Vodafone Response to Ofcom's Consultation:

Narrowband Market Review

Part 1 – WCT & Interconnection

✂ Non-confidential Version ✂

Executive Summary

Although the overall size of the Narrowband Communications Market in the UK has declined in recent years, it remains a very significant market, covering over 60 billion annual call minutes and supplying exchanges lines to over 33 million UK premises. While much of the attention often focuses on the rise of other forms of communication, such as over-the-top applications and social media platforms, it is important not to lose sight of just how significant the narrowband market remains and it is likely to remain for the UK's consumers and businesses for the foreseeable future.

The Narrowband market continues to be a key tool for commerce for both small and large businesses alike. It also provides a vital link to residential consumers, connecting communities, families and friends as well as underpinning a range of important services which many citizens rely upon, from home security alarm monitoring to help alert pendants that allow more vulnerable consumers to retain their independence. It is therefore absolutely right that Ofcom conducts a robust, comprehensive consultation to ensure that the correct remedies are set for the next market review period. This market is important to Ofcom because it matters to the UK's consumers and businesses. Most of the debates about the market in the Ofcom consultation take place at the wholesale level and are rightly focused on the specifics of the technical functioning of the market today. However, we should not lose sight that the consequences of those wholesale market decisions are ultimately felt by end consumers, who will bear the consequences or reap the benefits of any decisions taken as a result of this review.

As a CP with interests across the entire market, serving both residential consumers and businesses and having significant operating experience in the market since liberalisation, we have detailed knowledge and experience to contribute to this market review. In this response we set out our position on Ofcom's proposals in respect of interconnection, technology choice, call termination and other call conveyance issues. In summary:

- Ofcom's conclusions that each CP terminating geographic calls has SMP and that each should be subject to a charge control is a sensible and practical solution. We support the use of a charge control based upon the LRIC cost of a modern IP network and we agree that there should be a flat 24hr rate cap with no time-of-day variance.
- We believe Ofcom has erred in concluding that the technology choice for regulated interconnection should be given to the terminating network. IP and TDM interconnection are in the same market, but the current approach has resulted in the largest fixed terminating provider BT, holding up the pace of universal IP adoption. The reality is that most UK traffic is originated on networks with an IP core, with TDM now being the exception. CPs, including BT should of course be free to sweat TDM assets, but not to impose costs on other CPs as a result. To prevent progress being further delayed, the regulated termination rate should also be made available for IP interconnection regardless of the technology used in the terminating network, and should at least be available at a number of handovers consistent with migration to IP having taken place.
- Charges for interconnect services (switchports, extension circuits) make up a significant part of the voice cost base and have not been fully reviewed this century. To be consistent with regulation of call termination, these charges should be based upon usage of a modern efficient network. In the event this this is not accepted, then at the very least a full review of costs is required to ensure that these products do not continue to over-recover. These are charges that are principally borne by CPs, not by BT so create a significant asymmetry in the market place.

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Introduction

1. Vodafone welcomes this opportunity to respond to Ofcom's proposals in the Narrowband Market. At Ofcom's request we have split our response into two parts, to be submitted separately. Our comments on Ofcom's proposals in the Wholesale Fixed Analogue Exchange Line (WFAEL), Wholesale Call Origination (WCO) and ISDN Markets will follow once we have considered Ofcom's consultation proposals contained within *The Review of the market for standalone landline telephone services*[1].

2. This document therefore focuses on all other aspects of Ofcom's Narrowband market review proposals, principally interconnection, technology choice, call termination and other call conveyance issues. These are important matters that underpin the functioning of the market, dictating in part the physical aspects of call termination & conveyance as well as the resulting commercial transactions related to the flow of traffic across networks. In turn, the cost-base and degree of competition in these areas profoundly impact upon competition at the retail level and as a consequence, consumer welfare.

3. Narrowband, like many of the other markets regulated by Ofcom, is one overshadowed by market failure. BT retains significant market power in a range of wholesale markets that means it can, absent regulation, dictate terms and harm consumer welfare. In addition, BT retains a number of important commercial and technical levers that allow it to act as the *de facto* system controller across many markets. This control manifests itself through a variety of mechanisms, including control of the terms of the Standard Interconnect Agreement, control of the Carrier Price List (where BT is able to push through unilateral price changes) and through its authorship of various product and technical manuals that document various interconnection services and standards. This system control is similar to that observed in other regulated industries[2]. The cumulative impact of this control is significant, having a real bearing on market outcomes which is very rarely if ever considered in Market Reviews, but should be taken into account. It is a factor that is particularly acutely felt where de-regulation occurs, because without market specific regulatory safeguards, BT is able to leverage this control to maximum effect. We return to this further in our second submission to this consultation. It is however essential that the right regulatory remedies are in place to counteract BT's market power, preventing it from setting the agenda in the market or from holding other market participants back by virtue of its size or through its own technology choices.

