Your response

Question	Your response
Question 1: Hybrid sharing could mean that the upper 6 GHz band will be used for mobile outdoors and Wi-Fi indoors. What are your views on the priorities for each of these two services, assuming that suitable coexistence mechanisms are developed?	*Is this response confidential? – N* Wireless Broadband Alliance (WBA) is a not-for-profit organization and has been active in Wi-Fi space since its inception in 2003. WBA's vision is to drive the seamless and interoperable services experience via Wi-Fi within the global wireless ecosystem for carriers, consumers, enterprises and cities. WBA is highly supportive of Ofcom's continued interest in driving forward an ecosystem that delivers the best experience to the UK consumers and enterprises. WBA would like to thank Ofcom for its continued interest in 6 GHz spectrum policy with respect to hybrid sharing between Wi-Fi and mobile applications. Please note that positions stated in this response represent majority of the WBA members, but not necessarily all members. WBA has advocated for the entire 6 GHz band for Wi-Fi use, and we continue to view it as key to a well-balanced connectivity ecosystem. Additional Wi-Fi radio spectrum with all 1200 MHz in the 6 GHz band is complementary to higher capacity fibre and other broadband connectivity deployments prevalent nowadays. Mobile usage is most beneficial for on-the-go use cases, and as such, is most suitable for outdoor uses. In principle, a scenario where Wi-Fi operates across all 1200 MHz indoors and mobile operates outdoors is conceivable. Please note however that IMT macro base station signal power levels will likely need to be adjusted to account for varying building entry loss signal attenuation for indoor Wi-Fi and outdoor mobile to coexist. It is noteworthy however that 6 GHz is not considered a core band for mobile and any allocation for mobile would suffer from

	harmonization and economies-of-scale challenges.
Question 2(a): Hybrid sharing could mean that the upper 6 GHz ban will be used for mobile in some locations, and Wi-Fi in others. We would like feedback on the priorities for each of these two services, assuming that suitable coexistence mechanisms are developed. From the point of view of mobile, is the upper 6 GHz band most useful to provide outdoor coverage, or indoor coverage? Is it most useful in urban areas, or in those base stations that are currently carrying more traffic, or some other split?	*Is this response confidential? – N* Hybrid sharing of 6 GHz should assume that Wi-Fi will be used indoors and some combination of mobile and Wi-Fi is used outdoors. Physical mobility is the key criteria for considering mobile, and it naturally makes more sense to use it outdoors. Hybrid sharing mechanisms will not only need to account for outdoors Wi-Fi, but also incumbent 6 GHz links.
Question 2(b): Similarly, what are the priorities from the point of view of Wi-Fi deployments?	*Is this response confidential? – N* a. At least seven 160 MHz channels in the 6 GHz band to enable dense deployments that can sustain multigigabit links in adjacent cells b. Maximizing the number of available 40 MHz and 80 MHz wide channels to provide optimum user experience in very dense deployment areas such as large public venues, universities, and schools. c. Ability to support at least three 320 MHz channels for resiliency d. Very low power (VLP) product class for battery powered devices for indoors as well as outdoors e. Client-to-client connectivity of low power indoor (LPI) equipment without having to go through an access point (AP) so long as both clients are connected to access points. This can dramatically reduce time for any given data transfer, and make the medium usage a lot more efficient
Question 3: What are your views on a modified AFC or SAS-type approach to enable hybrid sharing? What additional work do you think would be required?	*Is this response confidential? – N* In principle, an AFC system can be used to determine existence of an incumbent user, or expanded further to potentially record Wi-Fi access point locations before a mobile network gets enabled and IMT base station locations before a Wi-Fi access point gets enabled. AFC database enhancements would be needed to cover additional types of devices deployed in the field. Commercial viability of this approach may be questionable due to installation costs

