BUSINESS CONNECTIVITY MARKET REVIEW ("BCMR")

CALL FOR INPUTS

NON-CONFIDENTIAL RESPONSE BY BSKYB ("SKY")

EXECUTIVE SUMMARY

1. As a large LLU operator offering retail broadband and telephony, Sky's interest in this review relates to backhaul services and their relevant markets (Alternative Interface Symmetric Broadband Origination or "AISBO"). Subscriber growth and increased usage amongst Sky's customers is driving demand for higher bandwidth backhaul circuits. This trend will continue over the lifetime of the market review period (2012 -15) with demand mainly focussed outside of the central business districts where most high bandwidth circuits have been concentrated so far and, instead, in areas where there is less effective choice of suppliers.

2. Evidence suggests that there may not be a break in AISBO markets above 1Gb/s. This is due to the increasing use of optical services to deliver circuits at all bandwidths and marked reductions in the cost of DWDM[1] equipment. We note that the many of the barriers to adopting "converged" backhaul – where circuits are used to convey broadband, voice and business Ethernet – are falling away and, as such, the case for separate access and backhaul markets is becoming stronger.[✂]

3. Either way, BT is likely to hold significant power in the market(s) from which LLU backhaul is supplied because of combination of high sunk costs, high barriers to entry, large scale and scope economies and the uniquely ubiquitous nature of its network.

4. Given these conditions, BT's duct and fibre backhaul infrastructure could be viewed as an enduring economic bottleneck. Therefore, it is worth considering whether there are points upstream of AISBO from where competition could be sustainable and effective. Access to BT's unlit fibre ("dark fibre") and access to BT's ducts (Physical Infrastructure Access, "PIA") are possible passive remedies that could create competing investment and innovation in backhaul.

[1] Dense Wavelength Division Multiplexing

5. Opereach's interpretation of Ofcom's trunk market definitions and its backhaul circuit distance limits mean that it is not practicable for Sky to unbundle certain exchanges that would otherwise be commercially viable - even though it is present in the relevant Trunk Aggregation Node ("TAN") area. We recommend that either distance limits are relaxed or, alternatively, if LLU operators are present in a TAN area but too far away from an exchange, they should be allowed to purchase backhaul circuits that cross TAN area boundaries.

6. Now that Openreach's Orchid services have been widely used in the supply of LLU backhaul, Ofcom anchor pricing approach to the Leased Line Charge Control may no longer be appropriate.

CONTEXT

7. Sky is an LLU operator providing residential broadband and telephony services. As such, Sky's main interest in the forthcoming BCMR is in wholesale backhaul (the so-called "middle mile") services that support the delivery of these retail products by connecting unbundled local exchanges to Sky's core network. Today, the backhaul products that Sky purchases are predominantly Ethernet-based and fall within AISBO markets.

8. Sky requires increasing LLU backhaul capacity in order to keep pace with the rapid growth of both its broadband subscriber base and per subscriber usage levels. This trend is expected to continue – or may even accelerate should consumer demand for NGA-based broadband increase significantly - during the period considered under the next BCMR (2012 – 2015).

9. As a result, Sky expects to continue to upgrade the capacity of its backhaul circuits to such an extent that it will become increasingly reliant on circuit bandwidths in excess of 1Gb/s.

   [✂]

MARKET DEFINITIONS

Bandwidth Breaks and Optical Services

10. At the last BCMR, Ofcom bifurcated the AISBO market on the basis that there was a natural break in the chain of substitution at 1Gb/s. Ofcom argued that the cost of equipment used to deliver lower bandwidth[2] Ethernet circuits was markedly less than the cost of the optical DWDM equipment required for deliver higher bandwidth circuits and that, as a result, the (cost-oriented) prices of higher bandwidth circuits could not constrain the prices of lower bandwidth Ethernet.

[2] 1 Gb/s and below

11. Ofcom illustrated this point by arguing that a hypothetical monopolist in the low bandwidth AISBO market could profitably impose a *small but significant non-transitory increase in the price* ("SSNIP") because there would be little or no scope for supply-side substitution to occur from the high bandwidth AISBO market.

12. Additionally, Ofcom concluded that, even though DWDM could be used to deliver wholesale AISBO, such optical services were upstream inputs and, thus, not part of the AISBO markets.

