing it to be competitive in the 2009 WNMR we concluded that there were sufficient alternatives to constrain BT. These alternatives would include using other transit providers or more own-build interconnection to BT's local switches by originating CPs. We accept that, for a CP like [✂], re-routing may be time-consuming but we also took account in the 2009 WNMR of the fact that re-routing of very large traffic volumes was achieved in a period of around 12 months. We are also of the view that large purchasers of LTC should be in a strong negotiating position with BT (which, following de-regulation, is free to offer attractive rates on a per-customer, commercial basis based, for example, on volume and/or term commitments) and potential transit providers. As such, we continue to disagree with [✂] arguments.

3.86 Irrespective of whether LTC/LTT is regulated or not, we do not think that [✂] argument supports maintaining the distortive effect that linking inbound and outbound traffic has on the LTC/LTT market.

[51] Indeed this was a flaw identified by Oftel in 1997 in applying reciprocal charging in the manner subsequently agreed and adopted by industry.

The three-stage test

3.87 We set out in the September 2010 Consultation that our analysis supported an approach based on a presumption that BT's termination rate would be a fair and reasonable rate for termination provided by other CPs, in compliance with SMP Condition BC1. However, whilst we could not identify any specific reasons for a variation to this approach, we did not discount that higher rates may be justified in certain circumstances and, as such, set out that CPs seeking to justify a termination rate higher than the LE rate should normally seek to show that:

- the LE rate would deny them recovery of their actual costs of providing termination of calls to geographic phone numbers;
- their actual costs of providing termination of calls to geographic phone numbers were efficiently incurred; and
- a higher FTR, would be offset by demonstrable consumer benefit. Such benefits might include lower overall end-to-end call costs (not just in particular cases but in general for calls to that network) or other benefits to calling parties related to, for example, the quality of the service provided.

3.88 We said that we recognised that the third stage could be difficult to demonstrate. We suggested one practicable approach to demonstrate the example of benefits of lower end-to-end call costs could be to compare the traffic-related costs of a set of calls, representative of actual calling patterns, originating on BT's network and terminating on the network tested, with the traffic-related costs of the same calls in a hypothetical counterfactual in which the called end-users are connected to BT's network.

3.89 We asked for views on the proposed three-stage test.

Respondents' views

3.90 C&W argued that the test would not be helpful as it would introduce regulatory uncertainty to otherwise simple and straightforward guidance. C&W also suggested that CPs may attempt to use the third stage of the test to demonstrate consumer benefit where services such as those using Intelligent Network ("IN")[52] dips to provide alternative routing are included. It also argued that demonstrating lower end-to-end costs would be problematic since different approaches to cost data could be used. C&W said that we should state whether we are currently aware of any circumstances that would meet the test and that any CPs considering a higher rate should set out their cases before the introduction of the new regime.

3.91 TTG maintained that in respect of NGNs the test effectively means that all costs incurred in interworking NGNs with TDM networks will have to be paid by the NGN operator even though the migration to NGN reduces costs for operators of TDM networks. The hurdles set by Ofcom that an NGN operator would need to pass in order to recover these costs are therefore, in TTG's view, arbitrary, illogical, unfair and insurmountably high.

3.92 BT supported the three-stage test in principle and suggested that it would be helpful if the guidelines were more expansive on how the third leg of the test would work.

[52] Intelligent Network ("IN") describes a capability in switched networks where the network intelligence is centralised and separated from the switching function, allowing more complex routing decisions on a call–by-call and customer-specific basis.

Ofcom's position

3.93 We acknowledge C&W's concerns regarding the regulatory uncertainty that the three-stage test could introduce. However, SMP Condition BC1 requires CPs to set rates that are fair and reasonable. Whilst we have concluded that rates no higher than the Benchmark FTR should be presumed to be fair and reasonable, we do not discount the possibility that CPs may wish to challenge this presumption. In doing so, we continue to think it would be useful to at least offer some guidance or a framework for how we might assess whether a higher FTR would be fair and reasonable.

3.94 We also note TTG's comments. We do not accept that the difficulty an NGN may have in passing these tests necessarily means they are unreasonable. We discuss our views on conversion and, more widely, interworking in Section 4. To the extent that an NGN can demonstrate its efficiently incurred costs (of termination and, where appropriate, conversion) are not recovered by the Benchmark FTR, an NGN would be able to at least pass the first two tests.

3.95 In relation to the third stage of the test, we set out in the September 2010 Consultation that one way of meeting this test could be to demonstrate lower end-to-end call costs. We consider this may be practical using data published by BT in the Network Information Publication Principles ("NIPP") and Element Based Charging ("EBC") data along with the prices published in the Carrier Price List[53]. Whilst there may be some issues arising with this approach in relation to the consideration of the treatment of costs[54], we expect this approach could provide a practical mechanism to establish the impact on end-to-end call costs of termination rates higher than the LE rate. We do not discount that CPs could demonstrate consumer benefit in other ways which we would need to consider on a case-by-case basis.

3.96 In response to C&W's point about services (such as those incorporating IN dips), it should be emphasised that we are considering the termination rate for fixed geographic call termination in this guidance. The National Telephone Numbering Plan ("the NTNP")[55] defines geographic numbers as those beginning with 01 or 02 and which begin with an Area Code, as set out in the NTNP. The NTNP indicates that numbers should be adopted or otherwise used based on these specific Area Code allocations, unless the subscriber specifically requested otherwise[56]. As such, we would consider that any service using a geographic number should be considered to be providing a geographic termination service. Where IN (or similar) functionality allows for additional routing on a call-by-call basis (based for example on resilience requirements, time of day, Calling Line Identification ("CLI")[57] or other parameters), the additional costs should not be recovered from the originating CP as it could not reasonably route the call to the point of interconnection nearest the point of termination. Whilst we accept that such services could in some cases provide consumer benefit to both the originating and terminating party, we do not consider that this example would, in general, merit a rate higher than the Benchmark FTR.

[53] NIPP (Network Information Publication Principles) and EBC (Element Based Charging) data allow CPs to assess what network elements would be used in routing a call between any two points in the BT network.
[54] For example, there may be a choice between using BT's charges as a proxy for efficient costs, or reported unit costs from BT's regulatory accounts, or other information.
[55] The National Telephone Numbering Plan ("NTNP") means a document published by Ofcom from time to time pursuant to section 56 of the Act and is published at http://stakeholders.ofcom.org.uk/binaries/telecoms/numbering/numplan201210.pdf
[56] See Part B.3.1.2 of the NTNP concerning Out of Area use of Geographic Numbers.
[57] Calling Line Identification ("CLI") is a facility that enables identification of the number from which a call is being made.

3.97 C&W suggested that we should state whether we were currently aware of any circumstances that would pass the three stage test. In concluding that there should be a presumption that the Benchmark FTR would be fair and reasonable, we have not established any specific cases where we consider that the three stage test would be met. However, we do not discount that a CP could demonstrate that its current termination service, or a future termination service requested from it, could pass each of the three stages of the test.

3.98 We agree with C&W that it would be helpful if CPs considering charging a higher rate than the Benchmark FTR set out their reasoning before the end of any transition period. We urge such CPs to set out their reasoning for a rate higher than the Benchmark FTR before 1 April 2012 so that originating CPs have a reasonable opportunity to assess whether they consider the higher rate to be fair and reasonable and, where relevant, for us to consider any disputes in accordance with statutory timescales.

Summary of key conclusions on the general application of reciprocal charging

3.99 Having carefully considered stakeholders' responses to the September 2010 Consultation, we have concluded that our guidance, subject to transitional arrangements, is that FTRs are presumed to be fair and reasonable where they are symmetric – i.e. no higher than the Benchmark FTR (currently BT's LE rate). Central to this decision is our conclusion, confirmed by several respondents, that differences in network topology between BT and other fixed operators are not necessarily reliable indicators of efficiently incurred costs of termination in today's environment of differing fixed network technologies and the availability of wholesale inputs from BT to provide customers with access to networks.

3.100 We have concluded that FTRs above the Benchmark FTR are only likely to be consistent with the SMP Condition BC1 where a CP is able to show that it meets the three-stage test included in our guidance.

3.101 We have decided on this guidance because:

- Consistent with our objectives, symmetric FTRs are likely to:
    - provide strong incentives for CPs to minimise the costs of termination;
    - remove distortions, inherent in the previous industry-agreed regime, to efficient interconnection arrangements with BT; and
    - promote competition in transit markets.
- The presumption that symmetric FTRs are fair and reasonable is consistent with the EC Recommendation of 7 May 2009 on the regulatory treatment of fixed and mobile termination rates in the EU (2009/396/EC)[58];
- With regard to our principal statutory duty to further the interests of consumers, it is likely to be favourable to consumers, in particular those who call geographic

[58] See paragraphs 1 and 9 of the *Commission Recommendation of 7 May 2009 on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU (2009/396/EC)* which is published in the Official Journal of the European Union, 20.5.2009, L 124, pages 67-74 at http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:124:0067:0074:EN:PDF

telephone numbers, insofar as reductions in FTRs are passed through to retail call prices; and

- It is practical to implement and is not prone to the potential gaming inherent in the previous regime.

Section 4

Fair and reasonable FTRs where NGNs and TDM networks interconnect

Introduction

4.1 TDM networks and NGNs are likely to coexist and compete in providing voice services in the UK for an extended period. We have summarised in paragraphs 2.16 to 2.21 of Section 2 our current policy regarding incentives for efficient investment in NGNs, and the role that this guidance on how CPs should set fair and reasonable FTRs plays in that context.

4.2 In the September 2010 Consultation we discussed issues raised by stakeholders in relation to the interconnection of TDM networks and NGNs. Operators of NGNs had raised the following issues:

i) FTRs currently fail to reflect that an NGN typically carries calls it terminates further than is the case in a TDM network, because an NGN generally has fewer nodes than a TDM network.

ii) Current termination rates fail to reflect that TDM networks' costs of sending traffic for termination to other networks reduce as other operators move to NGN, because the number of nodes to which TDM networks need to send traffic is reduced.

iii) NGN operators currently bear in full the costs that they consider arise from the co-existence of NGNs with TDM networks. NGN operators used the term "interworking costs" to describe these. They include:

- Outbound transmission – sending traffic to hundreds of local switches in BT's network;
- Protocol conversion – converting traffic from TDM to IP on ingress to NGNs and from IP to TDM on egress;
- TDM operation – operating TDM infrastructure (such as an SDH[59] network for example) for the sole purpose of interconnection with TDM networks;

iv) Current termination rates do not take into account the porting conveyance charges, typically payable to BT, for onward routing of calls to geographic numbers imported into NGNs which originate on other networks.

4.3 We reached the initial view in the September 2010 Consultation, that a general presumption that a fixed network's termination rate symmetric with BT's would normally be fair and reasonable, should also apply to NGNs. This was on the basis that such a termination rate would not normally deny NGN operators the ability to compete effectively, in so far as IP technology offers genuine costs savings or other

[59] Synchronous Digital Hierarchy ("SDH") is a method of digital transmission. One of its key features is that its transmission streams are packed in such a way as to allow simple multiplexing and de-multiplexing, and the addition or removal of individual streams from larger assemblies. SDH is a TDM based technology that requires very accurate timing across the network.

benefits. We considered that where an NGN operator would seek to recover costs in excess of the Benchmark FTR, it should demonstrate that it would pass the three-stage test set out as discussed at paragraphs 3.87 to 3.98 of Section 3 of this Statement. We also considered that the same presumption should apply to the possibility of apportionment of protocol conversion costs so that we would presume that an NGN should ordinarily be able to recover those costs by charging the Benchmark FTR.

