BT response to Ofcom's Call for evidence: Net neutrality review

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Non-Confidential version

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1 Introduction

1. Ofcom's review provides a timely opportunity to re-cast the net neutrality rules so that they are fit for the next decade. BT continues to support the core principles of net neutrality, customers should be free to access the content they want, the open internet should remain a viable choice for businesses to launch new services, and telecoms providers should be transparent with customers about how they manage traffic over their networks.

2. However, the internet has rapidly evolved, whilst the rules, underpinned by evidence a decade old, have not. To realise the full benefit of technical innovation in the next decade, a more balanced approach is needed. The telecoms industry is playing its part, investing billions of pounds in rolling out next generation infrastructure, but this adds pressure to ISP's network capacity, requiring further investment to keep pace with increases in data consumption. Data usage is showing continued rapid growth and new services will drive ever greater network peaks. The rules need to incentivise all content providers to use the most efficient technical means to deliver their content and be considerate of others. We are building network capacity to meet avoidable peaks at considerable cost. If more efficient forms of distribution were used and if non-time critical traffic could be moved to quieter times, cash could be freed up for investment in innovative products and services for our customers including security and IoT.

3. The review provides an opportunity to positively embrace the new innovation that full fibre and 5G can unlock. Now free from BEREC's prescriptive guidance, the UK should seek to lead Europe by encouraging telecoms operators and the wider value chain to invest in innovative services. The investment environment for telecommunications in Europe is notoriously poor, and Europe's digital infrastructure is falling behind the most advanced countries. If the UK gets its regulation right, we can reverse that trend. We need a more imaginative approach, South Korea and Italy have shown that it is possible to think differently.

2 Now is the time to reset the rules for the next decade

4. The net neutrality rules intended to benefit customers by providing an open internet that protected freedom of expression, access to information and promoted competition and 'permissionless' innovation. They were underpinned by an evidence base from the years prior to 2015. Some concrete concerns were identified, such as outright blocking of rival services like Skype, but the concerns were largely conceptual about how the internet should ideally evolve. The review provides an opportunity to assess how the internet and digital landscape has in fact evolved. In the last decade we have witnessed:
    - Consolidation in the content production landscape and the rise of platforms which capture a large amount of internet traffic and value.
    - The emergence of brand-new technologies bringing new and innovative use cases.
    - Shifts in customer demand accelerated by the pandemic - with online services becoming more and more critical to consumer's lives and the huge shift of TV and other entertainment to online experiences.

5. With the roll out of FTTP and 5G, the pace of change is likely to quicken in the future. Several questions should be addressed through this review:

Customers

- Are the rules sufficiently consumer centric?
- What tensions do the rules create between: rights of content providers versus consumers; cross-subsidy between heavy users and lighter users?
- How can net neutrality guidelines keep the overall service for customers affordable?
- How can net neutrality guidelines better enable customer choice within their connectivity packages (e.g. latency, bandwidth, reliability etc.)?
- Can net neutrality changes better unlock the potential of new technologies to help UK businesses drive productivity and the next waves of industry innovation?

ISPs

- Where do ISPs fit in the value chain? The internet has never been less 'neutral' and it is important to assess carefully the relative pros and cons of regulating just one part of the value chain.
- What is the state of competition in telecom markets and what does that mean for net neutrality policy?
- How can net neutrality guidelines better provide ISPs with tools to manage their networks to ensure quality and affordability of services?
- How can net neutrality guidelines better facilitate investment in the development and deployment of better technology and networks (e.g 5G, 6G, FTTP etc)?
- How can net neutrality guidelines provide ISPs with the incentives to develop innovative propositions in emerging technologies (low latency connections, edge and private networks, network slices etc)?

Content providers

- How has competition evolved in digital markets? For instance, TikTok has gained rapid popularity worldwide, what was the relevance, if any, of net neutrality to this rise?
- How does net neutrality impact innovation, new start-up businesses may benefit from an open internet to reach customers, but what of the hyperscalers, does net neutrality have any ongoing relevance to their incentives to invest?
- How can net neutrality guidelines incentivise content providers to use the network more efficiently?
- How can net neutrality rules best balance the need to keep the internet open and accessible to small providers ✂?