13. In fact, conditions today suggest that there may not be a break in the markets around the 1Gb/s point. Instead, there may be a single market - irrespective of bandwidth and without an upper limit – and one which, potentially, includes optical services not just point-to-point dedicated Ethernet. This is because, not only are optical services now widely used to deliver services above and below 1Gb/s[3], but the cost of the DWDM equipment used has fallen markedly – by more than 90%[✂] - over recent years. As a result, the cost differential between this equipment and standard Ethernet cards and chassis[4] has narrowed significantly. These changes suggest the SSNIP test described above may now prove unprofitable because of the increased scope for supply-side substitution.

Symmetric Broadband to Support Retail Broadband

14. While it is possible that there is no longer any basis for a bandwidth break in AISBO markets, it is also possible that there is a separate market for backhaul to support services alongside aggregated business connectivity – for example, retail broadband and telephony. LLU backhaul, for example, has several distinct characteristics that could support the view that it, or at least backhaul generally, is in a separate market:

    a) Backhaul is often purchased separately from access (copper loops), unlike business connectivity;

    b) There is little scope for indirect demand-side substitution at the retail level should wholesale prices rise;

    c) Backhaul is purchased as a total networking solution that could include over 2,000 circuits to exchanges and is not purchased on a circuit-by-circuit basis[5]. As a result, there may not be a common pricing constraint between LLU backhaul and business connectivity; and

    d) Unlike the financial district of London, there is insufficient demand for circuits at higher bandwidths on most LLU backhaul routes to justify the very

[3] For example, via so-called "Orchid" (EBD and BTL) products;
[4] Traditionally used to provide point-to-point circuits at 1 Gb/s and below.
[5] There are strong operational and commercial incentives for LLU operators to use only one supplier of backhaul. Furthermore, the costs of changing supplier will be very high and may act as a barrier to competition even if market entry were to occur. These incentives are strengthened by the rise of networked, optical-based backhaul solutions – such as EBD/BTL – because the associated increased scale and scope efficiencies and potential improvements in functionality could flow through LLU operators.

high fixed entry costs for alternative network operators in constructing competing duct and fibre networks.

Access vs. Backhaul

15. Access and backhaul was previously viewed by Ofcom as being in the same market but, as stated above, unlike standard business connectivity, LLU operators do not typically buy access and backhaul together (and when access is purchased it is from a separate market – Wholesale Local Access).

16. Moreover, in the last review, Ofcom cited "converged" backhaul – where more than one service runs over the backhaul link e.g. voice, broadband and business connectivity - as being a potential key driver of separated access and backhaul markets.

    [✂]

17. At the last BCMR, Ofcom described three factors which may inhibit the adoption of converged backhaul:

    a) Technical issues – it was stated that only SDH/PDH[6] and WDM could support all traffic types;

    b) Interconnection often occurs in different locations for different traffic types; and

    c) Investment uncertainty – BT's 21CN programme was still evolving at the time and, as a result, communications providers were unlikely to make significant investments in their backhaul networks.

18. Now, however, these barriers may be less effective in constraining the adoption of converged backhaul as:

    a) It is now possible to transport TDM over Ethernet backhaul circuits and, therefore, some of the technical issues cited by Ofcom may no longer be relevant;

    b) LLU operators already use backhaul to transport broadband, voice and business connectivity;

    c) While interconnection can occur in different locations, it is more often within the same building in BT's network (as an LLU exchange); and

    d) Less uncertainty surrounds BT's largely completed and scaled back 21CN programme.

    In light of these developments, it is appropriate for Ofcom to reconsider whether access and backhaul are in separate markets and to ensure that backhaul can be used for local interconnection.[7]

[6] Synchronous digital hierarchy and plesiochronous digital hierarchy

SIGNIFICANT MARKET POWER

19. At the last BCMR, Ofcom found BT to have significant market power ("SMP") in the low bandwidth AISBO market on the basis[8] of:

    a) BT's high market share;

    b) BT's high profitability;

    c) BT's extensive network advantages; and

    d) High barriers to entry and expansion as a result of high sunk costs and significant economies of scale and scope.