4. Vodafone is a longstanding market participant, having an established base of enterprise users who rely on Narrowband services in the UK. We are also a recent entrant into the fixed consumer market,

[1] https://www.ofcom.org.uk/__data/assets/pdf_file/0030/97806/Consultation-Review-of-the-market-for-standalone-landline-telephone-services.pdf

[2] For Example See: (1) http://www.dieterhelm.co.uk/assets/secure/documents/Railways-paper-.pdf or

(2) http://www2.nationalgrid.com/uk/industry-information/electricity-system-operator-incentives/

offering voice and broadband to UK consumers. Our longstanding industry experience, coupled with our ambition as a consumer market entrant affords us a wide view of the market.

5. Like other Communication Providers (CPs) operating in the sector we rely on the regulation of SMP services to deliver two things: certainty to allow commercial investment to take place and secondly charges based on the right costs using the right recovery mechanism. Efficient network investment can and will then take place.

6. The remainder of this document is split into the following sections:

    I. Section One focuses on Fixed Termination Rates, stressing how important standardised 24hr rates are for ensuring a level playing field. This section will also consider the issue of porting conveyance charges.

    II. Section Two examines the proposals for charges for interconnect circuits, highlighting the need to use the right cost basis and the need for cost scrutiny of BT's underlying cost base to prevent over-recovery.

    III. Section Three looks at the issue of technology choice and the importance of technology choice in the investment of voice services.

    IV. Finally in Section Four we will seek to answer the specific questions posed by Ofcom that are relevant to this part of our response.

1. Fixed Termination Rates & APCCs

Proposed Fixed Termination Rates

7. The current arrangement of regulating BT's Fixed Termination Rate and expecting other CPs to reciprocate has allowed some CPs to game the system. Whilst the materiality of any one case has been insufficient to warrant the raising of regulatory disputes, cumulatively those CPs that abide by the regulation – and hence their retail customers – have subsidised those CPs that have been flouting the rules. A more robust approach is required to ensure all CPs, regardless of their size, comply. The solution proposed by Ofcom in this consultation where each and every fixed terminating CP is designated as having SMP, and is subject to the same regulated termination rate, is a sensible one.

8. This proposal makes compliance easy to understand and is therefore likely to be effective. We support Ofcom's proposal to apply a universal charge control rate to all fixed calls terminated in the UK regardless of origin, removing the harm caused by market distortion and the presence of excessive fixed termination rates.

9. Ofcom's proposal to identify a single maximum rate that is applied as a charge control to all CPs with SMP for Wholesale Call Termination, which does not allow for time of day pricing differentials to be applied, is a logical and sensible way forward. We agree that it is unrealistic to argue that a difference in pricing of less than 0.03ppm at the wholesale level could possibly affect retail consumer behaviour.

10. Further, as set out in Vodafone's earlier submissions to Ofcom, CPs have had profound difficulties converting the 24hr rate set by Ofcom into the time-of-day charges subsequently levied by BT. A 24hr rate represents a simple, transparent and proportionate way of regulating termination rates.

11. We therefore agree with Ofcom's proposal to introduce for the first time a flat rate termination rate across all fixed CPs at all times of day. Vodafone notes the consultation update provided by Ofcom on the 12th January 2017 which set out revised rates for the "entry point" to the next charge control, which addressed an error in the previous version published in the consultation document. We agree with BT that the rate should be 0.035ppm rather than 0.029ppm, however this increase does not warrant any shift in Ofcom's conclusion that there is any merit to employing a glide path - Ofcom's original plans to implement without a glide path remains the right approach.

Future Modelling of Wholesale Call Termination

12. We note that Ofcom highlights possible future changes in respect of WLR regulation in subsequent market reviews as a consequence of a migration of retail customers to IP. The model being adopted by BT, and likely to be adopted by any other provider utilising SOGEA, will be that of voice

provided by an Analogue Telephony Adaptor (ATA) embedded into a broadband router with the voice being conveyed as an application in the data signal[3]. This differs from Ofcom's modelling approach, which Vodafone believes is based upon an MSAN architecture. Whilst we consider the current approach is a reasonable proxy for the more modern ATA architecture, Ofcom will need to review this aspect of the cost model in future market reviews, assuming call termination continues to be regulated (as a bottleneck service we believe this is a fair presumption).