4.4 In this section we consider respondents' views on the discussion in the September 2010 Consultation on this type of interconnection, and set out our final guidance on how operators of fixed networks should set fair and reasonable FTRs where such interconnection occurs.

4.5 The remainder of this section is structured under the following sub-headings:

- Incentives for efficient investment in NGN and for efficient interconnection;
- Reasonable requests for termination;
- Which operators should bear the costs of conversion;
- Which operators should bear the other costs of interworking;
- How we expect to treat BT's termination rate in the event of it migrating to IP within the current NCC period;
- BT's IP Exchange product; and
- Summary of key conclusions.

Incentives for efficient investment in NGN and for efficient IP/TDM interconnection

4.6 We consider, in this sub-section, whether our current proposals satisfy our policy objective of providing incentives for efficient investment in NGNs and for interconnection arrangements between NGNs and BT's TDM network.

4.7 We discussed the particular issues that arise from the interconnection between fixed NGN and TDM networks in our most recent consultation on NGNs in July 2009.[60] We set out our views on how those issues might be resolved in fully competitive markets. In the subsequent Statement in January 2010[61] we did not conclude on these issues but summarised the divergent views of respondents and signalled our further consideration of fair and reasonable charges for the interconnection of NGNs and TDM networks. We came to the initial view that reciprocal charging continued to be appropriate in setting fair and reasonable termination rates in this type of interconnection as set out in paragraphs 5.152 to 5.154 of the September 2010 Consultation.

4.8 We assess here the consistency of our guidance on fair and reasonable FTRs with our policy objectives in relation to NGNs, and consider the extent to which our guidance addresses the issues raised by certain stakeholders in relation to

[60] http://stakeholders.ofcom.org.uk/consultations/ngndevelopments/
[61] http://stakeholders.ofcom.org.uk/consultations/ngndevelopments/statement/

interconnection between fixed NGNs and TDM networks, in particular, whether BT and other TDM operators face appropriate incentives to migrate their networks efficiently to NGN.

Consultation position

4.9 In the September 2010 Consultation we considered whether the fixed termination regime encouraged efficient investment in NGNs. We considered that a symmetric rate would provide incentives on all operators to minimise their own costs. We also recognised that network operators may not take into account the wider benefits that could occur when a majority of customers are served by NGNs.

4.10 We considered that investment in NGNs was influenced by a number of factors and that any changes in termination revenues would not be a material factor in determining the timing of BT's eventual migration to an NGN.

4.11 We considered that "both TDM and NGN could be efficient ways for different operators to provide fixed-line services."[62] For the avoidance of doubt, we have not assessed whether the costs of termination are lower on TDM networks or IP networks, but for the purposes of the current NCC, which sets BT's FTR, TDM is considered to be an efficient proven technology. Other FTRs are set with reference to BT's FTR as the benchmark rate.

Stakeholders' views

4.12 In Sky's view, the only barrier to it realising fully the scale and scope benefits of an all-IP NGN is a requirement to maintain TDM technology to interconnect with legacy operators, which drives direct costs. It estimated that its current SDH network accounts for 40% of its total voice network cost base. It also believed that incentives on NGN operators to interconnect with other networks using IP are weakened as long as BT interconnection remains TDM-based, because of the added complexity of maintaining two interconnection types.

4.13 TTG believed that our proposals do not provide incentives for efficient investment in NGNs and will reduce the incentives on operators to migrate to NGN. It argued that our assessment in the September 2010 Consultation did not take into account the impact of our proposal regarding apportionment of conversion costs in reducing the incentive on CPs to migrate at an efficient rate to NGN. In its letter of 17 February, TTG said that the impact on it of incorrect recovery of interworking costs is several million pounds per year, and that the impact across the whole market will be several times larger[63]. It believed that by disallowing NGN operators the ability to recover interworking costs we would be acting in conflict with our duty to promote efficient investment in networks. TTG also believed that our proposals provide no incentives on BT to offer IP interconnection.

4.14 Sky argued that while adopting the approach we have proposed may not act as a brake on NGN investment for some new entrants, the case for legacy operators like BT to migrate their networks to NGN is very different, and that it is important that the costs of conversion are appropriately attributed in order to send the right economic signals to encourage all network operators to invest efficiently. In Sky's view, the

[62] See paragraph 1.37 of the September 2010 Consultation.
[63] In response to our formal information request of 2 June 2010 TTG estimated that the total cost of its TDM network that it attributed to termination of calls to geographic numbers on BT's network was [✂] per annum. This estimate excluded costs of protocol conversion.

costs delta between the network types must incentivise efficient investment because TDM networks and new entrants have different business cases for investing in NGN. It is not enough, in Sky's view, to oblige NGN operators to incur inefficient interworking costs because even if profitable entry remains possible, the entry incentive is inefficiently weakened. TTG argued similarly in its letter of 17 February that this has the effect of diminishing competitors' efficiency gain. Sky argued that this in turn sends the wrong economic signals to legacy operators and that the proposed guidance would lead to a prolonged period of transition costs which will eat away at the ultimate consumer welfare-enhancing benefits of NGN ubiquity. It would also penalise unfairly entrants who invested in NGN, shifting the costs of technology transformation unfairly to them if legacy operators do not move to NGN in a timely manner. This would discourage future risk-taking, and would not be technology-neutral.

4.15 Sky and [✂] believed that there would be wider benefits if all TDM networks migrated to NGN technology. In Sky's view, the requirement on NGN operators to maintain legacy TDM technology to interconnect with legacy networks may compromise quality of service and may result in lost benefits such as investment in new services (e.g. "presence" services) and enhancement of customers' end-to-end experience. In [✂] view these benefits include additional functionality such as mid-call switching to video calls; the use of high definition voice; multimedia conferencing calls; and the environmental benefits of lower energy consumption of NGN networks.

4.16 However, C&W did not believe that the benefits that could be derived from the migration by all CPs to NGNs are material. It also considered that call quality issues have not manifested themselves so far, pointing out that quality is currently not materially degraded even when calls undergo a number of transitions between TDM and IP.

4.17 Sky believed that removing the link between an originator's FTR and the way that it interconnects with BT would encourage inefficient investment by encouraging more interconnection at BT's local layer. Sky considered that extending its infrastructure into the local layer using TDM would be inefficient because it would need to invest further in legacy technology, and to duplicate its existing investment in (Ethernet) backhaul for Local Loop Unbundling ("LLU") [64] in BT's local exchanges.

4.18 Sky proposed that, where its backhaul circuits for LLU connect Sky's network with BT's local switches, it should be able to designate some of the capacity of these circuits as "virtual" capacity for the purposes of sending voice calls, although the voice calls would actually be routed over BT's own voice network. In this case Sky considered that it should be able to pay BT the Benchmark FTR for call termination as it is delivering traffic to BT's local switches.

Ofcom's position

4.19 We do not agree with TTG's suggestion that our proposals generally fail to encourage efficient migration because we consider that our approach encourages operators to adopt the lowest-cost technology. However, we recognise that there may be externalities at work and discuss these further below and in later sub-sections.

4.20 We recognise, as we did in the September 2010 Consultation[65], that, in seeking to minimise their own costs, operators may not take into account external benefits – that

[64] http://www.ofcom.org.uk/static/archive/oftel/publications/broadband/dsl_facts/LLUbackground.htm
[65] At paragraphs 5.67-5.68.

is, benefits to other operators and to those operators' customers - that could occur if they were to migrate their networks to NGN. Some broad potential external benefits, such as the introduction of new services, improved customer experience, energy savings and improved service quality, are not clear: respondents either did not substantiate the extent of these benefits or, in the case of service quality, provided conflicting views. Some responses to the consultation did, however, confirm that potential external benefits of reduction in interworking costs were more apparent.

4.21 It is therefore possible that a market failure could occur as there may be positive externalities associated with NGN investment if such externalities cannot be internalised. For example, while the costs of interworking do not feature in the considerations of operators of TDM networks, such an operator could be incentivised to migrate to NGN technology more slowly than would be most efficient for the industry (and for society) overall.

4.22 It is not clear, however, that such a market failure is occurring. Firstly, it is possible that externalities of interworking cost savings could be internalised by commercial negotiation. For example, an IP-based network could offer to terminate IP traffic at a lower rate than TDM traffic, to reflect the savings in interworking costs it would obtain, and thereby incentivise TDM networks with which it interconnects to migrate or to offer other IP-based interconnection solutions. Secondly, it is not clear whether greater overall efficiency would necessarily result if operators of TDM networks were to migrate to NGN technology more quickly than they currently are. Relevant factors in assessing the industry's optimal migration path would include the relative forward-looking costs of each technology and the costs and benefits of interworking. While we consider that interconnected NGNs are likely to be the most efficient *ultimate* outcome, at this stage we have not determined either the complex questions of the industry's optimal migration path to that outcome or its timing. In the meantime, we consider that either TDM or NGN could be efficient ways for different operators to provide fixed-line voice services.

4.23 If there were a market failure we would have to consider what possible remedies would be proportionate in addressing it. In that event, we currently consider that it is unlikely that adjusting the regime regulating FTRs of BT's competitors could materially alter the migration plans of TDM operators because of the relatively small size of fixed termination payments. BT (along with mobile providers and CPs other than BT) pays a significant proportion of the £60m[66] aggregate gross annual revenue received by the larger fixed CPs (other than BT) for wholesale fixed geographic call termination, while BT's annual retail revenue for calls and access is approximately £5bn.

4.24 For example, in considering whether the termination rates of NGNs could be used to send a signal to BT to migrate to an NGN, it could also be relevant to consider the activities BT would need to undertake to achieve this migration. Based on BT's previous plans for 21CN, this would include upgrades of Multi Service Access Nodes ("MSANs") at each of BT's local exchanges to support voice services (or new MSANs in exchanges where BT has not deployed MSANs to date)[67], additional IP routers within its backhaul and core network, the deployment of call servers to provide the full range of voice services that BT currently supplies, the establishment of Operational Support Systems related to each of these network elements and the migration of BT's

[66] Source: our own estimate, based on data we collected in relation to our work on guidance on fair and reasonable FTRs.

[67] We note that alternative approaches to providing voice services will be developed as BT deploys its Next Generation Access (NGA) networks.

end customers onto the new platform. In this context, the cost savings that could be realised through reduced termination rates are likely to be a very small factor in the business case of migration.

4.25 Furthermore, in considering how an NGN operator could set a fair and reasonable charge for terminating calls from a TDM network, we do not consider it desirable that the introduction of new technology should cause the price of existing services (in this case termination) to rise. In our view, this principle is more important than the uncertain improvement in the migration path which we might achieve by adjusting the regime regulating FTRs of BT's competitors to incentivise operators to take account of wider benefits of migration.

4.26 In light of the considerations above, we do not consider that it would be appropriate, in this guidance on fair and reasonable FTRs BT's competitors can charge, to seek to adjust incentives for efficient migration to NGN by providing means to internalise possible external benefits that may arise from that migration. In our view, the next review of wholesale narrowband markets would be an appropriate context to consider such incentives, with scope to consider other relevant factors, such as termination on BT's network, origination markets and transit markets. Later in this section we give further consideration to the questions as to which operators should bear the costs of conversion and other interworking costs (see paragraphs 4.60 to 4.110).

4.27 An important effect of our guidance would be to remove the link, established by the expired Reciprocity Agreement and its predecessors, between inbound and outbound termination rates. This removal should allow CPs to use transit services from other operators or to build out to local switches themselves without this resulting in a reduction of their own termination rates. We consider that this is likely to promote competition in the LTC/LTT market.