6. The COVID pandemic shed light on some of the shortcomings of the rules and guidance. The rules provide very limited ability to encourage content providers to think about their impact on networks and the customers of the network providers. For instance, gaming updates during the busy hour impact all users and drive investment in network peaks that are paid by all customers not just those consuming gaming services. The EU Commission needed to ask content providers to stream traffic in lower definition, whilst Ofcom worked with gaming providers to seek to coordinate download timings – some content providers did this voluntarily but that was not always successful and there is nothing to compel them to do so. In addition, measures taken to give free temporary access to websites such as Oak Academy, BBC Bitesize or NHS COVID sites, had to be made in breach of the net neutrality rules that require ISPs to switch off these zero-rated sites for customers when the customer reaches their data

cap. Moreover, the concept of 'open' zero rated offers is increasingly impractical as online services overlap categories and due to the need to work closely with individual content providers to ensure the zero-rating functions correctly.

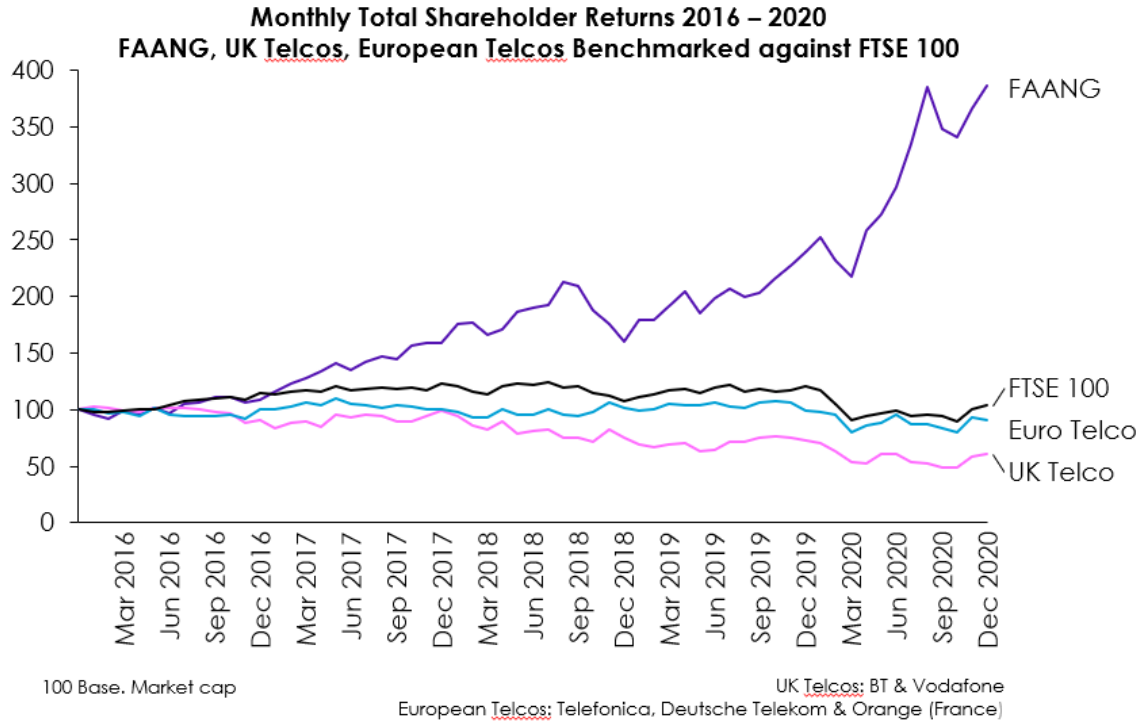
3 Incentivising fair use of a finite resource

3.1 Data growth and network investment

7. For the past decade, data usage on both fixed and mobile networks has rapidly increased. That trend will continue for the next decade but with potential surges as new services come to market and existing platforms for delivering TV services are migrated to IP.