Physical Handover points affect actual costs

13. Vodafone notes that the definition of termination services[4] specifically refers to "*the point in the network closest to the end customer's point of connection to the network where those signals can be accessed by another CP*". Figure 16.1 in the consultation[5] is quite accurate, and telling, on this point, highlighting that on a BT-CP interconnection the POC is typically closer to the BT than CP site. Although the diagram does not explicitly state this, the BT SIA requires that the POC must actually be within 100 metres of the BT site; otherwise it is treated as either Customer Sited Interconnect (CSI) or Nominated In Span Interconnect (Nominated ISI) and will result in additional charges for the CP[6].

14. By way of example, in Figure 16.1 the BT exchange building with CP fibre in close proximity could be in Plymouth, but the CP's exchange building could be in Bristol or even London: in effect the CP is conveying calls over their fibre from Plymouth to their switch in Bristol/London for the same call termination charge that BT is terminating the call from a maximum of 100m away from their site.

15. Such a situation is clearly unfair, but in this market, such inequality is a relatively common occurrence. As the proposed regulation of termination rates does not allow for, or even intended that, these distance related transmission costs to be recovered through ppm rates, we suggest that regulation should reflect that each CP is allowed to recover transmission costs of back to their own site. ✂.

Average Portability Conveyance Charges (APCCs)

16. In our response to Ofcom's CFI to this market review, Vodafone set out views on the future regulation of APCCs. At that time we were seeking to negotiate with BT to determine whether their prices were LRIC-based, as set out in Ofcom's regulatory guidance. We proposed that the Narrowband Market Review consultation project and mechanism was a useful way of setting a regulated charge, without creating a significant additional overhead. We were not suggesting that portability should be included in the definition of call termination market; although with calls to

[3] In the second part of this response, Vodafone will set out the considerably technical difficulties involved in implementation of the ATA approach which will limit the level of adoption during this market review period. This does not, however, take away from the fact that it will constitute the Modern Equivalent Asset when considering call termination costs.
[4] Para 11.3
[5] On page 302
[6] See Schedule 01 para 4.7 of the BT Standard Interconnect Agreement; as historically it is always operators that have requested interconnection rather than BT, this has set the structure.

ported numbers representing perhaps 30-40% of overall terminating traffic, there is certainly a case to suggest this. Instead, our proposal to incorporate a review of APCCs was borne of pragmatism.

17. We believe that the fixed APCC is very similar to the mobile Donor Conveyance Charge (DCC). Both are established and governed by General Condition 18. The mobile DCC is subject to the regulatory framework set out in GC18 and at Vodafone's suggestion is specifically calculated and established through a process that is carried out in parallel and at the same time as Mobile Termination Rates are set. This system works well in providing certainty and avoiding unnecessary disputes.

18. However fixed APCCs are subject to a quite different framework that has not delivered the same clarity in outcomes. APCCs are governed by a Fair and Reasonable obligation set out in GC18, with separate guidance on how this might be interpreted[7]. The reasoning for that difference is historic: DCCs had been subject to a series of regulatory disputes, with Ofcom intervention required. On the other hand, APCCS had been pretty stable with fewer disputes. Additionally, it was felt that BT would comply with the guidance to charge at Long Run Incremental Cost (LRIC), and other operators would reciprocate.

19. However this was not to be the case, as BT ignored the guidelines and attempted to maintain their APCC above LRIC, an issue that went to dispute and was then subsequently appealed at the Competition Appeal Tribunal. (CAT). A ridiculous amount of effort has gone into establishing the current BT APCC (seven months of unproductive negotiation in an attempt to establish the basis of BT's charging, calculating the correct rate, resolving the dispute and defending the decision at the CAT), we should surely learn from this lesson and additionally capitalise on the cost model developed during the dispute (updated with latest data) to set the APCC for the period of the next charge control.. In addition by setting the charge now, it would be in place for the next three years, hence reducing commercial risk for CPs; during the last iteration two years lapsed whilst resources were spent by CPs to fight back against an illegal APCC charge. In the end, whilst BT lost the right to impose the increased charge on CPs, no compliance action was taken for their breach of GC18 and we still await the outcome of the ongoing Ethernet Appeal to determine whether all of the APCC overcharge will be repaid (to date we only have surety of repayment of sums overpaid after the dispute was raised, not for the period prior to this while Vodafone sought to negotiate a solution).

20. It seems logical and a pragmatic use this good work (refreshing the numbers, but not undertaking a material revision) to establish the APCC for the next three years. This would meet many objectives and would not create an undue burden on any party – in reality would make compliance clear for BT, reduce the commercial burden on CPs and reduce the burden of any compliance action by Ofcom.

