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* The approach to allow the use of the upper 6 GHz for multiple use cases is ambitious and admirable. All spectrum should be allowed to be used, with maximum efficiency and lowest possible cost. There are existing and emerging use cases that would benefit from the upper 6 GHz spectrum and fundamentally, Ofcom should examine the use of the upper 6 GHz for these. That said, we don't think that it is feasible to develop a co-existence mechanism between traditionally licensed and traditionally unlicensed technologies. There are no demonstratable working co-existence mechanisms to date and we don't think it is feasible to expect that these would be developed. Even if the co-existence mechanism was successfully developed and implemented, the sharing of high power outdoor and low power indoor is not feasible. For example, based on Sky's experience over the last few years, there has been very significant interference on 5 GHz from high power outdoor to indoor use of Wi-Fi. The notion that a database could be populated with accurate exclusion zones is not practical without ray-tracing, predictive real time topology surveys and an array of measuring instruments. Even then, such a mechanism would inevitably make the only potentially emerging new use cases, i.e. very low power nomadic AR/VR use cases, impossible. With regards to the incumbent users and protecting those, all bar one use case could use some other spectrum for their use case. The Earth Exploration Satellite Services (EESS) and Radio Astronomy would require the use of the spectrum at least some of the time, notably,

	the Methanol (CH3OH) line studies and MERLIN measurements using 6650-6675 MHz. For these reasons, our view is that the upper 6 GHz band must not be allocated to mobile use, even in a hybrid sharing model. Priority should be for the new use cases that would be unlocked with the use of the full 6 GHz on Wi-Fi.
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? – Y*
Question 2(b): Similarly, what are the priorities from the point of view of Wi-Fi deployments?	*Is this response confidential? – N* From a Wi-Fi deployment perspective, the priority use cases could include: - Nomadic indoor/outdoor Very Low Power wearables (VR/AR). These use cases cannot emerge without better access to wide bands (160 MHz). - Sky operates several High Density deployments such as stadia, shopping centres and transport hubs which are currently restricted by the amount of spectrum available, serving for voice, video and high speed data as well as mobile network offload. These use cases cannot grow or expand without access to spectrum in the upper 6 GHz band - *Wi-Fi 7 relies on access to 320 MHz channels, which are not available without access to this spectrum.* - Residential Multiple Dwelling Units (MDUs) with Full Fibre deployments and 1 Gbps speed requirements within individual homes.
Question 3: What are your views on a modified AFC or SAS type approach to enable hybrid	*Is this response confidential? – Y*

sharing? What additional work do you think would be required?	
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* In our view, the only feasible hybrid sharing would be with Wi-Fi protocol only. It has excellent mechanisms that could be adopted, such as exponential back-off. This would allow low power indoor and very low power nomadic use cases to co-exist. The Listen Before Talk (LBT) mechanisms incorporated in 5G NR-U are different and not well suited to enable hybrid sharing between mobile and Wi-Fi.
Question 5: What mechanisms could potentially enable device-to device connectivity?	*Is this response confidential? –N* No comment
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* No comment
Question 7: How would you suggest that the mechanisms presented here can be used, enhanced, or combined to enable hybrid sharing or are there any other mechanisms that would be suitable that we have not addressed?	*Is this response confidential? – N* We do not think that hybrid sharing between Wi-Fi and cellular is feasible. Any approach to enable hybrid sharing would require substantial work, industry co-operation and work groups, case studies and standardisation. These would need to be established and funded. There are no models that have been established to achieve this. Sky notes further that a hybrid sharing approach would likely be a UK-only measure, given that other jurisdictions have not indicated that they are pursuing similar models. This is likely to act as a further barrier to adoption and investment given that many providers and manufacturers operate on a multinational basis, whilst also intrinsically constraining the scale of any potential benefits.

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? – Y*
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? – Y*
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 sharing of the band with mobile and Wi-Fi? Are there unique advantages of the upper 6 GHz band for these uses?	*Is this response confidential? – N* No comment.
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? – N* Ofcom's analysis is not sufficient to draw any conclusions. This sample size is far too small. It consists of just a single office building in central London and while that building does tie well to the ITU-R P.2109-1 (now superseded with 2109-2 (08/2023)), it should by no means be considered to validate it. In addition, the ITU-R 2109-2 Annex 1 "Introduction" itself states *"Building entry loss exhibits great variability,*

	both within any given building and between different buildings. Although techniques such as ray-tracing can provide useful site-specific predictions when coupled with detailed architectural data, such models will usually be inappropriate for generic applications such as spectrum sharing studies." We concur with this and would point out that when looking at coexistence, we should be focusing on the volume of potential interference cases (percentage of worst cases) rather than averages. Also, the UK building code for thermally efficient buildings does not focus on the cooling or exchanging of air quite as much as retaining heat. In non-air conditioned residential buildings, the chances are that there are open windows, significantly reducing or even removing the penetration loss. In other words, if the window is open, it increases the risk of interference. This is not a viable basis for hybrid sharing.
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? – N* Fixed Links and Fixed Satellite Services would likely need an exclusion zone to be able to continue using this spectrum. For these, it would be reasonable to burden the incumbents to measure the exclusion zone using ray tracing and the landscape topography, rather than a circular exclusion zone of, for example, 10 km. Programme Making and Special Events (PMSE) could use alternative spectrum or an AFC database where they would gain (exclusive) access to the spectrum on a time and location basis. Earth Exploration Satellite Services (EESS) and Radio Astronomy would require the use of some spectrum at some times, for example, the Methanol (CH3OH) line studies and MERLIN measurements using 6650-6675 MHz.
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	*Is this response confidential? – N*

hybrid sharing more generally and its potential for applications in other bands?	In our view, a hybrid sharing model will not work. Based on Sky's experience over the last few years, there has been very significant interference on 5 GHz. Fixed Point-to-Point links have caused (illegal) interference resulting in entire villages or municipalities being unable to use the 5 GHz Wi-Fi services due to a mere 4 Watt point-to-point link operating on the same band. (Case study attached).
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? – N* We welcome the approach for an internationally standardised use, such as AFC for per location per time use as well as an effective co-existence mechanism between cellular and Wi-Fi technologies. To be clear, the 5G NR-U mechanisms are not sufficient, but building on those would be a very welcome development for the future.

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