8. Data usage has increased far more rapidly than revenues. Ofcom reports that average fixed data usage per month increased from 112GBs to 429GBs between 2015 and 2020.[1] ✂.[2] A similar trend can be seen in mobile. The industry is embarking on a new wave of deep investment in fibre and 5G, with BT alone committed to spend £12bn in fibre roll out and many billions of pounds in mobile upgrades. To support access networks, each year BT invests significant sums in expanding core network capacity. ✂.

Figure 1 – Cumulative shareholder returns



Source: Yahoo finance, Finbox, Macrotrends

9. It is important to note that this investment in our access network will facilitate faster, more reliable access to more and more customers, however in order to handle the increasing traffic load, ISPs like BT also need to build capacity in their core networks. Failure to invest in their

[1] Ofcom Connected Nations Reports 2015-2020.
[2] ✂

cores would lead to ISPs being unable to manage increasing data traffic and create congestion, meaning degradation of service quality – typically when users need the internet the most.

10. Despite this challenging background, the net neutrality rules assume that, beyond the short term, core network capacity is infinite. Recurrent network congestion should be '*tackled through expansion of network capacity*'[3] with content providers having an unconditional right to distribute their content over ISP networks. BEREC permits ISPs only very limited rights to manage traffic. This regime has distorted incentives to distribute content and services efficiently, introduced unfair cross-subsidy between consumers, and to inefficient market outcomes whereby consumers have to bear all costs in a 'two sided market' in which content and applications providers clearly benefit from access to consumers.

3.2 Core network capacity

11. BT's Core network capacity is dimensioned to peak traffic demand with a significant contingency to provide resilience. It is dimensioned to the peak to help ensure, as far as possible, that the network remains available to customers even during one off major events, even if those events are infrequent. The move to IP distribution of all TV over the coming years, on top of underlying data growth, has the potential to drive very rapid peak growth, beyond previous levels, but also to increase the peak to mean ratio. Figure 2 provides an illustrative example of all DTT viewing of an extraordinary event, such as an England World Cup semi-final, moving to IP. Future services such as gaming also have potential to drive peak growth particularly when considered cumulatively with IPTV. Gaming downloads today are already a major driver of the peak.

Figure 2 – illustrative DTT – IP migration of an extraordinary live event

✂

12. The vast majority of traffic today is driven by less than twenty content providers, with the biggest users being some of the world's largest companies. Indeed, 80% of internet traffic can, at times, be driven by just four companies. ✂.

Figure 3 – traffic volume over BT's fixed network

✂

13. Content providers could choose, and net neutrality entitles them, to rely only on best efforts internet or 'transit'. However, distribution over transit alone will not produce best customer experience and neither is it an efficient means to relay large amount of content to customers. To improve experience, content providers can use caching/CDNs, peering, and efficient distribution technologies such as multicast. The optimal mix of these options will vary between content providers depending on the type of content in question for instance gaming, video, live sport etc. Whilst some of these providers do use caching, peering and other solutions to reduce the burden on the network, ultimately there is no requirement to and some of them choose not to.

14. Efficient use of the network also requires content providers to take steps to mitigate peak traffic growth, in particular content that is non time critical can be distributed outside of the

[3] Recital 15 Regulation 2015/210.

busy hour. Currently there is no incentive for them to do so. Looking at core network peak on a monthly basis illustrates the significant of major events and gaming updates on top of high usage levels from video streaming.

Figure 4 – 2020 BT monthly fixed core network peaks (tbps)

✂

15. Instead of building to this infrequent peak, there are alternatives, but the relative costs / viability of these options is not always reflected in content providers' decisions because they assume networks will continue to be expanded regardless. As examples of choices content providers can make:

    - What time of day gaming releases and updates are released. When new games are launched, they could be downloaded the night before when the network is only lightly used and then activated on the launch date;
    - Whether to use caching (and which caching provider to use), peering or transit; and/or
    - Whether to use multicast delivery for live TV, especially live sports content.