[7] https://www.ofcom.org.uk/__data/assets/pdf_file/0026/79424/statement_on_porting_charges_under_qc18.pdf

Regulation of mandatory services

21. Vodafone is concerned that there are a series of services to which originating CPs are either compelled by regulation to terminate calls or compelled by commercial necessity, yet for which there is no regulatory underpinning. In the second part of our response to this consultation, we raise the specific example of access to 999 services, but there are others such as text relay and payphone acess, where due to legacy issues or the economics of providing the service (requiring a critical mass of end users) where BT is the sole provider of the service and finds itself able to push through large prices rises without fear of any market response.

2. Interconnect Circuits

Interconnect Port Charges are unique to BT

22. Ofcom has reviewed interconnect circuit charges as part of this market review process. This is a series of charges that apply uniquely to interconnection with BT. The majority of other interconnecting fixed and mobile CPs do not apply the charge on their interconnect relationships - the charge is essentially waived. However, BT does not do this and therefore interconnect port charges that BT levies on CPs form a substantial part of the interconnect and therefore terminating call cost base.

23. As a result of the reductions in conveyance charges for call termination, which are now set at LRIC, port charges make up a significant part of the cost of interconnecting with BT. In Vodafone's case, we estimate the port rental bill to be ✂ of our total cost of terminating calls to BT: we expect that it would be higher for the majority of other CPs ✂. We have numerous concerns with the magnitude of this charge.

    a) Are the costs being allocated a true reflection of the cost of providing interconnect ports? We are suspicious that the RFS has not demonstrated a cost reduction over the last number of years, and yet there can be no new investment. There is a risk that costs are unduly allocated to interconnect ports, because this is a cost that is not borne by BT.

    b) Have common costs been moved to interconnect ports from ppm charges over time? The spotlight has not shone on interconnect ports for a number of years, with roll over regulation in place since around 1997. Without scrutiny, we cannot know if cost allocations continue to be accurate.

    c) Is the use of Fully Allocated Cost of historic network as the chosen cost model, rather than LRIC of an efficient network, the right approach? Given that LRIC is used for the associated call conveyance charges, and the ports are part of the same network assets that are used to calculated ppm charges, it feels like LRIC would be the right approach here too

24. These substantive port charges have an impact on competition. ✂ BT's own retail business is not subject to these charges and therefore does not need to incorporate them into its cost base.

Ports costs: actual costs or the costs of an efficient network?

25. The costs associated with call termination comprise the ppm charges for Wholesale Call Termination (WCT), together with the charges for switch ports and interconnect extensions (connections and rental). We note that whilst the former is regulated on the basis of the LRIC of a modern network in order to encourage efficiency, the latter is regulated with reference to BT's actual costs of provision (albeit not reviewed for some time), based on its regulatory accounts.

26. It is not a given that the two aspects of call termination should be regulated on the same basis, however we fail to understand the reasoning for the difference in the basis of the charges. Why are interconnect port charges not based on LRIC?

27. We are more than happy if BT wants to sweat its network assets, rather than moving to modern technology. However in doing so we do not understand how it can justifiably charge us a premium in order to avoid incurring its own costs[8].

28. There can be no justification for a charging mechanism that fails to both take account of the sunk assets in the cost base and that the associated regulated call termination charge has moved to LRIC. Allowing BT to continue to recover over-inflated and potentially artificial costs undermines competition in the UK. To maintain consistency, the charge for ports should be restricted to the incremental cost of offering those ports from a modern IP network. Where TDM technologies are deployed, then the charges should be limited to a proportionate value representing the cost of an IP interconnection, *pro-rated* according to the volume of voice channels being conveyed.

29. Vodafone notes that the CAT has previously decided that Ofcom should review whether it was appropriate for BT to recover common costs[9], in relation to Point of Handover for Partial Private Circuits[10]. They are directly comparable services to voice interconnect services .. Ofcom set out the following advantages to a LRIC approach in justification of its conclusion to use LRIC:

    We have decided to implement a cost recovery approach based on LRIC. This is because a LRIC approach:

    - *follows the cost causality principle closely (by only including costs incurred directly to provide POHs);*
    - *and is likely to promote more effective and sustainable competition by only taking into account the costs incurred as a result of CPs' demand for POHs.*

    It feels inexplicable to treat interconnect services for voice differently to those for PPCs: LRIC rather than FAC should be used to calculated the port charges.

Do BT's regulatory accounts reflect the actual costs?

30. However in the event that Ofcom considers BT should be able to recover its actual costs rather than those of an efficient network, Vodafone has concerns as to whether the Regulatory Financial Statements (RFS) accurately reflect the incurred cost of provision.