	when the availability of the spectrum is not known until after installation. If a scheme could be designed that mitigates infrastructure investment risk by being clear on relative coverage areas for side-by-side deployment of Wi-Fi and mobile this could work, however the feasibility would need to be determined.
Question 4: How could existing access protocols and sensing mechanisms be leveraged (i.e., those in Wi-Fi or 5G NR-U) to enable hybrid sharing?	*Is this response confidential? – N* Wi-Fi sensing mechanism can detect energy of -84 dBm or higher in a given frequency range, and then backoff in case of interference. In theory, a fairer approach would be to deploy mobile in well defined boundaries (such as outdoors) with power levels that permit Wi-Fi to coexist in the same frequency band deployed indoors. This would avoid scenarios of unfair starvation of Wi-Fi that might have to continually backoff because of detected signal energy. However, the problem of preventing indoor operation of IMT UE remains. It has to be noted that the current energy detection thresholds which are the result of many years of intense discussions in ETSI and IEEE were defined to optimise intra- and inter-RLAN coexistence as well as coexistence between RLANs and other users of the band.
Question 5: What mechanisms could potentially enable device-to-device connectivity?	*Is this response confidential? – N* Requiring 6 GHz Wi-Fi devices to be connected to Wi-Fi access points before enabling device-to-device connectivity can ensure that they are located in an authorized space that is known to meet regulatory requirements.
Question 6: If hybrid sharing is eventually adopted, and requires licensed mobile to operate at medium power, in what way would mobile networks use the upper 6 GHz band?	*Is this response confidential? – N* A number of Wi-Fi products using the entire 6 GHz band are available today. 6 GHz use for mobile may remain relatively niche worldwide given that the band is not and will not be available globally, and this may have impact on product availability. Its use as a mobile band may not necessarily benefit from economies of scale for a core technology.
Question 7: How would you suggest that the mechanisms presented here can be used, enhanced, or combined to enable hybrid	*Is this response confidential? – N* Avoiding interference would be the fairest solution. Deployments could even be determined on a venue-by-venue basis, and if

sharing or are there any other mechanisms that would be suitable that we have not addressed?	one technology has been deployed first, the other one would need to provision sufficient protections. This can include adjusting power levels and antenna directionality considerations for the newer technology to be deployed in vicinity or adjacent to the first one deployed, although feasibility of this would need to be verified. To avoid the aforementioned issue of IMT UEs operating indoors, modifications of the IMT channel access mechanism would have to be defined and implemented.
Question 8(a): Assuming the future of the band includes indoor use for Wi-Fi and outdoors use for mobile: How could this be achieved without creating or suffering interference?	*Is this response confidential? – N* US FCC decision[1] in 2020 shows that coexistence is achievable between Wi-Fi low power indoor (LPI) devices and outdoor fixed service (FS) or fixed satellite service (FSS) use. ECC Report 302[2] from 2019 also states that LPI and VLP RLAN devices do not present risk of interference with fixed microwave links and FSS links. This study was conducted for the lower half of the 6 GHz band, but its results also apply to the upper half. See also the answer to question 7.
Question 8(b): Could there be a combination of technical adjustments such as power limits and other mechanisms (including databases or sensing mechanisms)?	*Is this response confidential? – N* Power level and antenna directionality adjustments, subject to feasibility analyses, should be expected. Wi-Fi is able to detect energy in the band before starting a transmission, and back off in such case. Sensing could also be an option for IMT UEs to detect presence of a Wi-Fi network and back off. A database lookup could be feasible also, pending scoping of required complexity, and how often information would need to be refreshed.
Question 9(a): We are interested in input about the importance of the upper 6 GHz band for its incumbent users, and on the potential impact of hybrid sharing of the band. What evidence do you have on whether incumbents are likely to coexist with hybrid	*Is this response confidential? – N* Incumbents can share the lower 6 GHz band with LPI and VLP Wi-Fi, and initial studies confirm this is also the case for the upper 6 GHz band. Studies presented to WP5D found that for IMT to coexist with FS and radio astronomy systems (RAS), separation distances of up to

[1] https://www.fcc.gov/document/fcc-opens-6-ghz-band-wi-fi-and-other-unlicensed-uses
[2] https://docdb.cept.org/download/1397

sharing of the band with mobile and Wi-Fi? Are there unique advantages of the upper 6 GHz band for these uses?	several hundred kilometres would be required.[3] W.r.t. coexistence of IMT and FSS, the picture is inconclusive, as was recorded in the second CPM report.[4] From the results of the studies presented to WP5D,[5] it cannot be concluded that IMT will not interfere with FSS.
Question 9(b): What are your views on the initial analysis we have conducted around hybrid sharing and coexistence with incumbents?	*Is this response confidential? – Y / N (delete as appropriate)*
Question 9(c): For any incumbent uses that you view as unlikely to be able to coexist, what alternatives are there? What are the barriers that might prevent those alternatives?	*Is this response confidential? – Y / N (delete as appropriate)*
Question 10: Do you have any other thoughts that you would like to share about hybrid sharing in the upper 6 GHz band, or about hybrid sharing more generally and its potential for applications in other bands?	*Is this response confidential? – Y / N (delete as appropriate)*
Question 11: Do you have any other comments to make on these proposals or on the future use of the upper 6 GHz band?	*Is this response confidential? – Y / N (delete as appropriate)*

Please complete this form in full and return to Hybridupper6ghz@ofcom.org.uk.

[3] https://www.itu.int/md/meetingdoc.asp?lang=en&parent=R19-WP5D-C-1198
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