Figure 5 – illustrative example of peak efficiencies

✂

16. Figure 5 shows exceptional core network peak on BT's network on 16 December 2020 at 8.30pm, driven by ✂ game updates. ✂ :

    - Time shifting elastic traffic outside peak hour reduces peak traffic, for example a gaming update running in the background rather than downloading instantly. ✂ at this exceptional peak. If ✂ gaming updates were consistently time shifted outside of peak hour, this could equate to saving c.✂% of fixed core capacity without impacting experience for gamers.
    - Moving from less efficient traffic distribution "transit" approach to more efficient methods like peering and caching, and moving some peering traffic to caching. ✂.
    - By multicasting for live/broadcasting traffic, far fewer streams are created in the core network to deliver content to viewers. ✂.

17. There is precedent here already. During the pandemic, Amazon, Netflix, YouTube, and Disney, agreed temporarily to reduce high-definition video quality to standard definition, to reduce the strain on networks. Ofcom also sought voluntary assurances from gaming companies to release gaming updates "*between off peak usage times (midnight to 8am), limit download speed where possible and provide advanced notice to ISPs of future releases*."[4] to ensure their capacity demand didn't create congestion on ISP networks. The only difference is that there is no mechanism to ensure these companies do the same again.

18. In addition to the network efficiency and customer benefits, there are also environmental gains through the reduction of electricity consumption. BT uses around ✂% of total UK

[4] Ofcom Monitoring compliance with the EU Open Internet Regulation report 2020.

electricity produced and around ✂ % of that is attributable to our fixed and mobile networks. Total electricity needed to run our networks is broadly a function of two elements: overall size of the network; and efficiency of the network equipment. Network equipment efficiency gains are slowing due to Moore's law and 5G equipment is likely to require more power than previous generations. Switching off legacy networks allow energy savings, however once that is done the key determinate will be the overall size of the network. Looking only at the fixed network over the last seven years this traffic has increased around 35% per year, with a peak of 45%, with longer term traffic growth predicated at least 20%. Our initial modelling suggests:

Figure 6 – % change in electricity consumption by 2030

Scenario	% change in electricity consumption by 2030 for Network Equipment (BT owned legacy, fixed and mobile)
20% traffic growth pa	✂
30% traffic growth pa	✂
45% traffic growth pa	✂

3.3 Cross subsidy and two-sided markets

19. In addition to efficiency and customer experience, there is also a fundamental issue of fairness. Currently the cost of building to these peaks is shared across all customers, in effect low-usage users cross subsidise those higher data users. All customers pay for the problem of inefficiently delivered traffic – even if they do not consume content from the big tech players.

20. The net neutrality rules also lead to inefficient market outcomes as customers are forced to bear all costs in a 'two sided market'. Internet access is a two sided market, with content providers on one side and consumers on the other. Were ISPs able to charge both sides of the market, they would rationally seek to balance the content providers desire to reach customers and the customers desire to access content and services. Ofcom discussed this issue in 2010, concluding that on the basis of the existing evidence a prohibition on charging was disproportionate and potentially harmful to market efficiency.[5] "*Ofcom's initial view is that a prohibition on network operators/ISPs charging content and applications providers for access to consumers is unlikely to lead to efficient market outcomes. In simple terms, it means that consumers have to bear all of the costs in a 'two sided market' in which content and applications providers clearly benefit from access to consumers as well as vice versa.*"

3.4 International approaches

[5] See section 4, Ofcom publication: 'Traffic Management and 'net neutrality'.

21. Ofcom should look outwardly to approaches taken in other countries that have recognised more nuanced approaches are necessary. In South Korea[6], SK Broadband is seeking to recover a share of the costs associated with carrying traffic of the largest content providers. The regime only bites on the very largest content providers and, according to SK, those charges are being paid by Apple, Amazon and Facebook. Netflix has refused and is quoted as arguing that the internet is "*free of charge as a principle*."[7] The May 2020 Content Providers' Traffic Stabilization Law gave content providers a responsibility to ensure reliable access to their content.[8] In Italy, AGCOM has sought to ensure that DAZN contributes to network investment needed to distribute live Serie A content to avoid network congestion resulting from the traffic peaks of simultaneous live football events.[9] DAZN is required to provide operators with national broadband coverage 15% (Fastweb, Vodafone, WindTre) storage (caching) and transmission equipment to be integrated into its own Edge networks to manage a sufficient share of the overall traffic of the service. When customers complained about buffering and poor video quality and at least three outages during live matches on the platform, AGCOM called on DAZN to fix the issues and it was DAZN who compensated subscribers.[10]