31. BT is currently subject to an accounting separation obligation with respect to interconnect circuits. This is critical regulation that allows a small light to be shined on regulatory compliance. This provides some indication of the breakdown of costs, however does not provide sufficient

[8] In this context we note that for commercial reasons, BT typical waives the port charges on IPX, in contrast to TDM.
[9] http://www.catribunal.org.uk/files/1112_Cable_Wireless_Determination_300610.pdf, para 5.94 onwards
[10] https://www.ofcom.org.uk/consultations-and-statements/category-3/revision-points-handover-pricing/final-statement

information to fully understand the costs cited in Section 18 (which are drawn from the RFS) of the consultation document. Given our own knowledge of voice network costs we are concerned that they will lead to charges that are significantly higher than costs actually incurred.

32. Ofcom explains that while the RFS indicate 2015/16 returns below WACC for interconnect circuits; these figures reflect both DLE interconnect and tandem interconnect. A disaggregated analysis of 2014/15 data shows that returns for DLE interconnect are higher than returns for tandem interconnect. Given the unregulated nature of tandem interconnection and the shared platform costs that sit across BT's interconnect estate, Vodafone would support Ofcom's proposal to investigate further the most up to date available financial information that relates specifically to DLE interconnection[11] to ensure any assumptions used to set charges are robust.

33. Vodafone notes Ofcom's observation that the WACC used by BT in calculating DLE interconnect FAC appears excessive, and as part of this review, ensuring the FAC is not overstated as a result is necessary[12].

34. Vodafone understands that BT has not purchased any significant volumes of new DLE assets for over a decade, and in particular that as circuit volumes have been falling, BT has been reusing surplus ports and switches to repair other ones in use. That would suggest that all of the relevant assets have been fully depreciated by now, suggesting extremely low capital related costs (depreciation and Mean Capital Employed). We note that at para 10.137 of the last Narrowband Market Review in 2014[13], Ofcom noted the *"highly depreciated nature of the assets used to provide interconnect circuits"* – with no investment in the meantime the assets could hardly have been recapitalised. However, the financial data being examined by Ofcom curiously appears to suggest that such costs are still material[14].

35. Vodafone encourages Ofcom to review these costs to ensure they are not overstated, to prevent over-recovery. In particular, many of the assets used by interconnect services are also used by BT to deliver retail and unregulated wholesale services. For example, the switchports used on tandem and DLE switches are no different to those used when calls interconnected by BT's (unregulated) IPX service are handed into the TDM network for call termination; and carriage of BT's own retail calls utilise the same SDH assets as used for the provision of Interconnect Extension Circuits (IECs). This creates a risk that the costs of such assets are not appropriately allocated between regulated and unregulated services. We would be perturbed if we found that as volumes have reduced, the overall costs allocated to regulated services have not reduced, but those absorbed internally within BT have fallen in line with volumes.

[11] Paras 18.9 to 18.15, and 18.32 to 18.33
[12] Para 18.14
[13] https://www.ofcom.org.uk/__data/assets/pdf_file/0012/50160/nmr_consultation.pdf
[14] Table 18.2

36. Vodafone agrees with Ofcom's expectation that the cost of interconnect circuits is likely to fall in future[15]. Indeed, any other trend would appear to undermine the rationale given by Ofcom for regulating interconnection on the basis of TDM in the first place, which assumes that TDM is an efficient technology choice because:

    "*TDM networks represent a largely sunk asset with low forward-looking costs*" [16].

37. While we support Ofcom's further investigation, the information currently available appears to point strongly to a significant fall in charges in real terms:

    - Even in the event that the figures in the RFS prove to be correct, the current reported returns on DLE interconnect are "comfortably above the relevant WACC"[17].
    - as noted above, current actual returns may well be higher than this due to the overstatement of costs; and
    - costs are likely to fall in future.

The safeguard cap on port charges is inadequate

38. The proposed approach of a safeguard price cap on port charges is wholly inadequate given the materiality of these charges to CPs. We urge Ofcom to review both costs and methodology. If Ofcom decided to retain some form of FAC based charging mechanism, we would expect real costs to fall in line with the historic investment already having been recovered. However, a more appropriate charging mechanism would be LRIC of a modern network asset. Either way, a substantial review of port charges is necessary to ensure that CPs can compete with BT in retail voice markets.

39. It might be argued that Ofcom is time-constrained; a proper analysis would have profound implications for these charges possibly requiring supplementary consultation. However, this is no reason to duck the issue: ✂

[15] Para 18.34
[16] Para 16.46
[17] Para 18.14

3. Technology Choice for Interconnection

40. On face value, technology choice for interconnect circuits appears to be an esoteric technical discussion. In reality it is a critical commercial decision that drives investment business cases and therefore service and product choice in the market.

