Consultation response form

Your response

Question	Your response
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.**	Confidential? - N **Background** In addition to the in introduction of the Open Internet Regulation (EU) 2015/2120 the previous year saw the withdrawal of the RTTE Directive and its replacement by the Radio Equipment Directive, the recast Electromagnetic Compatibility directive and the Low Voltage Directive. This removed the requirements on fixed network equipment to meet the essential requirements previously imposed to protect public networks. In turn that removed the need for operators to publish requirements to connect equipment to those networks. In the case of the UK this had been done by BT publishing Supplier Information Notes, other operator also published such information using various names. As we move to IP for PSTN replacement the NTTE referred to in the Telecommunications Act is moving to an IP terminal inside the customer premises and obtains the benefit of being behind a barrier device in the form of a modem or Optical Network Terminal. The requirements to characterise the service therefore appear to be needed for the Analogue Terminal Adaptor which is provided at the customer premises. When this adapter is provided as part of a router there is possible interference with open network considerations. This is a matter which was not discussed within the discussions around the open internet regulations because the combination with mobile Tariff issues skewed the discussions towards mobile networks. However the open network issues were always meant to apply to all networks on a technology neutral basis. **Answer to Question 1 (a)**

	The aspects which are to be included in contractual requirements next year are to a degree following the work of the Broadband Stakeholder Group initiative on Traffic Management as regard openness of network characteristics and were seen as fairly easy to adopt in the UK at the time of drafting the regulations. **Answer to Question 1 (b)** In general the qualitative issues and the enforcement of rights over access and equipment have not been rigorous. I recall hearing a pleas to ensure that tethering to mobile phones be permitted by mobile operators. In general there has been more attention paid to mobile networks than fixed networks and telephony in the IP world has been treated as a collaborative problem solving enterprise rather than one which needs enforcement. We are now entering a phase where fixed networks will again be important as the latest developments from Sky may show. Mobile access from domestic premises will rely heavily on self-provided Wi-Fi access and it the access to voice services is from domestic Wi-Fi is generally restricted to network supplied terminals. If considered in the light of the regulations this limitation to what is an internet service could be considered to be improper. The regulation does not limit what the commercial terms are for internet service in giving the rights and the contract terms for Voice over Wi-Fi apply to the phone service rather than the internet service. This is an area where consumer rights are being withheld and may require Ofcom intervention.
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,**	**Answer to Question 2 (a)** There is evidence that some operators are providing new equipment for use on FTTP in a way which does allow open network principles to be maintained. One example is Zen, which provides fibre through its own router but does

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.**	not bundle voice with it and instead use a separate Analogue Terminal Adaptor (ATA) for PSTN. This makes the PSTN, within the meaning of the Regulation, a specialised service delivered over the Internet. It appears that a customer can decline the voice component and purchase that from another provider although there is not currently an open market, in that customers have to be quite technically aware to purchase the ATA and configure it appropriately. In this approach a standard router is used which is supplied with a PPoE username and password for access so that the facilities provided by the router and its management are under the control of the customer if he so chooses. A further example related to the first is that of Virgin Media's Project Lightning. The supplied Hub can be set in Modem mode and the telephony port is contained in the Hub box. Customers can connect their own router to the supplied hub which supplies Ethernet to the customer's router without the need to authenticate to the Virgin Media Cable Modem Termination System. Once again this allows customers to choose their out router and its facilities. Both of these approaches allow the use of VPN's for homeworking and private use where the control of the VPN can be independent of the ISP and allows more than a single VPN client on the site. This configuration is useful for interconnecting small network sites and is quite different in nature to a simple VPN pass through function.. BT has an implementation of FTTP which is more problematic using an ONT, without a PSTN port, and their Superhub 2. The design of the Superhub2 assumes that it is used as the end user's router. It implements Wi-Fi in a way which results in it not being possible to be fully turned off and it has a limited set of features. In particular it does not support being a client of a VPN but only allowing pass through of VPN tunnels from specific client or clients. It is possible to force the superhub2 to forward all traffic to a single user port and turn off DHCP and NAT in order to support another dependant router that does support the