4 Future innovation

22. The net neutrality rules essentially envisage three categories of services: internet access services where strict regulation applies; specialised services, that aren't internet access and are optimised to ensure performance; and other services that fall outside the rules entirely. Specialised services cannot be a disguised form of internet access, use so much of the available bandwidth to make internet access services unviable, and must objectively require optimisation. This review provides an opportunity to re-consider / clarify:

    - That 5G use cases are actively encouraged. To date BEREC has given lukewarm support tending to provide commentary such as "*the Regulation and Guidelines are technologically neutral, and therefore do not constitute a ban on the implementation of any 5G technology itself.*"[11] Whilst at the same time BEREC has sought to provide ever more prescriptive guidance on how services should operate. For a Regulation whose operative provisions are less than a page, we now have 60 pages of prescriptive guidance. It would be very simple and desirable for Ofcom to signal to the market that innovation is actively encouraged and that Ofcom, unlike BEREC, is not looking for an ever-expanding net neutrality jurisdiction. Provided internet access remains of high quality, there should be little concern with new services and indeed significant consumer benefit.

    - Where services fall outside the rules they are unregulated, that was a conscious choice of the legislature, there is no justification for BEREC's approach of creating unnecessary uncertainty, for instance see its commentary on services that aren't publicly available (and hence unregulated).

[6] Netflix might have to pay millions in bandwidth usage fees in South Korea - The Verge
[7] https://www.nme.com/news/tv/netflix-sued-by-south-korean-internet-provider-after-squid-game-traffic-surge-3061877
[8] Assembly research.
[9] https://www.italy24news.com/sports/news/52095.html; Agcom puts the stakes in Dazn to avoid network congestion – The Observatorial
[10] Italian watchdog calls on DAZN to fix Serie A live streaming problems | Reuters; https://www.sportcal.com/News/FeaturedNews/136837
[11] BEREC Opinion for the evaluation of the application of Regulation (EU) 2015/2120 and the BEREC Net Neutrality Guidelines (europa.eu)

- Whether the rules are sufficiently flexible to accommodate future trends such as convergence, personalisation, and hybrid networks.

4.1 Future networks and use cases

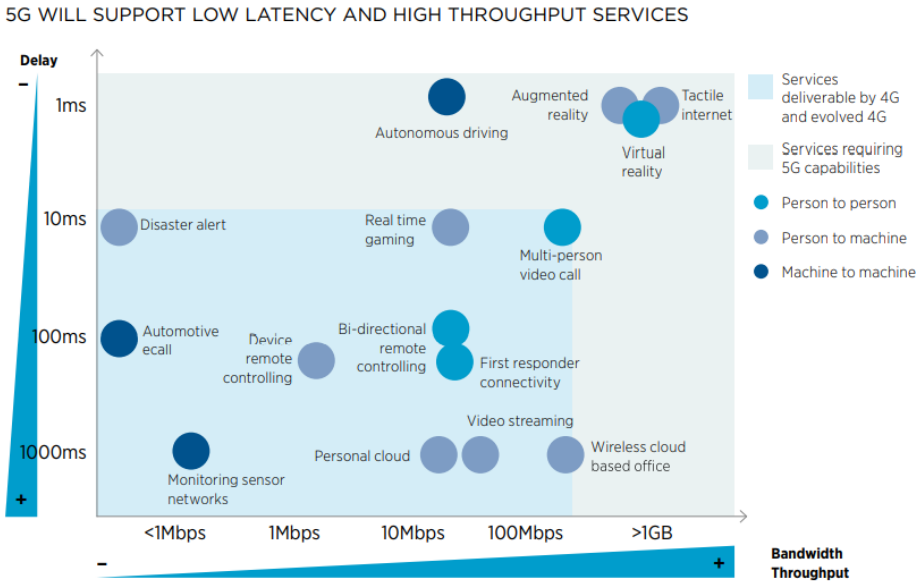
23. The roll out of 5G and full fibre will bring future network realities and transform telecoms. Many new networks will develop - private networks, fibre, satellite, wholesale IoT, campus, mesh etc. Some of these networks will need to work together, internet services may no longer be a simple as a single technology. Convergence will open growth in fixed and mobile bundles and satisfy customer demand for connectivity to 'just work' and further competition. Edge networks will be one of the building blocks to enable new applications such as self-driving cars and robotics to grow rapidly and offering ultra-low latency by allowing data to be analysed at the edge of the network.