41. The assessment that Ofcom has made in looking at future technology choice assumes that there is no event that would change current run rates for TDM and IP interconnect in the future. Vodafone notes that Ofcom sought information on the historic level and projected forward looking volumes of IP interconnection. It is inescapable that the bulk of interconnection historically has been using TDM technology.

42. However, the choice of interconnect technology is influenced by a number of factors including both the regulatory regime and by the state of technical standardisation. It is quite possible that CPs did not quality their answers based on these variables and therefore relying on these answers, does not take account of CPs ultamite preferenace, merely, their reflection of likely outcomes.

Regulation is a significant factor in technology choice for interconnect

43. To date, Ofcom's regulation has allowed the technology to be adopted for a given interconnect relationship to be set by the terminating CP: this means that for BT termination, regulation has favoured the use of TDM interconnection: since BT's calls terminate on TDM DLE nodes, the regulated fixed termination rate applies only to TDM interconnections, with IP interconnection to BT's network being unregulated.

44. We note that the market has perhaps not functioned as Ofcom would have anticipated when it established the currently regulatory framework. In principle it would be expected that interconnection to TDM networks would be TDM, with IP at a commercial premium; conversely that interconnection to IP terminating networks would be IP, with TDM at a commercial premium. Vodafone is unaware of any case where an IP terminating network has demanded a premium for terminating calls via a TDM interconnect: the practical impact of the current regime – which is proposed to continue – is that those terminating networks sweating TDM assets can have commercial freedom in offering IP interconnection, but the reverse hasn't been the case.

45. In an ideal world, Originating CPs seeking to terminate calls will seek to use the most cost-effective mechanism, and this will – leaving aside any regulatory distortion – invariably be the technology used in the core of their networks. Amongst the major operators in the UK, we would note the following:

    - BT and Virgin operate predominately TDM networks.
    - Sky and TalkTalk operate IP core networks.
    - Vodafone's fixed network is of mixed technology, with a planned IP migration during the review period.
    - Other small fixed networks are pretty much universally IP.
    - To the best of our knowledge all mobile originating networks operate an IP core.

46. It should be noted that the retail access mechanism to the network is irrelevant – for example Sky and TalkTalk serve residential customers via analogue access but this is interworked to IP at the network edge; similarly Vodafone's fixed network operates ISDN services in the access, but the core is IP and it is that technology which we seek to maintain through to interconnection.

47. We therefore estimate[18] that 82% of traffic originates on networks with an IP core, 18% of traffic from networks with a TDM core. The natural interconnect mechanism, absent regulatory distortion, is IP. To frame this a different way, in past reviews Ofcom has raised the prospect of a "tipping point" in the transition from TDM to IP: there can be no doubt that we have now passed this tipping point as far as core networks are concerned.

48. In the case of BT, because the regulated rate for call termination is only available at the terminating TDM node (DLE), TDM is the only mechanism of interconnect that provides regulatory certainty. It will also be the lowest cost of terminating calls (in isolation, ignoring the costs of connecting to those hundreds of nodes), because inherently BT's commercial termination rate for IP interconnection will always be above the LRIC cost of terminating the call at the DLE[19].

49. Therefore, in asking the question of CPs' future plans for interconnection with BT without providing the backdrop of the future regulatory environment, CPs will likely have assumed the *status quo* – which means the question being asked is whether the CP intended to continue to use the regulated call termination service, or take their chances on an unregulated IP capability.

[18] Consultation at Figure 3.2, 65% of traffic is mobile network originated, 35% is fixed originated. Consultation at Figure 3.4, of that 35%, 40% is originated on BT, 12% on Virgin, i.e. TDM origination is 52% of 35% of total traffic.
[19] Absent BT pricing at below cost, which would represent a margin squeeze.

Technology standardisation

50. The last remaining technology barrier for IP interconnect was only addressed in 2016. ND1035[20], the interconnect specification which Ofcom recognises, was published in February 2016 in a form supporting number portability, emergency calls and call diversion. Prior to this, while CPs were able to bilaterally specify interconnect protocols, inherently these were not harmonised meaning each relationship required technical negotiation. It is only in the last year that network CPs have had an industry standard to rely upon in establishing IP interconnects. As this last barrier has fallen we would expect the desire for IP interconnection, and therefore regulatory certainty would hasten.

Future regulation of interconnect technology choice

51. There is a single market for Wholesale Call Termination, with IP and TDM interconnect products both in this market.. Regulation in that market is designed to provide predicable cost base for originating CPs. It is a distortion that TDM interconnect is given regulatory certainty, while IP interconnection does not have this same level of certainty. It is therefore essential that purchasers (primarily of BT's) Fixed IP Termination should be afforded the same regulatory certainty on fixed termination to ensure networks and interconnect arrangements can evolve in the UK without the uncertainty that goes with being outside the scope of formal regulation.