4.28 While we agree with Sky that this guidance could encourage further investment in connecting to local switches, this does not imply that there actually will be any such further investment. We consider that our approach will remove the distortion which acted against efficient investment in connecting with the local layer. We agree with Sky that the investment in accessing the local layer is likely to be "time-limited" because eventually BT's local layer will be replaced. However, we do not consider that this automatically and necessarily would make any such investment inefficient. By removing the build/buy distortion inherent in the expired Reciprocity Agreement we have sought to increase incentives on operators to make efficient investment decisions. Operators which are not connected at the local layer are not forced to interconnect there and could choose, alternatively, either to connect at BT's tandem exchanges or to use transit services from other providers. In addition, regulation imposed on BT requires it to make available interconnect products, in particular, Interconnect Extension Circuits ("IECs"), that allow CPs to rent interconnection infrastructure to local switches. These products allow CPs to avoid (or minimise) the risk of stranded assets if they think any investment in interconnection to the local layer of BT's network will be time-limited.

4.29 Regarding Sky's proposal for "virtual" capacity, we consider that in order for Sky to pay the Benchmark FTR for termination on BT's network, Sky needs to interconnect at BT's local switches in a way that voice traffic would actually be delivered to BT's local switches so that calls could be terminated to BT customers' lines. As the LLU backhaul circuits are Ethernet-based and provide IP transport, Sky's circuits do not interconnect with BT's TDM switches. Instead, these circuits connect to Sky's own LLU deployments in BT's local exchange buildings. The BT local switch may not be located in this same building. In order to access the Benchmark FTR, Sky would

need to interconnect to BT at the termination point. This is currently the local TDM switch and would require Sky to convert traffic from IP to TDM. Later in this section we discuss the potential for a CP such as Sky to make a reasonable request for IP interconnection to overcome this need for conversion.

4.30 If IP operators wish to purchase IP termination from a TDM network (which, by definition, would include conversion) they can request this from that TDM operator. TDM operators would be bound by the SMP condition to meet fair and reasonable requests for access in response to such a request. Requests by IP operators for IP interconnection at a non-terminating node should be a matter for commercial negotiations with TDM operators (whether the terminating TDM provider or, as an alternative, transit operators).

Ofcom's conclusion

4.31 We accept that interconnection between networks of different technologies may create externalities (as discussed in paragraphs 4.20 to 4.21) but consider that this needs to be assessed more widely within the context of a market review to determine whether incentives for efficient migration require regulatory intervention and, if so, the appropriate mechanisms for implementing these.

4.32 In respect of the regulation of FTRs for CPs other than BT (and KCOM inside the Hull area) we consider that our guidance should not act to disincentivise efficient migration by TDM operators to IP - in particular, taking account of the wider externalities associated with termination markets (i.e. raising rivals' costs and termination rates ultimately being paid by the calling party).

Reasonable requests for termination

4.33 In the 2009 WNMR we defined the call termination market as:

- "Wholesale fixed geographic call termination on each individual network. Call termination in this context includes the conveyance of all signals (including relevant control signals) required to terminate calls on a customer's exchange line from the first point in the network where those signals can be accessed by another communications provider."[68]

4.34 The market definition included all network architectures and technologies. Since the originating and terminating networks have to interconnect using a common technology, it is useful to consider the technological variants that could be used to provide termination services.

Consultation position

4.35 In the September 2010 Consultation we proposed that originating operators should be able to make reasonable requests for termination using either IP or TDM termination. We considered that such requests would be reasonable if originating operators were willing to pay a fair and reasonable rate, which we would ordinarily consider to be the Benchmark FTR, unless a terminating operator could justify a higher rate under the proposed three-stage test.

[68] Paragraph 7.2 of the 2009 WNMR.

4.36 We proposed encouraging NGN operators and BT to discuss options where BT would provide IP interconnection.[69]

4.37 We also proposed that it would be reasonable for a CP to request interconnection using standards endorsed by Network Interoperability Consultative Committee ("NICC")[70] or otherwise agreed between the parties and included a specific provision in our provisional guidance[71].

4.38 We noted that one NGN operator proposed offering TDM termination at its MSANs and we sought stakeholders' views on this approach.[72]

Respondents' views

4.39 TTG believed that we need to require BT to offer IP interconnection within a reasonable timeframe at a rate equivalent to that which NGN operators charge, and that, in the meantime BT should "emulate" IP handover and offer 27 points of TDM interconnection on its network at which NGN operators could hand over all traffic terminating on BT's network at LE rate.

4.40 Sky said that it would ideally prefer, in the event that our proposals take effect, to interconnect IP-IP using its LLU infrastructure at BT's DLE sites. This would require interworking equipment at those sites. However, it considered that interconnecting in this way could be unduly costly, irrespective of which operator pays for it. Instead, Sky considered that a second option recognised by Ofcom may be more efficient, in which NGN operators would interconnect with BT at a few national locations to realise the scale economies of the interworking equipment.

4.41 C&W did not agree with our interpretation that IP interconnection for calls destined to a TDM line were likely to be part of the call termination market. C&W maintained that a characteristic of the call termination market is that the terminating operator has SMP. It argued that a terminating CP cannot have SMP in the interworking function because this could be self-supplied, purchased from the terminating CP (if it offers it) or from a transit CP.

4.42 C&W said that our proposal that the terminating CP should be required to meet technical standards requested by the originating CP neglects to take account of the fact that IP interconnection standards continue to evolve and that, as such, a terminating CP could be required to develop and support a multitude of differing standards. This would not be a rational approach.

4.43 BT said that it has concerns that IP operators would request that originating operators interconnect at MSANs, which BT thought was unlikely to be efficient.

4.44 C&W considered that an MSAN is not a termination point as MSANs are unable to route calls directly without "hair-pinning"[73] into the core of an NGN.

4.45 [✂] agreed with our proposed approach in that common industry standards should be used and that the different standards should not be used to frustrate

[69] Paragraphs 5.147 and 5.154 of the September 2010 Consultation.
[70] NICC defines technical standards for use in the UK telecommunications market.
[71] Paragraph 7.14 of the September 2010 Consultation.
[72] Paragraph 5.95 of the September 2010 Consultation.
[73] Where a call is conveyed from the MSAN to the core and back again before being conveyed to the destination phone line, instead of being directly conveyed to the destination phone line from the MSAN.

interconnection. It suggested that where agreement between operators on the standard to use cannot be reached, the Office of the Telecommunication Adjudicator ("OTA")[74] could facilitate a reasonable technical resolution.

Ofcom's position

4.46 Terminating CPs have market power in termination and therefore originating CPs should be able to make reasonable requests for a termination service. However, if originators were to make a request from a CP for an interconnection product that did not have the characteristics of a termination service, then we would generally expect the terms, conditions and prices of the service to be set by commercial negotiation between the interconnecting parties (except where other SMP Conditions were to apply).

4.47 For the purposes of producing this guidance we did not undertake a separate market definition in relation to IP interconnection. In the September 2010 Consultation we considered it likely that an IP termination service on BT's TDM network would be part of the call termination market.[75] However, we agree with C&W that IP interconnection and onward switching and conveyance to BT's local switches from a limited number of Points of Interconnect ("POI") is not a termination service because transit operators could offer a similar service.

4.48 A termination service "includes the conveyance of all signals ... from the first point in the network where those signals can be access by another communications provider."[76] If operators were to request a service from another point in the network (i.e. at a non-terminating node) then the resulting service would not be confined to termination. If BT were to offer, in accordance with TTG's suggestions, IP interconnection at 27 POI with its TDM network, this would, in our view, include services other than termination, because lines would not be hosted directly on these POI and operators can interconnect at BT's local switches. We consider in a later sub-section below what would happen if BT chose to migrate to IP during the current NCC period to September 2013 and local switch interconnection were no longer available.

4.49 TTG's suggestion that BT should offer TDM interconnection at 27 POI and charge the Benchmark FTR would not appear to be a termination service as defined in the 2009 WNMR. Operators could still interconnect at local switches so the 27 POI do not appear to be terminating nodes as they are not the accessible points "nearest" the customer. We recognise that our position is based on the definition of call termination in the 2009 WNMR and our decision to regard TDM as the efficient proven technology on which to base the costs of the hypothetical ongoing network, which is the basis of the NCC. If we decide in future that IP should be the efficient technology, it may then be appropriate to define the market to take account of the efficient way to interconnect IP networks and to set the future benchmark FTR based on IP costs. In this context, it may then also be appropriate to require TDM operators to provide IP termination and charge a symmetric termination rate.

4.50 We accept the point made by C&W that the standards relating to IP interconnection are continuing to evolve and that, therefore, allowing the originating CP to require the terminating CP to provide IP interconnection using a particular standard could lead to the terminating CP needing to support multiple standards purely for the purpose of

[74] Further information regarding the OTA can be found at http://www.offta.org.uk/
[75] Paragraphs 5.140 to 5.145 of the September 2010 Consultation.
[76] Paragraph 7.3 of 2010 WNMR Statement.

terminating traffic. This could lead to an increase in the costs of providing termination services which could ultimately lead to higher prices for consumers.

4.51 Where an originating CP requests IP interconnection, we consider that the terminating CP should not be able to impose unnecessary costs onto the originator in order to disincentivise requests for IP interconnection. On the other hand, the originating CP's request for interconnection would need to be reasonable (as per the relevant SMP condition) and this would, amongst other things, include consideration of the technical standards to be supported. A request that unnecessarily requires the terminating CP to incur additional costs, for example, to support a particular technical standard, could be considered unreasonable. Further, where a request is deemed reasonable but additional costs are incurred by the terminating CP, the three-stage test we have set out could become relevant if the Benchmark FTR was insufficient to recover the efficient costs of termination and the additional costs incurred to support the requested standard.

4.52 In the September 2010 Consultation (at paragraph 5.147), we considered that it may be appropriate for BT to provide network access over IP interconnection using technical standards reasonably requested by the originating CP. Having taken into account responses to the consultation, and in particular the considerations of the paragraphs above, we are now of the view that any request for IP interconnection should allow for negotiation of the interconnection protocol by the two CPs within the context of requests needing to be reasonable.

4.53 In the case where the technologies of the terminating and originating network are the same, there is no need for conversion. However, some requests for termination may involve a service that includes conversion. In such cases it may be that the terminating CP's costs cannot be recovered via the Benchmark FTR. In this case, the three-stage test would be appropriate to determine if a charge above the Benchmark FTR were reasonable. This could apply equally to an IP network or a TDM network providing conversion.

4.54 BT is concerned that it would be asked to hand over traffic at MSANs. We also note C&W's point that an MSAN would not be a valid termination point. We consider that MSAN interconnection is likely to be less efficient than interconnection at a small number of nodes, however as long as an operator can demonstrate that an MSAN is a reasonable termination point, we do not consider that we would necessarily prevent NGNs offering these as terminating points.

4.55 In indicating that an MSAN was the termination point, an NGN operator would need to demonstrate how another CP could practically interconnect at this point including, for example, how it would consider reasonable requests for interconnection from TDM networks[77]. Whether an MSAN was a practical termination point may depend on the functionality of the MSAN in question and we would assess this on a case-by-case basis if called to do so in a dispute. However, we consider it unlikely that NGNs would offer MSANs as termination points, because the general view of NGN operators in response to our consultation is that the more efficient way for NGNs to offer interconnection is via fewer points of interconnection.

[77] In this context it may be relevant to consider not only interconnection by BT but also by other TDM networks.

Ofcom's conclusions

4.56 TDM originating networks can reasonably request TDM handover from IP terminating networks. Indeed, this is how TDM and IP operators interconnect today. If IP operators were able to demonstrate via the three-stage test that a rate above the Benchmark FTR for this termination service was fair and reasonable they would be able to charge a rate above the Benchmark FTR. In practice we consider it unlikely that an IP operator would be unable to recover its costs of termination (including conversion) from the Benchmark FTR though we do not rule it out.