	desired features. Whilst this can be made to work after a fashion the two routers do interact and in my experiments it was impossible to make IPv6 work. More significantly there were problems when the BT router is taken into a diagnostic mode and TR69 commands are run every two weeks. This seems to leave the dependent router able to see a PPOE connection, presumably trying to send PAD requests and it then goes into an unknown state. Logs suggest this is because it needs to be configured to use an upstream fixed IP address (which it does correctly even though the fixed address is in the Private range). However when it is reset by the Superhub2 and loses an internet connection it looks to see if an Ethernet connection over PPOE is possible and since it is available the non-BT router tries to connect with no success and subsequently locks up. This has the result that the dependent router needs to be resent manually every two weeks or so. The reason I tried to make this two router arrangement work is that BT will not offer a telephone service on copper after putting a fibre for internet use and insist that the telephone service is transferred to the Superhub2. Since making a dependant router work is difficult to impossible and will vary according to the model a consumer wishing to use their own router is prevented which means that the article 3(1) [1] right to use equipment of the user's choice is denied by BT. If the router had a modem only model with fixed IP addresses for IPv4 and IPv6 this could be overcome as in the Virgin Media implementation. That the BT approach is ill considered overall is made clearer by the lack of any statement on the REN characteristics of the router, or any warning whether it support symmetric and asymmetric ringing for older telephones. The Superhub2 also has a DECT terminal built it with no evidence that it can be turned off if one already has a DECT phone (or of the quality

[1] Regulation (EU) 2015/2120 of the European Parliament and of the Council as modified by The Open Internet Access (Amendment etc.) (EU Exit) Regulations 2018 (SI 2018/1243)

	implications of using multiple codecs), not a breach of the regulations but a usability issue. BT Wi-Fi continues to send 802.11 frames with a hidden SSID and to show its presence to other systems with the ongoing possibility of interference with other equipment, which has been reported by users already. It is the presence of these PSTN voice features which prevent the open use of the IP service. Thus BT are providing PSTN over fibre as a specialised service in a manner which is "to the detriment of the availability or general quality of internet access services for end-users" contrary to article 3(5) of the Open Internet Regulation. On complaint to BT they told me it is BT policy only to use the Superhub2 for voice. Regrettably that policy is contrary to law. If a customer chooses to use their own router connected directly after a transfer BT provides IP service only but will not provide a voice service contrary to the Universal Service Obligation on them. This may cause a gap in service provision that in turn causes Number Portability to be denied even if the user is able to procure a voice service from an alternative provider. If a user chooses to use his own router it will be disrupted in unpredictable ways because BT's implementation assumes that it is in sole control of the Internet connection and its actions need not be subject to consideration of the needs of any consumer provided router. This prevents users from exercising their right to use "terminal equipment of their choice, irrespective of the end-user's or provider's location or the location, origin or destination of the information, content, application or service, via their internet access service" contrary to article 3(1) of the Open Internet regulation [2]. There are technical issues that need to be considered but the problem is not intractable if a little effort is applied and advice sought more widely than just inside BT and Openreach. BT's approach seeks to deliberately integrate their

[2] Regulation (EU) 2015/2120 of the European Parliament and of the Council as modified by The Open Internet Access (Amendment etc.) (EU Exit) Regulations 2018 (SI 2018/1243)

	implementation of voice and totally break the previous regulatory model of open interfaces for PSTN services. This appears to be a regulatory failure to address PSTN issues whilst undertaking the massive change over to IP in what seems to be an over hasty manner. **Answer to Question 2 (b)** Greater emphasis on functional separation to implement specialised services as there will be other example such alarm systems and they may well need additional facilities such as a stun server and may benefit from notification that an network IP change has taken place. This may be especially true in IPv6 since not all networks appear to give out fixed global address spaces and some including BT warn that the IPv6 addresses are pooled. In the case of alarm systems which need to operate at all times the need to check that the IP address has not changed and possible renegotiate security may cause problems. It may be sensible to consider the functional entity that is the Modem function used by Virgin Media and determine a proper specification that specialised service providers can rely upon. If ISPs and operators chose to provide specialised service functions co-located with their router/modem they would then have a specification for those things that they must continue to provide for other service. One would hope that NICC might be able to provide the expertise and incentive to generate such a specification. There is evidence that some operators are providing new equipment for use on FTTP in a way which does allow open network principles to be maintained. One example is Zen who provides fibre through their own router but do not bundle voice with it and instead use a separate Analogue Terminal Adaptor (ATA) for PSTN. This makes the PSTN which the Regulations term a specialised service delivered over the Internet. It appears that a customer can decline the voice component and purchase that from another provider although there is not currently an open market in that customers have to be quite technically aware to purchase

	the ATA and configure it appropriately. In this approach a standard router is used which is supplied with a PPoE username and password for access so that the facilities provided by the router and its management are under the control of the customer. A further example related to the first is that of Virgin Media's Project Lightning. The supplied Hub can be set in Modem mode and the telephony port is contained in the Hub box. Customers can connect their own router to the supplied hub which supplies Ethernet to the customer's router without the need to authenticate to the Virgin Media Cable Modem Termination System. Once again this allows customers to choose their out router and its facilities. Both of these approaches allow the use of VPN's for homeworking and private use where the control of the VPN can be independent of the ISP and allows more than a single VPN client on the site. This configuration is useful for interconnecting small network sites and is quite different in nature to a simple VPN pass through function.. BT have an implementation of FTTP which is more problematic using an ONT, without a PSTN port, and their Superhub 2. The design of the Superhub2 assumes that it is used as the end user's router. It implements Wi-Fi in a way which results in it not being possible to be fully turned off and it has a limited set of features. In particular in doe not support being a client of a VPN but only allowing pass through of VPN tunnels from a specific client. It is possible to force the superhub2 to forward all traffic to a single user port and turn off DHCP and NAT in order to support another dependant router that does support the desired features. Whilst this can be made to work after a fashion the two routers do interact and in my experiments it was impossible to make IPv6 work. More significantly there were problems when the BT router is taken into a diagnostic mode and TR69 commands are run every two weeks. This seems to leave the dependent router able to see a PPOE connection, presumably trying to send PAD requests and it then goes into an unknown