52. Why is this important? A lack of regulatory certainty provided for IP Termination means that CPs are reluctant to move to IP interconnect which means that inefficient network investment decisions are being made by the majority of CPs in the UK. If we leave distortions due to regulation to one side, the preferred interconnect mechanism will be determined by the technology used in the core of networks. If an operator has a network with an IP core they would wish to extend that to interconnection, conversely if the network has a TDM core then that is preferable for interconnection.

53. Vodafone is absolutely supportive of the right of those operators who wish to sweat TDM assets to continue to do so. There is no suggestion that TDM interconnect should be retired or in other ways discouraged. What is however happening currently is that BT's prevailing choice of interconnection is resulting in distortive effects on the investment of CPs.

54. Although we are concerned about the technology cost of gatewaying traffic from IP to TDM in order to align with those operators sweating assets, it is the transport layer implications which are of greater consequence. By way of example, a decision by BT to demand TDM interconnection for traffic terminating on its network in order to secure access to the regulated termination rate means that it is necessary to interconnect to 600+ BT DLEs spread across hundreds of sites to avoid commercial charges. This number of interconnects are not required because of BT's scale: it is

[20] Consultation para 16.30: we note that the footnote in the consultation refers to the previous ND1035 v1.1.1, which did not specifically encompass support of number portability, call diversion and emergency calls.

purely a consequence of their technology decisions hence network architecture. As a comparison when industry previously discussed the move to IP interconnect with BT as part of 21CN it was agreed that fewer than 30 IP handover points would be sufficient (noting that at that point in time, according to the consultation[21], BT's call volumes were some 75% higher than now, meaning even fewer handovers are likely required now as traffic volumes have declined). That other operators are required to meet the cost of physically connecting to hundreds of sites rather than perhaps 20 sites that would be required through IP interconnect is solely a consequence of BT's technology decisions – it is a classic economic externality.

55. It cannot be right that BT's technology decisions means that we face the cost of maintaining a transmission network[22] connecting to hundreds of BT sites in order to secure the termination rate that we're entitled to under regulation. There may be a logic in sharing *gatewaying* costs; but given the inefficiency of needing to *connect to hundreds of switch sites* is purely down to BT's network investment decisions, it cannot be right that this cost lies with anyone other than them.

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58. Before we get to that situation where BT can exploit all CPs and become essentially dominant again in competitive markets, IP interconnect should be subject to regulation. This would give CPs sufficient commercial certainty to make efficient investment decisions and provide the market with new technology and choice.

59. This is not an esoteric wholesale market without relevance to consumers. Termination costs (i.e. both wholesale call termination, and the consequent costs arising on one's own network to access this service) are what sets the underlying cost base for retail competition.

60. The total cost of interconnect products (ports, transmission, ppm charges) set the framework for investment decisions. At the moment, the cost of transmission and ports means that TDM interconnection costs are significantly higher than the recent regulated reductions in ppm rates would suggest. However, the alternative IP interconnect is not commercially palatable due to the lack of any commercial certainty: once the Rubicon has been crossed, we have no choice but to take whatever rate BT offers. We therefore cannot envisage using efficient IP interconnection until we have regulatory certainty. Our analysis shows that 82% of voice traffic is IP in the core, whatever tipping point we might decide is the right one for regulating IP interconnection, we have surely surpassed it.

[21] In 2010 BT had market share of 42% (Figure 3.4) of 123Bn mins (Figure 3.3); in 2015 these numbers were 40% of 74Bn mins.
[22] Or lease one from a third party such as BT

4. Answers to questions

Question 11.1: Do you agree with our provisional conclusion regarding market definition for WCT? Please provide reasons and evidence in support of your views.

Vodafone agrees with Ofcom's conclusions. Call termination is a bottleneck service that can't be avoided in the short term and is beyond the control of the party making the call.

Question 11.2: Do you agree with our provisional conclusion that each CP has SMP in the defined market for fixed geographic call termination applicable to that CP? Please provide reasons and evidence in support of your views.

Please see Vodafone's analysis in Section One of this response.

Vodafone agrees with Ofcom's conclusions. Since the last market review we have raised concerns that some CPs appear to be trying to set their own termination rates out of step with being reciprocal to the benchmark termination rate. This is unacceptable and we welcome Ofcom's efforts to address it within this market review.

Question 12.1: Do you agree with the remedies that we propose for CPs with SMP (other than BT) in the WCT markets? Please provide reasons and evidence in support of your views.