4.57 MSANs may be valid termination points but this would depend upon the specifics of the NGN. In any case an NGN would have to provide TDM termination at these points upon a reasonable request from TDM operators. It seems unlikely however, that locating conversion equipment at every MSAN would be an efficient interconnection architecture, particularly since current NGNs tend to have fewer interconnection points than TDM networks.

4.58 Responses to the consultation indicate that IP termination at BT's TDM DLEs is unlikely to be economically attractive. However, to the extent that such termination could be economically viable we consider that it could be reasonable to request this service within the call termination market. As IP standards for voice interconnection are still evolving, our view is that, where such IP interconnection is requested, commercial negotiation between the parties would be the most appropriate first step to agree the relevant interconnection standard in order to avoid unnecessary development costs for the terminating CP. Where agreement cannot be reached between the parties, the resolution of any dispute would need to be based on the specifics of the two parties' networks. Where an IP termination service was deemed reasonable, the Benchmark FTR would apply unless the terminating operator could satisfy the three-stage test.

4.59 If originating operators request IP interconnection at non-terminating nodes (such as interconnection at tandem exchanges or a limited number of POI) then rates, terms and conditions for services additional to the regulated termination service would be subject to commercial negotiation

Which operators should bear the costs of conversion

4.60 We recognise that a specific need for protocol conversion arises where TDM and IP networks interconnect, and assess our policy on the costs of conversion in this sub-section. In our view, the need to incur other costs involved in interworking TDM and IP networks – namely outbound transmission to numerous TDM termination points and operation of TDM infrastructure for interconnection – arises generally where any originating network, whether TDM or IP, seeks to interconnect with terminating TDM networks. We therefore assess our policy in relation to these other interworking costs separately in the next sub-section.

Consultation position

4.61 We considered that, ordinarily, a symmetric FTR would be appropriate (i.e. the Benchmark FTR) even where IP operators perform conversion. However, if IP operators sought a higher rate, this would have to be justified under the three-stage test.

Respondents' views

4.62 TTG argued (both in its consultation response and its subsequent letter to us of 17th February 2011) that by requiring IP operators to recover all the costs of conversion (and other forms of interworking) the period of dual running of IP and TDM networks will be extended to longer than is efficient. TTG considered that TDM networks should pay at least 50% of conversion and other interworking costs in order to incentivise migration from TDM to IP. TTG combined conversion and other interworking costs in its arguments, but there are some considerations that apply only to other interworking costs, which we address under a subsequent sub-heading below (see paragraph 4.86 *et seq*).

4.63 TTG argued that an NGN operator is placed at an unfair competitive disadvantage because it needs to interconnect with BT's relatively inefficient legacy TDM network. It explained that it needs to recover the additional costs it incurs in the transitional period because of BT's slow deployment of its own NGN, and argued that it should be able to pass on the cost caused by BT's sluggishness and/or any FTR should reflect the cost saving that TDM operators enjoy as a result of NGN networks reducing their egress backhaul cost. In its letter of 17 February, TTG considered that, irrespective of the approach we took to the current NCC, it should not tie our hands in coming to a decision on recovery of interworking costs.

4.64 [✂] also believed that while IP operators incur the costs of conversion the incentive on existing TDM operators to migrate to IP is reduced.

4.65 C&W considered that conversion costs are not part of the termination market and should not be subject to regulation.

4.66 Sky thought that it is not sufficient for us to argue that IP operators should necessarily pay for interworking costs just because they can still make a profit whilst paying those costs.

4.67 Sky argued that in a hypothetically competitive market for call termination a TDM operator would be unable to recover the cost of conversion in its charges for termination because, if it attempted to do so, NGN originating operators would purchase termination from other NGN operators. In reality, however, the originating NGN operator has no alternative supply that would not require interworking, so, in Sky's view, it is this market power in conjunction with the technology choice of the terminating operator that causes interworking costs. Sky proposed that the application of this principle to each direction of traffic would ordinarily point towards equal cost sharing of interworking costs.

4.68 [✂] argued that TDM operators may choose to migrate their networks only partially in order to raise the cost of termination to IP networks.

4.69 Colt argued that, as IP operators incur higher conveyance costs (because their networks have fewer nodes), they should receive an uplift for conversion.

Ofcom's position

4.70 In the September 2010 Consultation we discussed conversion costs under the six principles of pricing and cost recovery[78]. With respect to cost causation we came to

[78] Cost causation, cost minimisation, effective competition, reciprocity, practicability and distribution of benefits.

the initial conclusion that there were different interpretations of cost causation and neither a TDM nor an IP network necessarily caused the costs of conversion.

4.71 We do not necessarily agree that BT has caused the need for conversion costs. It is not clear that BT's decision to step back from large scale migration of its voice services to IP results in its maintaining an inefficient network. BT's decision is likely to be based on its own assessment of what is the most efficient network for it to use for voice services, given the costs of different technologies, the age of its network and the costs of dual running a TDM and IP network during the migration period. The question of the efficient timing of migration is complex and BT's slow migration of its voice services to IP does not necessarily lead us to conclude that it is operating inefficiently.

4.72 Where there are two networks (one TDM and one IP) there are conversion costs that arise between the two networks. Under the proposals set out in the September 2010 Consultation, the IP network would ordinarily pay for those conversion costs when providing termination. The IP network would therefore receive a benefit when the TDM network converts to IP and the TDM network is unlikely to take this into account when considering whether to migrate. Therefore, other things being equal, this might incentivise TDM networks to migrate later than otherwise. That said, however, the IP network could reflect the savings in conversion costs it would obtain and incentivise the TDM operator to migrate by offering to lower its termination rate when traffic is delivered to it as IP rather than TDM (this may allow the externality of conversion cost savings to be internalised). We note that this is only likely to be economic where there are sufficiently large traffic flows between the networks concerned.

4.73 We now consider the more complex case where there are initially two TDM networks (say TDM network A and TDM network B) interconnected with one another and also with an existing IP network (IP network C). When network A decides to migrate to IP, conversion costs would then arise between it and TDM network B. If network A bore only some (or none) of these costs of conversion when it migrates to IP it could be incentivised to migrate earlier than is efficient as it would pass (some or all of) the conversion costs onto network B. That is to say, in making a decision to migrate, network A would not take account of the external costs incurred in making that decision. This could result in the inefficient early migration of network A.

4.74 Were network A, which migrates from TDM to IP, permitted to pass on any of the costs of conversion onto network B through higher termination charges, then network A's migration decision would trigger an increase in its price for termination. TDM network A would therefore raise network B's cost base for calls to A's network in a way which network B could not avoid. This would not be desirable under the principle of effective competition. Moreover, the customers of network B would end up paying a higher rate for calls to network A as a result of network A's decision to migrate (or as a result of decisions by called parties to join a network which has migrated). This is despite the expectation that network A would realise efficiencies from its decision to migrate to IP.

4.75 When network A migrates, the conversion costs that network C is currently incurring for conversion between it and network A are likely to be eliminated (provided that their IP networks can inter-operate without protocol conversion). Therefore network A may fail to take account of all the benefits of its migration. Network C could however, encourage network A to migrate to IP by offering IP termination at a lower rate than TDM termination.

4.76 Therefore, since the Benchmark FTR is currently derived using TDM costs, and in light of our view that either TDM or IP technologies may be currently efficient for different operators, we consider that if a TDM operator (such as BT) migrates and new conversion costs arise between it and other TDM networks, the migrating network (which would then be IP) should bear those costs.

4.77 When a TDM operator migrates to IP, we consider as a regulatory principle that it is desirable for the price of termination on its network not to rise. If it were to do so, we do not consider that this would be consistent with the principle set out in the Competition Commission's determination in relation to 2G/3G voice termination regulation that new technology should not cause the price of an existing service to rise.[79] If migrating TDM operators were able to raise the price of termination to their competitors by migrating to IP, they may have distorted incentives to invest in IP technology, which would mean that such migration could distort competition away from other TDM operators. We consider that either TDM or IP technology may currently be an efficient choice for different operators, and we consider it important for network operators using either technology to be able to compete effectively with one another.

4.78 We note that if in future we were to decide that IP, rather than TDM, should be the basis of the Benchmark FTR, then TDM operators would be unlikely to be able to raise their price of termination by migrating to IP. However, TDM technology is the basis of the current NCC, and if a TDM operator were currently required to bear costs of conversion then such an operator would be able to raise the price of termination to its TDM competitors by migrating to IP. We consider that this would go against the principle of effective competition. We therefore consider that, at least while TDM technology is the basis of the NCC, IP operators should ordinarily be required to bear the full costs of conversion.

4.79 In a hypothetical competitive termination market in which originators could choose between terminating networks, originators would seek to minimise their end-to-end call costs including conversion where this was necessary. TDM originators might purchase termination from an IP terminating network if the cost of terminating on an IP network plus the cost of conversion (either supplied by the IP operator or self-supplied) was lower than the cost of terminating on a TDM network without the need for conversion. Similarly IP originators might purchase termination services from TDM terminating networks (and either purchase conversion services or self-supply) or from IP terminating networks. In this hypothetical competitive market, terminating networks would reflect their efficiently incurred costs of termination without conversion and their efficiently incurred costs of conversion.

4.80 However, as termination markets are not competitive, the competitive market counterfactual is not easily defined. We seek to mimic the competitive outcome and provide incentives for investment by requiring originating networks to pay a charge for a termination service that is, in effect, independent of the actually incurred costs (and hence technology) of the terminating party. Our approach to achieving this is that the termination service should be provided at the same rate (i.e. the Benchmark FTR reflecting TDM costs), even if the terminating network chooses to uses IP and expects to achieve lower costs. However, we also accept that the costs of conversion between TDM and IP may raise costs above those that would prevail in an environment with only one technology, and to the extent that the terminating network,

[79] *Mobile phone wholesale voice termination charges*, Competition Commission Determination, 16 January 2009. Available from http://www.catribunal.org/files/CC_Determination_1083_H3G_1085_BT_220109.pdf

in bearing these costs, cannot recover its own costs and provides a benefit to the originating party (by supporting the originator's technology choice), the three-stage test could be considered. As such, we seek to reflect the competitive outcome via symmetric rates plus the three-stage test.

4.81 Our argument is not, as Sky suggests, solely predicated on the ability of IP operators to make a profit if they pay for the conversion. Rather, we consider that any other approach could lead to the situation in which originating networks, and ultimately consumers, pay more for calls which terminate on a supposedly more efficient technology.

4.82 In response to [✂] argument that TDM operators may choose to migrate their networks only partially in order to raise the cost of termination to IP networks, we note that CPs would have to incur their own parallel running costs and also would need to undertake conversion when on-net TDM and IP connected customers call one another. For these reasons we consider that it is not likely to be in operators' interests to maintain a TDM network purely for the purposes of increasing the costs faced by competing IP networks.

4.83 We note Colt's view that other operators should pay it for conversion because of its additional conveyance costs when it interconnects with BT. In paragraphs 3.52 to 3.60 of Section 3, we discuss and reject the argument that operators should receive a higher rate because of differences in topology. This conclusion is independent of whether an operator uses TDM or IP so we do not assess it further in this sub-section which considers which network should pay for conversion costs.

Ofcom's conclusions

4.84 At least while TDM technology is the basis of the Benchmark FTR, IP operators should ordinarily bear the costs of conversion, except where they are able to make reasonable requests for IP termination. This balances, on the one hand, the provision of efficient investment signals, and, on the other, ensuring that competition is not distorted and that consumers do not pay more for existing services as a result of the introduction of new technology.

4.85 In so far as there are material costs associated with conversion, we consider that, in principle, IP operators are able to offer IP-IP interconnection at rates below the Benchmark FTR in order to encourage originating operators which currently use TDM to hand over traffic as IP where possible. We note that this is only likely to be economic where there are sufficient traffic flows between the networks.