20. However, when it came to the high bandwidth AISBO market, Ofcom concluded that no communication provider had SMP. Ofcom cited[9]:

    a) BT's falling market share;

    b) No extensive network advantages – the relatively few high bandwidth circuits at the time were congregated in the financial district of London;

    c) Evidence of market entry - the concentration of high bandwidth circuits within the City and their associated high revenues meant that new entrants – such as Colt and Vtessse – could profitably sink the high fixed costs of building their own fibre networks in this area and, as a result, provided effective competition to BT; and

    d) Few scale and scope economies.

21. We have already argued in this paper that the case for bifurcation of the AISBO market may be weaker today. If Ofcom finds there to be a single AISBO market irrespective of bandwidth in the forthcoming market review, then it is likely that BT would have SMP – for similar reasons that BT has previously been found to have SMP in low bandwidth AISBO i.e. a combination of high market share, extensive network advantages, high barriers to entry and large scale and scope economies.

22. However, should Ofcom conclude that bifurcation remains justified or, alternatively, should it consider that there is a separate LLU backhaul market, then we would still argue that, given the extensive backhaul coverage that LLU operators seek at all bandwidths (including increasing demand for >1Gb/s), only BT has a ubiquitous middle mile backhaul network that can meet this demand.

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[7] On this latter issue, we note that, while Ofcom considered there to limited scope at the time for the adoption of converged backhaul in AISBO markets at the last BCMR, it nevertheless explicitly required BT to offer handover products – both in span, in building and customer sited – in AISBO markets.

[8] Paragraph 1.29, Ofcom, *op cit*

[9] Paragraph 1.30, Ofcom, *op cit*

23. Sky notes that, at the last BCMR, Ofcom felt that there was little scope for demand for high bandwidth AISBO circuits to develop outside of a few high density financial districts:

> "*We recognise that the high bandwidth AISBO market is continuing to develop and that demand is likely to increase over the period of the market review. However, we do not have any evidence which suggests that this demand is likely to develop to any significant degree in geographic areas outside of areas with a concentration of large business sites. On this basis, the available evidence suggests that there is no operator which can be found to be in a position of SMP in this market for the reasons outline* [sic] *above.*"[10]

Sky's internal forecasts provide compelling evidence that, this time around, demand is likely to develop well beyond a few financial districts and be more expansively spread across the UK.

REMEDIES

Passive Remedies: Duct Access and Dark Fibre

24. In fact, given that further viable market entry is unlikely due to high sunk costs of constructing competing duct and fibre networks for backhaul and access, it is worth considering whether there is a point upstream of Ethernet and/or optical services from where competition could be sustainable and effective. As such, it may be justifiable to require Openreach to offer regulated access to its ducts – via Physical Infrastructure Access ("PIA") – or even to its unlit fibre ("dark fibre") in the middle mile.

25. In Sky's view, the lack of competition on the majority of routes where it requires LLU backhaul, the low likelihood of market entry and the inefficiencies of procuring LLU backhaul from a variety of suppliers as opposed to a single source, all point towards BT's middle mile fibre and duct network being an enduring economic bottleneck. Moreover, Sky considers that, for certain backhaul routes, there could be a case for operators to invest and innovate from a point upstream of AISBO by installing their own fibre and equipment should PIA be available for this purpose.

26. For example, there are around [✂] LLU exchanges that are currently connected to Sky's network [✂] that are within [✂] Km of a Sky Point of Presence ("POP"). This distance is too long to warrant the high cost of digging directly from the POP to the LLU exchange but it is sufficiently close to make the pulling of Sky's own backhaul fibre through BT's ducts (via a PIA remedy) a potentially viable option – especially in the context of Openreach's current bandwidth-related pricing gradient for backhaul and Sky's anticipated increases in demand for backhaul bandwidth to a sizeable proportion of its LLU exchanges.

27. Dark fibre is downstream of duct access (but upstream of AISBO) but could also prove a viable point for sustainable competition. As with duct access, network operators purchasing Openreach dark fibre would still be able to invest and

[10] Paragraph 7.162, Ofcom, *op cit*

innovate around DWDM and Ethernet equipment but, while duct access may only be suitable for relatively short cable-pulls, dark fibre could be used over much longer distances and, therefore, it could be used to connect more LLU exchanges.

28. Sky recognises that full consideration of whether it is appropriate to mandate access to BT's network – via dark fibre and/or duct access – upstream of AISBO will be required at the forthcoming BCMR. While passive remedies may offer the possibility of future deregulation of downstream markets, it would not be appropriate to act until any new remedies have had some time to take effect.