	state because it needs to be configured as using an upstream fixed IP address which it does correctly (even though the fixed address is in the Private range) but when it is reset by the superhub2 and loses an internet connection it looks to see if an Ethernet connection over PPOE is possible and since it is so it tries to connects with no success and locks up. This has the result that the dependent router needs to be resent manually every two weeks. The reason I tried to make this two router arrangement work is that BT will not offer a telephone service on copper after putting a fibre for BT to use and insist that the telephone service is transferred to the superhub2. Since making a dependant router work is difficult to impossible and will vary according to the model a consumer wishes to use that means that the article 3(1) right to use equipment of the user's choice is denied by BT. If the router had a modem only model with fixed IP addresses for IPv4 and IPv6 this could be overcome as in the Virgin Media implementation. That the BT approach is ill considered is made clearer by the lack of any statement on the REN characteristics of the router, or any warning whether it support symmetric and asymmetric ringing for older telephones. The superhub2 also has a DECT terminal built it with no evidence that it is controllable if one already has a DECT phone, not a breach of the regulations but a usability issue. BT Wi-Fi continues to send 802.11 frames with a hidden SSID and to show its presence to other systems with the ongoing possibility of interference with other equipment having been reported by users already. It is the presence of these PSTN voice features which prevent the open use of the IP service. Thus BT are providing PSTN over fibre as a specialised service in a manner which is "to the detriment of the availability or general quality of internet access services for end-users" contrary to article 3(5) of the Open Internet Regulation. On complaint to BT they told me it is BT policy only to use the Superhub2 for voice. Regrettably that policy is contrary to law. If a customer chooses to use their own router connected directly BT provides IP service but

	will not provide a voice service contrary to the Universal Service Obligation. This may cause a gap in service that causes Number Portability to be denied even if the user is able to procure a voice service from an alternative provider. There are technical issues that need to be considered but the problem is not intractable if a little effort is applied and advice sought more widely than just inside BT and Openreach. BT's approach seeks to deliberately separate out their implementation of voice and totally break the previous regulatory model of open interfaces for PSTN services. This appears to be a regulatory failure to address PSTN issues whilst undertaking the massive change over to IP in what seems to be an over hasty manner.
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.**	**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.** PSTN as a specialised service deserves to be considered because it is an important service that may otherwise be given insufficient attention. It is the case that consumers continue to rely on the PSTN as back-up in circumstances that frankly they are unaware of until the need arises. It is most unlikely that all of these needs can be specified in a short space of time. It is therefore rather important that a consistent emulation exists for the PSTN which can be made dependable for users to fall back upon. In essence one should be able to get a good emulation of the PSTN from any ISP. The present regulatory environment encourages fragmentation of PSTN and a reduced market size for equipment. It may be that BT should have retained a requirement to provide a wholesale PSTN service as that would have generated a larger terminal market as

	other providers would possible have treated it as a continuation of WLR without the line maintenance charges. Not every consumer need is best soled by diversity of implementation. The diversity has a side effect in that every one of the implantations has a different arrangement for battery backup and the lowest common denominator is going to be no back-up at all. The provision of a standard set of requirements for connecting leads and battery back-up devices would meet a social need. Those in need in of the facility are often the least able to cope with variability and complexity. A clear requirement to label the required voltage and current needs of the equipment (e.g. the ONT and the Superhub2 as modified or the ATA) and the supply of standardised equipment with clear settings to meet the power supply requirement and to inform the rechargeable battery requirements are needed. Presently this information is not clear and people do not understand that they may need alternatives in the future. In some cases the alternative access is using a GSM voice circuit without a SIM so that it can pone make emergency calls. It is not clear that this currently provided alternative will even work as it relies on technology which is now becoming available at less mast sites and the battery back-up at those sites may currently be limited.
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.**	No comment.
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.**	No comment.

ambiguity, gaps)? Assuming the rules stay broadly the same, which areas could Ofcom usefully provide additional clarity or guidance on? Please provide details.	
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?**	No comment.
Question 7: Other **Is there any other evidence or analysis that you are aware of and/or could provide to aid our review?**	Not at this time