Which operators should bear the other costs of interworking

4.86 As noted in paragraph 4.60 above, in addition to conversion costs there are other interworking costs that arise. This sub-section addresses whether operators should be able to recover these other interworking costs through termination rates.

Consultation position

4.87 We proposed that ordinarily NGN operators should not be able to charge a termination rate above the Benchmark FTR in order to recover interworking costs.

Respondents' views

4.88 Both TTG and Sky considered that the difference in network topologies between them and BT leads to interworking costs that they should be able to recover from BT.

4.89 TTG argued that by requiring TDM operators to face these costs they would be incentivised to migrate to IP earlier than they otherwise might which, it suggests, would minimise interworking costs. As noted in the sub-section above, TTG made this argument with respect to all interworking costs including conversion. In its letter to us of 17 February 2011 TTG considered that this would be beneficial to the consumers of TDM networks as NGNs would impose pricing constraints.

4.90 TTG, which is interconnected with BT at the local layer, maintained that it should be able to recover the costs of interworking from TDM operators (if not through higher FTRs then some other charge) because they are caused by TDM operators failing to migrate to NGNs.

4.91 TTG, in its letter of 17 February 2011, considered that as long as the interworking charges applied to TDM operators by IP operators were based on efficient benchmarks, rather than actual incurred costs, IP operators would still have the incentive to minimise costs.

4.92 TTG believed that our analysis of financial impacts failed to take into account the dynamic inefficiencies of dual running of TDM and IP networks. TTG also considered that there is a benefit to TDM operators from IP networks offering a small number of POI.

4.93 TTG, in its letter of 17 February 2011, considers that our approach to recovering interworking costs is not technology neutral.

4.94 Sky argued that interworking costs are temporary inefficient costs, so there is a strong case for incentivising their removal by obliging TDM operators to absorb them without recovery through wholesale charges. This, Sky argued, could be desirable today, with BT indicating its intention to sweat its legacy network: as long as BT continues to operate TDM, other operators will have to maintain their old network in order to interconnect with BT, so there will be little incentive on them to migrate fully to NGN unless they can buy IP-IP interconnection from BT or are fully compensated for their interworking costs.

4.95 Sky also believed that because it has to maintain an SDH network due to the existence of TDM operators that it had little incentive to interconnect directly with other IP operators because it is complex to maintain two forms of interconnection.

Ofcom's response

4.96 In Section 3 we discuss and refute the argument that some networks should receive a higher termination rate because they have fewer termination points. Whilst Sky and TTG have fewer termination nodes than BT, the issue of the number of nodes on terminating networks arises because of differences in network topology and is not unique to the choice of network technology – for example, TDM networks other than BT typically have far fewer terminating nodes than BT.[80] We conclude that networks with different network topologies should not ordinarily receive different termination

[80] For example, we understand that, prior to migrating to IP, TTG was running a TDM network with 3 POI.

rates, and this is independent of technology. If we were to conclude that IP networks' topology was relevant, whereas TDM network's topology was not, this would not be technology neutral regulation.

4.97 IP networks need to maintain a parallel TDM infrastructure for the purposes of interconnection with TDM networks. However, these costs do not arise solely for the purpose of accepting TDM originated traffic, but also for the purpose of handing over traffic to TDM networks. The interworking costs would also arise for on-net traffic during a network's period of migration. The costs associated with handover of traffic to TDM networks are controlled by the approach the IP network takes to delivering traffic (for example whether to interconnect to BT's local switches, interconnect to BT's tandem switches, interconnect to a transit provider via TDM or, potentially, via IP). This cost is therefore not fully associated with the act of terminating traffic onto its IP network.

4.98 If TDM networks did migrate substantially to IP, IP networks may be able to decommission some or all of their parallel TDM networks. As TDM networks migrate to IP, the interworking costs of IP networks would reduce. There is therefore the possibility that TDM networks would migrate later than is efficient, because there is a positive externality associated with migration. In a situation with only two networks, operators may be able to internalise this externality if the IP operators were to offer differential rates for TDM and IP termination. In the multiple network case in which TDM networks do not migrate *en-masse* (the more realistic scenario), it is possible that there could be a coordination failure due to the externalities associated with migration (given that the decommissioning of parallel TDM networks may require all (or most) other networks to have migrated).

4.99 Taking the three network example from earlier[81] if TDM Network A migrates to IP, it will now face interworking costs due to the need to interconnect with TDM network B. IP network C may also face interworking costs if it interconnects with TDM network B. If TDM network A were able to pass some or all of its interworking costs onto TDM network B, not only would migration cause the price for termination paid by TDM network B to rise, but TDM network A may migrate inefficiently early as it fails to take into account the external costs imposed on TDM network B. In addition to the interworking costs of TDM network A, there are also the interworking costs of IP network C. IP network C's interworking costs may not be reduced until all (or a majority of) the networks have migrated to IP. The socially optimal outcome would take into account the running costs, migration costs and interworking costs of all three networks. It is not clear that a regulator can reliably determine the socially optimal path given the uncertainties associated with NGN migration.

4.100 Given the derivation of the Benchmark FTR using TDM costs and our view that both TDM and IP technologies may be currently efficient, when a TDM operator migrates to IP it should take account of the interworking costs, and should not expect other TDM operators to pay for them. Otherwise if TDM operators bore the cost of interworking then when TDM operators migrate to IP, they would increase the costs to TDM operators which would have not yet migrated. As mentioned earlier the migration to a more efficient technology should not cause the price of an existing service (here termination) to rise.

4.101 If IP operators bear all the cost of interworking, when operators migrate from TDM to IP, there is no change to the cost base of remaining TDM operators. Any other split could lead to the price of termination increasing to other operators when the service

[81] Paragraphs 4.73 to 4.75 of this document.

they purchase remains the same. Given the derivation of the Benchmark FTR using TDM costs and our view that either TDM or IP technology may be currently efficient for different operators, such increases would unfairly disadvantage the remaining TDM operators as they would have no control over the decision to migrate taken by other networks.

4.102 We note that as more networks migrate to IP, existing networks may be able to decommission some or all of their SDH networks if they are able to rely on IP interconnection with other networks. Operators that migrate late in the process would not take account of this benefit that would accrue to IP operators in their decision to migrate.

4.103 Taking the above into account, we acknowledge there is a possibility that the presence of interworking costs has the potential to delay migration to IP networks. However, allowing IP operators to recover interworking costs from the remaining TDM networks could cause migration to happen earlier than is efficient and risks making calling parties worse off if recovered via FTRs. As the nature of NGNs is still evolving, the risk of "too early" investment matters as much as investment happening "too late" (i.e. later than socially efficient taking account of all externalities). We consider that the issue of the co-existence of TDM and IP networks, and the potential for co-ordination failure impacting the efficient migration path, should be considered more widely in our next review of wholesale narrowband markets.

4.104 With respect to TTG's argument that NGNs provide "pricing constraints" on TDM networks, we note that the competitiveness of the downstream retail market is not based only the prevalence of NGNs *per se* but on a number of factors.[82]

4.105 In our September 2010 Consultation we considered that the principle of cost minimisation would suggest that if IP networks' interworking costs were passed onto TDM operators, IP operators would not have an incentive to minimise those costs. We accept TTG's point that this would be the case when interworking "charges" are based on actually incurred costs rather than benchmark costs. Nevertheless, for the reasons set out in this section, we remain of the view that IP operators should not ordinarily recover interworking costs via FTRs.

4.106 Sky considered that it could be desirable to oblige TDM operators to absorb the interworking costs because they are, in its view, temporary inefficient costs. We consider that, while either TDM or NGN could be efficient ways for different operators to provide voice services, interworking costs are not necessarily inefficient, and that obliging TDM operators to absorb them could risk incentivising inefficient migration paths.

4.107 TTG asserted that we had not considered the dynamic inefficiencies of dual running of TDM and IP networks. We did not consider that our proposals would have a material impact on TDM to IP migration and therefore our guidance should not materially affect the level of interworking.

4.108 We note that IP operators may have a reduced incentive to offer IP interconnection where they have to maintain a TDM network for the purposes of interconnection, particularly where the IP networks have relatively low volumes of traffic to exchange with each other. However, we would expect that where two IP operators have sufficient traffic to exchange, direct IP interconnection would be more efficient than

[82] See Section 6 of *Fixed Narrowband Retail Services Markets*, Statement dated 15 September 2009, http://stakeholders.ofcom.org.uk/binaries/consultations/retail_markets/statement/statement.pdf

both operators converting their interconnected traffic to TDM. We also note that the SMP obligation to set fair and reasonable rates and our guidance are consistent with the possibility of pricing IP interconnection at a lower rate than TDM interconnection, and so enable IP operators to incentivise such interconnection.

Ofcom's conclusions

4.109 While the co-existence of TDM and IP networks does lead to interworking costs, we consider that recovering these costs from TDM networks could ultimately lead to their customers facing higher prices (as a result of the actions of competing networks). However, we recognise that a failure of co-ordination could lead to the migration to IP becoming artificially extended and so we propose to consider this issue more fully in our next review of wholesale narrowband markets.

4.110 We conclude that the adoption of IP technology should not change the guidance that FTRs symmetric with the Benchmark FTR would ordinarily be presumed fair and reasonable, and that claims for higher rates than this should be assessed within the framework of the three-stage test.

Regulation of BT's call termination services

4.111 Our charge controls for BT's termination service use a model that assumes a "technology neutral" approach to transition from TDM to IP.[83] The unit costs are estimated using a "hypothetical ongoing network" which assumes traffic stays on the existing TDM network and that this network is maintained as if it were to be used in the long run. The termination rates are then set without explicit reference to how BT's actual network assets are used. We consider that this approach is consistent with the "anchor pricing" methodology we have used for other charge controls.[84]

4.112 The issue of BT's price for termination in the event that it migrates to IP in the current NCC was not raised in the September 2010 Consultation but respondents made specific comments on this issue. This sub-section clarifies the position on what would happen in the event that BT chooses to migrate some of its lines from TDM to IP.

Respondents' views

4.113 TTG is concerned that BT's migration to an IP network would cause termination rates to rise if BT were to reconfigure its network with fewer POI.

4.114 In its letter of 17 February 2011 TTG questions our use of "anchor pricing" in the last NCC. TTG considers that BT has reduced incentives to adopt cost minimising technology as by using "inefficient technology" BT will be able to charge higher prices. TTG also believes that it distorts competitors' investment decisions as BT's charges do not reflect long-run costs and that BT's prices are higher than they would be if they were based on the most efficient technology.

Ofcom's position

4.115 In the 2009 WNMR we imposed a number of obligations on BT with respect to the fixed geographic call termination market. These were:

[83] http://stakeholders.ofcom.org.uk/binaries/consultations/review_bt_ncc/statement/nccstatement.pdf
[84] See Annex 7 of http://stakeholders.ofcom.org.uk/binaries/consultations/nga/summary/future_broadband_nga.pdf and paragraph 3.39 onwards of http://stakeholders.ofcom.org.uk/consultations/wba-charge-control/

- Requirement to provide network access;
- Requirement not to unduly discriminate;
- Basis of charges;
- Charge control;
- Requirement to publish a reference offer;
- Requirement to notify charges (with a 90 day notification period);
- Cost accounting; and
- Accounting separation.

4.116 In the 2009 NCC Statement we specified that we were not setting charge controls for future 21CN services. Where services fell within the SMP markets defined by the 2009 WNMR, they would be subject to the other SMP obligations noted in the preceding paragraph.