Trunk vs. Terminating Segments

29. At the last BCMR, in order to define the boundary between the trunk market (relating to core network) and the market for "*terminating segments*" (effectively made up of access and backhaul) for leased lines, Ofcom defined a series of TANs[11]. Circuits served from a TAN and entirely within the catchment area of that TAN are deemed terminating segments but, should a circuit cross the boundary between one TAN area and another, it would be deemed to include some trunk.

30. With respect to AISBO services, Openreach is only allowed to provide circuits that are contained entirely within a single TAN area[12]. [✂] Openreach applies a cap on the allowable circuit distance (35Km) even though Ethernet circuits can operate over much longer distances and despite Ofcom's removal of any regulated distance restrictions at the last BCMR[13].

31. There are two solutions to this issue that Sky would like to see considered at the next BCMR:

    a) Require Openreach to replace the 35Km cap with a higher cap that reflects current technical limits; and

    b) Define TAN rules so that, where an operator has a POP in a TAN area that is further away from the TAN than any distance cap, then it should be allowable for Openreach to connect to the TAN from another of the operator's POPs located in another TAN area. [✂]

Leased Line Charge Control

32. At the last BCMR, low bandwidth AISBO services were subject to a charge control for the first time. Ofcom imposed a price cap for the single low bandwidth AISBO basket of services with a further RPI-0% sub-cap for certain LLU backhaul services (BES). Ofcom adopted an "anchor pricing" approach to setting the caps whereby forecast fully allocated costs ("FAC") were assumed to be entirely based on the typical point-to-point Ethernet technology even if DWDM was used instead.

[11] Ofcom listed 56 TANs for AISBO markets
[12] Openreach is allowed, via an Undertakings exemption, to provide Wavestream National which includes some trunk.
[13] Paragraph 8.282, *Business Connectivity Market Review – Statement and Consultation*, 8 December 2008

33. Ofcom has adopted an anchor pricing approach elsewhere, justifying it on the basis that:

    a) Applying price caps to regulated services in this way can act as a constraint on the pricing of emerging SMP products in the same market that are not charge controlled i.e. NGA;
    b) It provides the right incentives for the regulated firm to invest in more efficient technology because it will be able to keep any efficiency gains that may result from the new investment;

    c) The firm's wholesale customers are protected from any high set-up costs associated with the new technology;

    d) The firm's wholesale customers are protected from the rising unit costs of legacy services with declining product volumes; and

    e) It is not straightforward to forecast and model the costs and any abatements of the Modern Equivalent Asset ("MEA") within BT's network.

    As both BES and Orchid services are subject to the charge control, Ofcom's main reasons for adopting anchor pricing at the last BCMR were (b), (c) and (e) above.

34. In Sky's view, the anchor pricing approach can actually distort investment decisions by assuming costs and, hence, prices for services that are well above their competitive level i.e. those of the MEA. The risks associated with this approach are that the regulated firm will be:

    a) Disincentivised from investing in new technology because it continues to enjoy high cash flows on largely depreciated assets and, hence, with relatively low cash costs; or, alternatively, it is

    b) Rewarded, through higher prices, even though it would have made the investment in new technology anyway because it was a relatively low risk solution that was already widely adopted and established in other communications networks.

35. While at the last BCMR there remained some uncertainty as to the scale and scope of Orchid deployment and adoption (and other optically based inputs into AISBO services), since then Orchid has become well established and been adopted by some LLU operators. Therefore, one of the primary reasons for adopting an anchor pricing approach – i.e. incentivising efficient investment in new technology - may no longer be relevant.

36. Even if Ofcom were wedded to maintaining anchor pricing to incentivise further investment in Orchid and other optical services over more of the country, the anchor price for LLU backhaul in those areas where Orchid has become well established (possibly covering 60% - 70% of UK premises) may no longer need to be based completely on the costs of point-to-point Ethernet services like BES.

37. Further, should Ofcom conclude that there is a separate market for LLU backhaul at all bandwidths then, naturally, any resultant charge control would be specific to that market. As such, operators would be protected from the risk of "cross-subsidy" from LLU into business Ethernet connectivity (or vice versa).

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