Please see Vodafone's analysis in Section One of this response.

Vodafone agrees with Ofcom's conclusions. We support these remedies, believing them to be overdue and creating a level playing field.

Question 12.2: Do you agree with the remedies that we propose for BT in the WCT market? Please provide reasons and evidence in support of your views.

Please see Vodafone's analysis earlier in this response.

Vodafone agrees with Ofcom's conclusions. It is essential that BT is not able to discriminate, publish a reference offer and providing transparency through accounting separation and cost accounting obligations in addition to the remedies imposed on other CPs.

Question 13.1: Do you agree with our proposal to apply a charge control to all designated CPs with SMP in the WCT markets? Please provide reasons and evidence in support of your views.

Please see Vodafone's analysis in Section One of this response.

Vodafone agrees with Ofcom's conclusions.

Question 13.2: Do you agree with our proposal to apply the WCT charge control to all

calls terminated in the UK irrespective of where the call was originated? Please provide reasons and evidence in support of your views.

Vodafone agrees with Ofcom's conclusions. Although there is merit to allowing differential rates in the case of mobile termination, where the benchmark UK rate can vary dramatically to that charged in some countries, we cannot see the same rational for fixed termination rates. We note that the routeing pattern for geographic calls varies significantly to that of mobile calls, in the main because of the large volume of fixed line CPs: it is far more common for a variety of transit networks to be involved. Implementing a differential termination rate affects not just the terminating CP, but all transit networks in the call path – and it is uncommon for transit networks to have the ability to differentially account based on the contents of the CLI field.

To introduce this complexity on fixed termination rates would also act as a significant incentive for transit networks – some beyond Ofcom's regulatory control – to manipulate CLIs to obfuscate the origin of calls. This runs counter to Ofcom's parallel activity to improve the reliability and authenticity of CLIs with the aim of reducing nuisance calls.

Question 15.1: Do you agree with our proposals regarding modelling and setting the WCT charge control? Please provide reasons and evidence in support of your views.

Please see Vodafone's analysis in Section One this response.

We welcome Ofcom's proposal of a charge control that encompasses all UK fixed communication providers, imposing a single maximum rate on geographic call termination. A universal charge controlled rate to all fixed calls terminated in the UK regardless of origin is the best way to achieve this. We think the benefits of time of day pricing are now much reduced in termination markets and a 24Hr rate represents a simple, transparent and proportionate way of regulating termination rates.

Question 16.1: Do you agree with our approach to the regulation of interconnection? Please provide reasons and evidence in support of your views.

Please see Vodafone's analysis earlier in the response. Vodafone disagrees with the technology choice being made by the terminating CP, if that CP makes choices which impose costs on CPs using the MEA for their network.

Question 17.1: Do you agree with the remedies we propose in relation to BT's interconnect circuits? Please provide reasons and evidence in support of your views.

Please see Vodafone's analysis earlier in this response. Vodafone disagrees with Ofcom's approach, and believes that like call conveyance charging associated with call termination, charges should be regulated on the basis of an efficient (i.e. IP or fully-depreciated TDM) network being used. In the event that Ofcom does not accept this, then at the very least a rigorous review of BT's costs should be undertaken to ensure that it is

not over-recovering costs. Ofcom has repeatedly rolled over safeguard regulation in this area, and it is now time for a thorough review.

Question 17.2: Do you agree with the remedies we propose in relation to KCOM's interconnect circuits? Please provide reasons and evidence in support of your views.

Please refer to Vodafone's response to Q17.2; we see no reason why there should be any difference in regulation between BT and any other CP that has been designated as having SMP in call termination (including ourselves).

Question 18.1: Do you agree with our charge controls proposals for BT's interconnect circuits? Please provide reasons and evidence in support of your views.

Please see Vodafone's analysis earlier in this response. We believe the propose baseline costs for the charge control are overstated. Given that most of the assets are fully depreciated, we would expect charges to be lower on the TDM platform. Our preference remains for a charge control based on MEA principles, moving off TDM to an IP based architecture.

Q19.1: Do you agree with our proposals for BT and KCOM's regulatory financial reporting? Please provide reasons and evidence in support of your views.

Regulatory Reporting is essential for transparency and given the SMP nature of these markets it is essential that full and transparent reporting is available to all stakeholders to ensure that costs can be scrutinised. Market failure needs to be remedied through regulatory intervention and unless stakeholders have access to reliable regulatory accounting information, they can't judge if the prices charged for regulated services are reasonable or fully participate in future consultations related to those charges. We discuss the importance of reliable regulatory accounting information in the second part of our consultation response.

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