4.117 In considering whether a higher price for a termination service not specified in the 2009 NCC was offered on "fair and reasonable" terms we would expect BT to be able to demonstrate why a higher rate was justified. Whilst we are discussing, within this guidance, interpretation of the "fair and reasonable" condition applied to termination on CP networks other than BT, we would expect that the principles of the three-stage test would also be appropriate in considering BT's rates for termination services (e.g. 21CN) not otherwise captured by the 2009 NCC.

4.118 In any case, we note, in light of BT's decision to delay investment in 21CN, that BT is unlikely to migrate a significant number of consumers onto its IP service before the expiry of the NCC.

4.119 In relation to TTG's wider questions regarding the basis of the NCC, we considered in the 2009 NCC Statement the impact on investment incentives of using a hypothetical ongoing network approach as opposed to an approach based on an NGN model, and concluded that if the investment in NGN is overall likely to be profitable for BT compared to delivering the same services on its existing network then BT will be incentivised to make the investment[85].

4.120 In our next review of the wholesale narrowband markets we will consider, among other things, the definitions of the fixed call termination market and whether a wholesale charge control on BT's FTR remains an appropriate remedy. If so, we will then consider afresh the appropriate basis for such a charge control. If we were then to decide that a new technology is sufficiently established to replace TDM as the modern equivalent asset ("MEA") on which to base the charge control it may then no longer be appropriate for IP networks to ordinarily bear the costs of protocol conversion. TDM networks may then be required to offer IP termination for a charge ordinarily no higher than the Benchmark FTR.

[85] See paragraph 4.20 of the statement *Review of BT's Network Charge Controls: Explanatory Statement and Notification of decisions on charge controls in wholesale narrowband markets* published 15 September 2009 at http://stakeholders.ofcom.org.uk/binaries/consultations/review_bt_ncc/statement/nccstatement.pdf

Ofcom's conclusions

4.121 BT's migration to IP should not, in general, cause the cost of termination to rise and in any case, as a matter of principle, we consider it important that new technology should not cause prices for existing services to rise.

4.122 The 2009 NCC is a remedy imposed within the 2009 WNMR. When we evaluate the regulation of narrowband wholesale services, including termination, again during the next review of the wholesale narrowband market we will take into account the extent of current (and CPs' future planned) deployment of NGNs within our market analysis.

BT's IP Exchange product

4.123 BT currently offers an IP interconnection service called IP Exchange. It offers this service on a commercial basis.

4.124 We did not explicitly discuss BT's IP Exchange product in the September 2010 Consultation but respondents made a number of comments in respect of this product and this sub-section seeks to clarify our regulatory position.

Respondents' views

4.125 C&W believed that if we were to regulate the IP Exchange product, CPs would, in effect, be receiving "cost orientated" conveyance charges for IP ingress and that this would distort the competitive transit market. However, C&W also considered that if BT were to offer an IP interconnection product to one CP, then all CPs should be able to receive the same charge.

4.126 [✂] is concerned that because BT's IP interconnection product is unregulated, BT would be able to exercise market power in the conveyance of traffic between local switches and the lower number of IP interconnection points. It also thought BT may seek to raise the price of its IP product to "squeeze" operators who lacked any TDM infrastructure.

Ofcom's considerations

4.127 We concluded that BT no longer had SMP in the LTC/LTT market at the time of the 2009 WNMR and accordingly removed its SMP obligations in this market. If operators purchase services from BT that involve interconnection at BT's tandem nodes, the charges for the LTC leg of the call are now subject only to commercial negotiation. Operators can effectively bypass BT's LTC product by self-provision or by purchasing an alternative service from transit operators.

4.128 BT's IP Exchange product consists of a termination service (via TDM), a LTC service (and possibly also Inter-Tandem Conveyance ("ITC")) and conversion between IP and TDM.

4.129 The termination service is regulated by BT's SMP obligations, including the NCC. LTC was de-regulated because of the competition that exists in that market due to CPs having the option of purchasing interconnection at a local switch (or transit via a third party). As discussed in the previous sub-section, IP originating operators can make reasonable requests for IP interconnection at a local switch and purchase an "IP termination" product, but the deregulation of LTC did not rely on this.

4.130 Transit operators could provide a competing IP interconnection product combining BT's termination service, their own transit service and an IP-to-TDM conversion service at a small number of POI. We therefore consider that BT's IP Exchange product provides a service that could also be provided on competitive terms by other providers.

4.131 The potential for alternative supply of LTC, including conversion from transit operators, should ensure that BT is not able to act independently of the market, (i.e. enabling it to raise its prices when other CPs have migrated onto IP Exchange and de-commissioned their own TDM networks).

4.132 As the market develops we recognise that we will need to keep this area of interconnection under review, to assess competition in the market.

4.133 C&W also suggested that if BT charges a specific rate for IP interconnection then all CPs should be able to access that rate. As discussed above we consider that IP Exchange provides a service that incorporates competitive services and, as such, it would not be appropriate to impose an obligation restricting BT's commercial offers.

4.134 If BT provides a termination service where interconnection is not available at the LE rate via a TDM node (e.g. a service where numbers are effectively hosted on the IP Exchange platform), it would be consistent to interpret this service as being a termination service provided via IP Exchange.[86] If so, BT should make available a point of interconnection to IP Exchange where the LE rate applies. In that case, we would expect BT to meet reasonable requests for TDM interconnection to this service, and if BT sought a rate above the LE rate for providing this interconnection it would need to demonstrate that it satisfies the three-stage test.

Summary of key conclusions

4.135 Our conclusions regarding how CPs should set fair and reasonable FTRs where NGNs and TDM networks interconnect are as follows:

- FTRs should be presumed to be fair and reasonable where they are symmetric with the Benchmark FTR, even where technology conversion is provided at the terminating node. Where a CP seeks to justify a higher rate, it would need to do so by showing how each of the criteria of the three-stage test, set out in the final guidance in Section 6, were met.

- While we consider that interconnected NGNs are likely to be the most efficient *ultimate* outcome, at this stage we have not determined either the complex questions of the industry's optimal migration path to that outcome or its timing. In the meantime, we consider that both TDM and NGN could be efficient ways for different operators to provide fixed-line voice services, and consider that our proposed guidance on fair and reasonable charging for termination will provide reasonably efficient signals for investment in NGNs until the next review of the wholesale narrowband market. We recognise that operators need to interwork the two technologies during their co-existence, and to incur the costs that arise.

- We recognise that termination charges that apply in the interconnection of TDM networks and NGNs could be set in ways which could influence the extent to which different operators take interworking costs into account in making their respective technology choices, and which could hence affect the migration path.

[86] See paragraph 7.50 of the 2009 WNMR.

However, for the reasons we summarise below, we consider that it would not be appropriate for us to intervene now in setting such charges beyond providing guidance that symmetric termination charges would be presumed to be fair and reasonable:

- The extent of any improvement in the industry's migration path from TDM to NGN that could be achieved by regulatory intervention in setting termination rates is uncertain. We consider that the complex interaction of incentives and the appropriate regulatory arrangements which could help deliver an improved migration path may be more appropriately considered in the broader policy framework of a market review than in the context of guidance on how FTRs should be set by CPs other than BT (outside the Hull area).

- We consider that an NGN seeking to convert its outbound traffic from IP to TDM protocols before sending it for termination to a TDM network has some commercial options, including self-provision and procurement of conversion services at a small number of locations from providers of transit services or from the terminating TDM network. We therefore do not consider it appropriate to intervene in setting charges for the IP to TDM conversion of outbound traffic from an NGN.

- We do not consider it appropriate for an NGN to face a different charge for the regulated termination service provided by a TDM network from the charge faced by another (originating) TDM network seeking the same termination service from the same terminating TDM network. We note that an NGN and a TDM network need to perform similar functions in sending TDM traffic for termination to a TDM network[87].

- In considering how an NGN operator could set a fair and reasonable charge for terminating calls from a TDM network, we do not consider it desirable that the introduction of new technology should cause the price of existing services (in this case termination) to rise. In our view, this principle is more important than the uncertain improvement in the migration path which we might achieve by determining an apportionment of conversion costs between IP and TDM networks. We therefore consider that the IP operator should seek to recover the costs of such conversion within its termination charge, and presume that the NGN operator should charge no more than the symmetric rate, unless it can demonstrate using the three-stage test that it would be fair and reasonable for it to charge a higher rate.

- We recognise that the efficient path of migration is a complex issue: those that migrate from TDM to NGN may save conversion and interworking costs for NGN operators, but will introduce conversion costs for interconnection with parties which have not migrated and may incur other interworking costs in interconnecting with such parties.

- NGN operators could consider commercially whether to set charges for IP termination on their networks at a level lower than the symmetric rate in order to

[87] We distinguish in this regard between the different functions presented to us by NGN operators as interworking functions. We recognise that the need for conversion between TDM and IP protocols arises as a consequence of the co-existence of TDM networks and NGNs. However, in our view, the needs for outbound transmission to numerous TDM termination points and for operation of TDM infrastructure for the purpose of interconnection are consequence of the existence of TDM networks generally, and not specific consequences of the co-existence of TDM networks and NGNs.

signal to TDM networks, in considering their migration plans, to take into account opportunities for reducing interworking costs.

- Originating networks should be able to make reasonable requests to terminating networks to interconnect at termination points using the originators' preferred technology. Operators will be expected to provide these services at a fair and reasonable rate, which we would presume to be the Benchmark FTR unless operators could demonstrate that a higher rate is justified under the three stage test. We would expect this to include where IP operators requested an IP termination service from a TDM operator, although IP standards are less well developed than TDM standards.

- BT's migration from TDM to IP should not ordinarily cause termination rates to rise. If BT undertakes any TDM to IP migration in the current NCC period, we would be unlikely to reopen the charge control, but we would also expect BT to be able to only charge a FTR no higher than the LE rate for termination, unless it can justify a higher rate via the three-stage test. We will reassess the call termination market in the next wholesale narrowband market review, which we expect to carry out in 2012/13.

- We do not currently consider that BT's IP Exchange product is a termination service as IP Exchange interconnection is only available at a few locations, and operators can access termination for geographic calls to BT's subscribers deeper into BT's network by interconnecting at local switches. The pricing and commercial terms of IP Exchange or similar products should therefore be subject to commercial negotiation. This would apply to any interconnection product where conversion does not take place at a terminating node.

Section 5

Other issues

Introduction

5.1 In this section we address responses on a number of other issues:

- Additional switching and conveyance in termination;
- Routing constraints;
- Time of day profile;
- Symmetry with KCOM's rates in Hull; and
- Transitional issues (timing).

5.2 We discuss each of these below, setting out our proposal in the consultation, respondents' views and our final position.

Additional switching and conveyance in termination

5.3 In paragraphs 3.8 to 3.11of the September 2010 Consultation we set out that we were not proposing to provide guidance on transit services provided by the terminating CP because this service falls outside the termination market to which our guidance will apply.

Respondents' views

5.4 [✂] and [✂] suggested that our guidance does not address cases where calls are handed over at a node other than the terminating node. They suggested that this would mean that BT (or other operators) would pay the LE rate for calls handed over at a point of interconnection other than the one at which the termination service was provided.

5.5 BT maintained that our guidance should state that any negotiation of rates for services outside of the termination market should be based on the principle of reciprocity. It also noted that it would only enter into negotiation if the impact on rates would make a material difference to the CP concerned. BT said that there are a number of scenarios where it was unavoidable that it would route traffic to the incorrect switch. These include: host switches that are not available for interconnection, the CP does not make capacity available for route expansion, number ranges are dual hosted for traffic management purposes, routing to the non-host switch is requested by the CP and the traffic to the host switch is too low to make direct interconnection efficient.