24. Unlike in previous technology roll outs, new use cases will be developed for specific industry verticals. From Massive IoT in Smart Cities and Smart Logistics to critical communications for autonomous vehicles and manufacturing automation. For example:

- **Road safety and efficiency** – Services providing information to drivers about imminent dangers such as red-light violations, hazard, collision, and traffic jam warnings
- **Hospitals** - Medical device tracking, emergency communications, remote healthcare for diagnosis and treatment, and remote surgery
- **Public sector** - Asset tracking, waste management (e.g sensing when bins require collection), Smart Parking (reducing congestion and improving usage of parking spaces)
- **Manufacturing** - Augmented reality to monitor processes and production flow, robots to assist with transport of goods and materials
- **Consumer** – AR/VR gaming, enhanced video streaming (8K)

25. Given these developments, one size-fits-all connectivity isn't fit for the future. Different devices will have different connectivity needs. Augmented reality requires both low latency and high bandwidth, whereas monitoring sensors do not require either low latency or high bandwidth, other use cases could sit somewhere in between:

Figure 7 – Example future use cases



Source: GSMA 5G Guide 2019

4.2 Personalisation and differentiation

26. The market is also moving towards more personalisation. Connectivity is central to our customers lives, but not all customers have the same needs. Increasingly, they want unique experiences targeted at their individual preferences/usage. Customers should be empowered to decide how services are prioritised or managed over the network. For example, if they want to prioritise their streaming over non time-critical updates, or real-time QoS boosts for gamers.

27. The rules should recognise that not all discrimination is harmful and even within internet access services ISPs should be able to differentiate service tiers and charge accordingly for customers who are willing to pay for a premium service. This structure avoids cross subsidy by over-offering functionality to customers who do not need it.

4.3 Specialised services

28. To ensure we can build a robust case for investment, we need clarity that future services which require special treatment of traffic will be recognised by Ofcom. The current conditions upon which specialised services can be offered are vague and uncertain.
    - "*The optimisation is objectively necessary in order to meet requirements for a specific level of quality*" - A clear definition of "*objectively necessary*" is needed so that this doesn't inhibit providers ability to develop these services. For example, if a corporate customer saw value in Skype, Teams or Zoom being prioritised for its employees, would this constitute being '*objectively necessary*'?
    - "*The network capacity is sufficient to provide these services in addition to internet access service offered and not detrimental to the availability or general quality of internet access*

service for end users" - We agree that the general internet must remain viable, but capacity is shared and there will always be an impact when providers are offering specialised services. Common sense is needed here, we don't need prescriptive rules but rather a statement of intent that this is understood and specialised services are encouraged.

29. For customers to get the full benefits of 5G the industry needs an unambiguous, pro-innovation approach to future services and technologies. The current stance from BEREC creates a very poor investment environment:

    - **BEREC's 2018 Opinion** –*"In general, most communication technologies can be used in a way that is in line with the Regulation, and in a way that is not in line with it." "The Regulation and Guidelines are technologically neutral, and therefore do not constitute a ban on the implementation of any 5G technology itself." "NRAs may take into account the MEC policies and practices of ISPs insofar as they have the effect of limiting the exercise of end-user rights under Article 3(1)."*

5 Other issues

5.1 ECJ judgments on zero rating

30. The net neutrality rules have suffered from a lack of clarity of objective and legal basis which has in turn reduced investment confidence. Although BEREC has been at pains to stress that this isn't the case, the latest ECJ judgments on zero rating have created further confusion and regulatory uncertainty. BEREC will not opine on what these judgments mean until March next year when it intends to issue a revised version of its guidelines for consultation. However, it is hard to see how BEREC comes out well from this. Having spent so long devising and reviewing these guidelines, should BEREC decide that the judgments require substantive revision to the guidelines it hard to see how operators can take confidence that the regime will remain stable.