Ofcom's position

5.6 Where a call is handed over at a node that is not the terminating node, the terminating CP must provide a switching and conveyance service to transport the call to the terminating node, in addition to providing the termination service. This additional switching and conveyance service does not fall into a market where we

have concluded that any CP has SMP. Therefore, this service would not be subject to regulatory obligations.

5.7 We note that in the expired Reciprocity Agreement the Multi Switch Operator ("MSO") status provided a mechanism for agreement of the charges for this service. In addition, the MSO approach took into account that CPs' billing systems may not be able to bill different rates based on the point in the CP network at which the call is handed over. Therefore, the MSO uplift was calculated as an uplift to be applied on all calls. In addition, for an operator to obtain MSO status under the expired Reciprocity Agreement, at least 10 percent of calls needed to be handed off by BT at the "wrong" (i.e. non-terminating) switch.

5.8 It is our view that the terminating CP, in providing this additional switching and conveyance, is able to charge for this service and this charge should be paid for all calls that use the additional service. CPs are free, within their commercial negotiations with BT or with each other, to continue to use an approach such as that adopted in the MSO calculation to set the rates for additional switching and conveyance outside the termination market if they wish to do so, but we do not offer guidance that CPs should be required to take this approach. CPs are free to establish their own charges.

5.9 In relation to several of the scenarios that BT listed as reasons why it routed traffic to the incorrect switch, the termination service is defined from the point of interconnection closest to the called party. As such, where interconnection is not available at a terminating switch, CPs should not, in general, be charged extra for switching and conveyance from another point of interconnection to the terminating switch. This inter-switch conveyance on the terminating network should be considered part of the termination service (since it cannot be by-passed by the originating CP and is determined by the terminating CP).

Routing constraints

5.10 In the consultation we discussed certain routing constraints that exist in TDM networks such that analysis of dialled digits to determine call routing is restricted to number-block level (compared to NGNs that have the ability to route at a more granular level). We asked for respondents' views on whether we should provide guidance on how these routing constraints should be treated when considering the termination service and how they might impact on termination rates.

Respondents' views

5.11 TDM operators in general argued that routing below number block level (generally at the 1k level) was not practical given the routing capabilities of their networks and that they should not be penalised for not supporting more granular routing.

5.12 BT said that it routes calls based on the agreed routing plan and that some circumstances exist that make it unavoidable for it to route to the "incorrect" switch. We have discussed some of these points above but BT also said that it sometimes routes traffic to the incorrect switch because it was not practical for a TDM network to route calls at the per-number level.

5.13 C&W stated that, subject to Ofcom's number conservation work, routing should be based on 1k blocks. Bilateral agreements between CPs could allow for more granular routing than this but CPs should not be required to pay higher rates where they

delivered traffic to the correct POI, based on a "notional" homing of all 1k blocks onto a specific POI.

5.14 Several NGN operators said they had no routing constraints in their networks and so their networks were capable of routing calls on a per-number basis. They argued that the constraints of TDM networks should not impose inefficiencies upon them. [✂] said that routing calls based on blocks (e.g. 1k blocks) would cause it significant difficulties. It said that it believed a reasonable approach would be that the terminating CP provided a list (effectively a NIPP for its own network) showing the relevant POI for each number. Calls handed off per this plan would be charged at the termination rate. Calls handed off at other POI would be subject to additional charges.

Ofcom's position

5.15 The NTNP requires that geographic numbers should be adopted or otherwise used based on the specific Area Code allocations set out in the plan, unless the subscriber specifically requests otherwise. The NTNP does not impose any obligations on the terminating CP as to which of its switches and/or POI should host geographic numbers but CPs that disperse numbers within a number block across multiple POI without specific justification (for example, to support out-of-area services requested by their customers) may not be providing services that meet the obligations of the NTNP.

5.16 The market definition in the 2009 WNMR defined the relevant market as "Wholesale fixed geographic call termination on each individual network" where call termination included the conveyance of all signals (including relevant control signals) required to terminate calls on a customer's exchange line from the POI closest to the customer.

5.17 TDM networks have generally allocated geographic numbers to exchanges on a number block basis. All traffic to numbers within a number block can be handed over to the exchange on which the block is hosted for termination. The interconnected networks need only analyse the dialled number to the number block level to be able to determine the POI over which calls should be handed.

5.18 NGNs offer the capability that numbers can be allocated across POI at a more granular level so that numbers from within a particular number block could be allocated in such a way that they are spread across different POI. TDM networks have identified that this can be problematic for them, since their networks are less capable of routing at these more granular levels. Some TDM network operators have expressed concern that the charging regime for FTRs could create a perverse incentive to disperse geographic numbers in order to increase termination revenues if very granular routing is implemented.

5.19 Each terminating CP is required to provide network access on fair and reasonable terms. Whilst the purpose of this Statement is to provide guidance on how we would interpret SMP Condition BC1 in relation to fair and reasonable charges, CPs are also required under this Condition to provide termination on fair and reasonable terms and conditions.

5.20 We would expect that CPs would offer geographic call termination services which would make use of numbers in a manner consistent with the NTNP and that they will provide termination on a fair and reasonable basis. We think that providing more prescriptive guidance that routing should be at the number block level may limit the development of services that make the optimal use of NGN capabilities. We consider

that there is scope for commercial agreement to be reached on a bilateral basis between interconnecting providers on the granularity of routing that should be applied. In cases where such agreements cannot be reached we would consider, with regard to the specific facts of the case in hand, whether more granular routing is reasonable based on the service being provided by the terminating CP. Where routing at a more granular level is considered reasonable, calls handed over at the "wrong" POI would be subject to additional conveyance charges. That is, we would not consider that a rate above the Benchmark FTR was justified for geographic call termination, but rather that an additional conveyance service was being provided by the terminating CP as discussed above in paragraphs 5.3 to 5.9.

Time of day/weekend profile

5.21 We did not specifically discuss the time of day profile in our September 2010 Consultation, but received comments from two respondents on this subject. Time of day/weekend profile refers to the practice whereby CPs charge different rates at different times of the day (e.g. between daytime and evenings) and/or charging a different rate between week days and the weekend.

Respondents' views

5.22 [✂] said that CPs should be given flexibility in setting the time of day profile and suggested an approach similar to mobile call termination ("MCT").

5.23 BT said that other CPs' tariff periods should be aligned to BT's tariff periods, which are used to establish the day, evening and weekend rates in order to recover BT's costs.

Ofcom's position

5.24 BT's termination rate must comply with the NCC. The NCC allows BT some flexibility in setting the Time of Day ("ToD") gradient, although we note that BT has not traditionally altered the gradient it uses when it has changed its rates[88].

5.25 In our November 2010 consultation document on MCT[89] we proposed, as our preferred option, to set a maximum charge ceiling which we considered appropriately addresses concerns over frequent and significant changes to mobile termination rates ("MTRs") or so-called 'flip-flopping' or 'see-sawing'. In our subsequent statement of March 2011 on MTRs[90] we decided to adopt our preferred option and set a simple MTR cap with a single maximum charge in each year to limit disruptive price-setting flexibility ('flip-flopping') after a two-month transition period.

5.26 Our aim with this guidance is to ensure that rates for fixed termination are set on a fair and reasonable basis. Our view is that rates would be presumed to be fair and reasonable where a CP sets rates equal to BT's LE rates for the different time periods – day, evening and weekend – and uses the same times to define these periods.

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[88] See BT Wholesale's Carrier Price List (Pricing Information) briefing on the time of day gradient at http://www.btwholesale.com/pages/static/service_and_support/service_support_hub/online_pricing_hub/cpl_hub/cpl_pricing_hub.html

[89] A consultation entitled *Mobile call termination: A simpler pricing rule* published on 16 November 2010 at http://stakeholders.ofcom.org.uk/binaries/consultations/mtr/summary/mtr.pdf

[90] A statement entitled *Wholesale mobile voice call termination* published on 15 March 2011 at http://stakeholders.ofcom.org.uk/binaries/consultations/mtr/statement/MCT_statement.pdf

5.27 However, we do not discount that alternative ToD profiles for other operators could be fair and reasonable if a variation from the profile used by BT is justified, for example, based on differences in traffic profiles.

5.28 Where a CP considers that a rate higher than the corresponding BT rate in any time period would be reasonable, we would expect the CP to demonstrate that this rate is reasonable, for example by considering whether its average rate across all of its traffic exceeds BT's 24 hour rate. In the case where a CP sets the rate for any particular time period higher than the corresponding BT rate and cannot demonstrate that its average rate does not exceed BT's 24 hour average rate, the three-stage test may be appropriate in assessing whether the overall rates are fair and reasonable.

Symmetry with KCOM termination rates in Hull

5.29 In the September 2010 Consultation we set out in paragraphs 3.4 to 3.7 that we were considering guidance related to SMP Condition BC1. This condition does not apply to KCOM in the Hull area. KCOM is regulated in the Hull area by SMP Conditions BB1 to BB5 and hence KCOM's rates for termination in the Hull area are outside the scope of this project.

Respondents' views

5.30 In its response BT questions the lack of symmetry with KCOM in the Hull area. It recognises the outcome of the last market review in imposing additional obligations (notably a cost orientation obligation) onto KCOM but argues that rates should be symmetrical in order to ensure efficient operator costs are reflected in call termination to KCOM in the Hull area.

Ofcom's position

5.31 Our guidance is addressing the requirement for FTRs to be fair and reasonable as required under SMP Condition BC1 given industry's failure to negotiate and reach consensus on a new agreement, compliant with the condition, to replace the expired Reciprocity Agreement. KCOM was not a signatory to the expired Reciprocity Agreement for the determination of its FTRs applicable for terminating geographic calls to its network in the Hull area. KCOM's termination rate within the Hull area is regulated by SMP Conditions BB1 to BB5. SMP Condition BB3 requires KCOM to ensure that the basis for its charges for network access (including call termination) is derived from the costs of provision based on a forward looking long-run incremental cost approach allowing an appropriate mark up for the recovery of common costs.

5.32 The correct place to consider the regulation to apply to KCOM in the Hull area in relation to termination rates is within the wholesale narrowband market review. Within future market reviews we will consider appropriate remedies to impose on KCOM in the Hull area to address any SMP that is found to exist. As we are considering guidance related to SMP Condition BC1, it would not be appropriate to also apply our presumption of the LE rate to KCOM in the Hull area within the context of this guidance. However, the same principles set out in this Statement and final guidance may be applicable to any future consideration of KCOM's FTR taking into careful consideration any specific circumstances of call termination in the Hull area.

Transitional issues (timing)

5.33 In the September 2010 Consultation we considered three options as to what period of time might be proportionate and reasonable to take into account in providing guidance on FTRs, to enable CPs to make adjustments to their businesses in order to minimise transition costs and disruption:

- **Option 1**. A straight switch to symmetric FTRs for all CPs from the point we publish our final guidance.
- **Option 2**. A straight switch to symmetric FTRs for all CPs at the end of the current NCC period (30 September 2013) – a period for adjustment then of around 32 months.
- **Option 3**. A straight switch to symmetric FTRs for all CPs following an adjustment period. Our view would be that this period should balance the time needed by CPs to react to our guidance (in terms of any network changes) with the benefit that may flow to consumers of reduced FTRs.

5.34 Our provisional view was that Option 3 would provide the best balance between a reasonable period for CPs to make adjustments to their businesses and delivering benefits to consumers. Our proposal was that a date of 1 October 2012 would be appropriate as this would align with the date when the final year of BT's NCC commences. Furthermore, it would be consistent with the EC Recommendation which requires symmetry of FTRs by 31 December 2012.

Respondents' views

5.35 Respondents agreed that we should provide a reasonable period for businesses to make adjustments and were generally supportive of our common industry approach i.e. that all CPs should switch to the new arrangements at the same time. However, respondents took very different positions as to the duration of any transition period.