5.2 End users' rights to use the terminal equipment of their choice

31. The current rules are outdated and prevent providers from effectively planning data demand by device. As we move towards an IoT world, the number of connected devices will grow exponentially. These devices will have different connectivity requirements. The rules around terminal equipment limits ISPs ability to build compelling offers for customers on a device-by-device basis. Operators are far more likely to offer unlimited packages for a particular device if they know that the connectivity is limited to the functionality of that device. For example, connectivity sold to use with a particular gaming device, smart watch, smart phone or connected device.

6 Way forward

32. We welcome the breath of Ofcom's review, the outputs of which could provide the evidence base and analysis for Government to take forward more fundamental review. In the short term we believe Ofcom can make meaningful change including as follows:

    - Refresh the guidelines from scratch with a focus on innovation and consumer welfare - the current guidelines are overly complex and have sought to find new 'problems' to regulate
    - Interpret the legislation in a way that provides the right incentives for the wider value chain – for instance it should be permissible to treat unidentified and/or inefficiency distributed traffic below other traffic.
    - Broker a code of conduct for content distribution – for instance encouraging off-peak timing of gaming updates as was agreed during the pandemic.

Question 1: Functioning of the net neutrality framework

(a) Which aspects of the current net neutrality framework do you consider work well and should be maintained? Please provide details including any supporting evidence and analysis.

(b) Which aspects, if any, of the current net neutrality framework do you consider work less well and what impact has this had? What, if any, steps to you think could be taken to address this and what impact could this have? Please provide details including the rule or guidance your response relates to and any supporting evidence or analysis.

See our response in sections 2, 3 and 5.

Question 2: Use cases, technologies, and other market developments

(a) What, if any, specific current or future use cases, technologies or other market developments have raised, or may raise, particular concerns or issues under the net neutrality framework?

(b) What, if any, steps do you think could be taken to address these concerns or issues and what impact could this have? Please provide details of the use case, technology or market development and the rule or guidance your response relates to, as well as any supporting evidence and analysis.

See our response in section 4. The GSMA has conducted extensive research into future 5G/IoT use cases.[12]

Question 3: Value chain

Are there particular business models or aspects of the internet or other value chains that you think we should consider as part of our review? Please explain why, providing details including any supporting evidence or analysis.

See our response in sections 2-3.

Question 4: International cases studies

Are there any international case studies or approaches to net neutrality that you think we could usefully consider? Please include details of any analysis or assessments.

See our response in section 3.4.

It would also inform the debate to look at how markets have developed where different approaches to net neutrality have been taken. Australia for instance has no legislation on net neutrality, where competition law protection suffices.[13]

Question 5: Guidance and approach to compliance and enforcement

Are there specific challenges with the existing guidance that we should be aware of (e.g. ambiguity, gaps)? Assuming the rules stay broadly the same, which areas could Ofcom usefully provide additional clarity or guidance on? Please provide details.

See our response in sections 4, 5 and 6.

Question 6: Annual report

Do you find Ofcom's annual monitoring report useful or are there any changes you think we could usefully make either to the content or how we communicate this?

[12] https://www.gsma.com/wp-content/uploads/2019/04/The-5G-Guide_GSMA_2019_04_29_compressed.pdf; https://www.gsma.com/iot/wp-content/uploads/2020/10/2020-10-GSMA-5G-IoT-Private-and-Dedicated-Networks-for-Industry-4.0.pdf; https://www.gsma.com/futurenetworks/wp-content/uploads/2018/07/Network-Slicing-Use-Case-Requirements-fixed.pdf

[13] https://ppp.worldbank.org/public-private-partnership/telecom-and-ict/net-neutrality

No comments.

Question 7: Other

Is there any other evidence or analysis that you are aware of and/or could provide to aid our review?

No comments.

Comments should be addressed to:
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