5.36 Some respondents argued that the proposed period is unreasonably long, suggesting that allowing CPs 6-12 months to make the necessary network adjustment would be sufficient. C&W was concerned that our proposal would leave an approach based on the expired Reciprocity Agreement in place for at least three years, even though we have concluded this is not a fair and reasonable approach for setting termination rates.

5.37 Others said that the arrangements should be synchronised with the start of the new NCC for BT, which would commence on 1 October 2013. [✂] argued that this should be the earliest that any deviation from an approach based on the Reciprocity Agreement should be considered as it would take at least that length of time for the necessary arrangements to be put in place to re-route traffic.

Ofcom's position

5.38 The fair and reasonable obligation was imposed by the last market review (2009 WNMR). In that and previous reviews, the Reciprocity Agreement has been taken as a mechanism to satisfy this obligation. However, as there is no Reciprocity Agreement in place, we consider that providing guidance on interpretation of the obligation would be helpful. In the absence of such guidance, there would be uncertainty as to how CPs should approach setting their FTRs in order to meet the obligation and this could lead to a series of disputes.

5.39 Because of this, we do not consider that it would be appropriate to wait until the start of the next market review as some respondents have proposed. This would not address the issue of how CPs should set their termination rates in the meantime which is central to the purpose of this guidance.

5.40 However, we continue to believe that in providing guidance on fair and reasonable FTRs, taking a transitional period into account is appropriate since the investment incentives created by the expired Reciprocity Agreement differ from those that would exist based on our guidance. The substantive reason for providing for any transition period is therefore one of fairness to CPs, some of whom would lose out (having had their previous arrangements legitimately incentivised by the expired Reciprocity Agreement) in higher termination out-payments to BT if we did not provide for a period of adjustment. Consumer benefits would be affected by our decision on a transition period to the extent that any such period would delay the potential benefits to them of lower wholesale termination charges being passed on through reduced retail prices. Consumers could also be affected adversely if too short a transition period gave rise to disruption in the industry, however the risk of this is difficult to substantiate. Therefore, in deciding what transition period is appropriate we need to balance the need to be fair on CPs on the one hand with the delay in delivering consumer benefits on the other.

5.41 Whilst implementing changes to FTRs could be carried out immediately, we consider that it is reasonable to allow CPs a period of time to respond to this change in order to minimise disruption to their businesses. A number of respondents say that this period could be as short as six months. However, we consider that this period may be unreasonably short for some CPs who may require a longer period of between 12–17 months in which to reasonably plan and implement significant changes in the configuration of their interconnection arrangements (taking also into account the notice CPs have had about the prospect of changes to arrangements for FTRs). We note the point raised by C&W that the longer the period of transition, the greater the concern that the mechanism for setting CP termination rates does not align with our view of how fair and reasonable rates should be set. Whilst we agree with the view that the transitional period should be as short as reasonably practical, we nevertheless consider that it is appropriate to take due consideration of a reasonable adjustment period in our guidance.

5.42 We have considered our proposed preferred timeline which provided for a transition period until October 2012 – a period now of about 18 months. Taking account of the arguments above and responses from stakeholders, any transitional period should avoid an unnecessarily extended period, but should also allow a reasonable period of time for CPs to reflect the impact of the changes in their business plans. We recognise that for some CPs this may involve significant network rearrangement and/or traffic re-routing decisions (including commercial negotiations). We believe that our provisional preferred timeline reflects a period of time which would enable a CP to reasonably undertake these activities. We therefore conclude that a period of around 18 months is reasonable and that the end of this transition period should align with the start of the BT charge control year on 1 October 2012.

5.43 During this transition period we consider, as we set out in our draft guidance[91], that unless a party's circumstances have materially changed since the expiry of the last Reciprocity Agreement, it is unlikely to be fair and reasonable to charge for fixed call termination at higher prices or on bases, terms and conditions that are less

[91] Paragraph 7.12 of the September 2010 Consultation.

favourable for purchasers of termination than those provided for under the expired Reciprocity Agreement.

Section 6

Final guidance

Introduction

6.1 In this section, we draw together the reasoning set out in the previous sections and set out our final guidance on fair and reasonable charges for fixed geographic call termination services in UK markets excluding the Hull area.

Scope of guidance

6.2 This guidance applies to wholesale termination of calls to geographic numbers[92]. Ofcom's statement of 15 September 2009 entitled *Review of the fixed narrowband services wholesale markets*[93] ("the 2009 WNMR") defined wholesale fixed geographic call termination in relation to each terminating fixed network to include conveyance of all signals (including control signals) required to terminate calls on a customer's exchange line from the first point in the network where those signals can be accessed by another communications provider.

6.3 The scope of the guidance concerns SMP Condition BC1 set in the 2009 WNMR which requires, amongst other things, that Communications Providers' ("CPs'") charges for call termination services (hereafter referred to as Fixed Termination Rates ("FTRs")) in the UK outside the Hull area[94] should be fair and reasonable.

6.4 This guidance applies only to FTRs for wholesale fixed geographic call termination as defined in the 2009 WNMR. It does not apply to charges for other services that a fixed network may perform in switching and conveying calls from other networks to its customers. Ofcom considers that charges for services which fall outside markets subject to SMP regulation are matters for commercial negotiation between CPs.

Reciprocal charging as a continued basis for fair and reasonable charges

6.5 Ofcom considers that, in principle, reciprocal charging, whereby the FTRs for wholesale fixed geographic call termination on other CPs' networks are based on the charges paid to BT for call termination on BT's network, remains a fair and reasonable basis, consistent with SMP Condition BC1, for all operators of fixed networks to set their termination charges outside the Hull area.

Presumption that all FTRs are set equal to BT's termination rate

6.6 FTRs for wholesale fixed geographic call termination are presumed to be fair and reasonable where they are the same as BT's call termination rate. Currently this rate

[92] A geographic telephone number is an ordinary number of a fixed phone line. It starts with either '01' or '02'.
[93] See http://stakeholders.ofcom.org.uk/binaries/consultations/wnmr_statement_consultation/summary/main.pdf
[94] In the UK excluding Hull, other CPs can purchase wholesale inputs from BT and as such reciprocity with the regulated BT rate provides a benchmark for reasonably efficient termination. KCOM has a cost orientation obligation pursuant to SMP Condition BB3.

is the BT Call Termination Local Exchange ("LE") rate (hereafter referred to as the "Benchmark FTR") and is subject to controls as set out in Ofcom's Explanatory Statement and Notification of decisions on charge controls in wholesale narrowband services of 15 September 2009 (entitled *Review of BT's Network Charge Controls*)[95] ("the 2009 NCC"). Subject to the guidance on transitional arrangements set out below, Ofcom's rebuttable presumption is that FTRs for wholesale fixed geographic call termination that are higher than the Benchmark FTR are unlikely to be fair and reasonable.

Framework for assessment of exceptions (the "three-stage test")

6.7 Any disputes pursuant to sections 185 to 191 of the Communications Act 2003 ("the Act") regarding FTRs above the Benchmark FTR will be reviewed on their own facts.

6.8 However, Ofcom considers that FTRs above the Benchmark FTR, are only likely to be consistent with SMP Condition BC1 where a CP is able to demonstrate that:

- charging a FTR equal to the Benchmark FTR would deny it recovery of its actual costs of providing fixed geographic call termination; and
- its actual costs of providing fixed geographic call termination are efficiently incurred; and
- charging a higher FTR than the Benchmark FTR would be offset by demonstrable consumer benefit. Such benefits might include lower overall end-to-end call costs (not just in particular cases but in general for calls to the CP's network) or other benefits to calling parties related, for example, to the quality of the service provided.

Guidance on transitional arrangements

6.9 We consider that a reasonable period of adjustment is appropriate before CPs implement the arrangements for FTRs set out in this guidance which provides a reasonable balance between:

6.9.1 the time required for CPs to review and adjust their business arrangements and, where appropriate, mitigate financial impacts by planning and implementing any changes to their interconnection arrangements; and

6.9.2 delivering the benefits of symmetric FTRs in a timely manner.

6.10 We therefore consider that FTRs should comply with this guidance from 1 October 2012.

6.11 We consider that, prior to that date and after 30 September 2009, the continuation of the arrangements which provided for the determination of FTRs under the Reciprocity Agreement which expired on 30 September 2009 are likely to be considered fair and reasonable.

6.12 We therefore consider that, unless a party's circumstances have materially and demonstrably changed since the expiry of the last Reciprocity Agreement, it is unlikely to be fair and reasonable to charge for fixed call termination at higher prices or on bases, terms and conditions that are less favourable for purchasers of

[95] See http://www.ofcom.org.uk/consult/condocs/review_bt_ncc/statement/nccstatement.pdf

termination than those provided for under the expired Reciprocity Agreement until 1 October 2012.

FTRs and different network technologies

6.13 For the avoidance of doubt, this guidance applies irrespective of the technology used by the network providing termination of calls to geographic numbers, including, for example Next Generation Networks, and including where such call termination involves conversion between different technical standards. That is, FTRs charged by such networks will be presumed fair and reasonable if they are no higher than the Benchmark FTR. Claims for objectively justifiable higher rates would need to consider the cumulative three-stage test set out above.

Section 7

Glossary

21CN (21st Century Network): 21CN is an investment programme, announced by BT in 2004, designed to upgrade its network infrastructure and systems. The original network architecture was designed to deliver a single IP-based NGN, which would replace numerous service specific platforms in the legacy architecture. This included replacing the existing TDM-based voice network in its entirety.

Communications Providers (CPs): Companies which provide electronic communications services to the general public, i.e. end-users.

Conveyance: conveyance refers to the transport of traffic, often voice traffic, across a network.

DLE (Digital Local Exchange): The DLE is a type of switch in BT's voice network. It is generally the switch closest to the end-user, i.e. the first switch to which an end-user line connects. End-user copper access lines may connect directly to a DLE, or may connect via a concentrator. There are around 700 DLEs in BT's current voice network architecture.

FTR (fixed termination rate): the wholesale rate charged per minute by a fixed network for terminating calls on its network.

IP (Internet Protocol): IP is a protocol which is used to send data across the Internet, and now in many other networks. IP defines the addressing system on the Internet and allows different IP datagrams (packets) to be routed to the correct destination.

MSAN (Multiservice Access Node): In 21CN and in other NGN designs, an MSAN is a piece of equipment which allows a CP to provide both Digital Subscriber Line (DSL) based broadband and voice services over a single line. It therefore performs the function of both a DSLAM and concentrator/DLE. It is usually located in the local exchange.

Next Generation Networks (NGN): A 'Next Generation Network' is generally understood to refer to an IP network capable of being used for both voice and data, and in which there is some control over quality of service. The key features of an NGN are that it is a packet-based, multi-service network, which has a clear separation of transport and control, and where the control functions may reside on a physically separate network.

NGNuk: NGNuk is an industry forum which was created to help the coordinate the transition to NGNs in the UK.

SDH (Synchronous Digital Hierarchy): SDH is a method of digital transmission. One of its key features is that its transmission streams are packed in such a way as to allow simple multiplexing and de-multiplexing, and the addition or removal of individual streams from larger assemblies. SDH is a TDM based technology that requires very accurate timing across the network.

SMP (Significant Market Power): SMP is the term used in the European Regulatory Framework to describe the position of a company, which either individually or jointly with others, enjoys a position equivalent to dominance, that is to say a position of economic strength affording it the power to behave to an appreciable extent independently of competitors, customers and ultimately consumers.

TDM (Time Division Multiplexing): TDM refers to technologies and methods of putting multiple data streams in a single signal by separating each signal into many segments, each having a very short duration. Each individual data stream is re-assembled at the destination based on timing.