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? – No* techUK is pleased to provide its views on Ofcom's proposals for enabling licensed mobile and Wi-Fi users to access the upper 6 GHz band. As an organisation, we recognise that there are several differing views regarding the access to the upper 6 GHz band by IMT and Wi-Fi. Our intervention aims at exploring the relevant points for techUK's members reflected on this proposal. techUK members have raised reservations about the proposals. Members who do not agree with the proposal have a range of views and reasons for this. These include: • If sharing is about allowing Wi-Fi only indoors (LPI) and IMT only outdoors and leaving all technical characteristics unchanged, some members believe that it would not be feasible to share the upper 6 GHz band in a way that allows both Wi-Fi and IMT to operate as users expect, as interference problems would arise even if mobile use could be constrained to outdoors and Wi-Fi deployments to indoors (which is not possible). • There are some concerns over the interference levels which might be unpredictable because there is a significant and unpredictable variation of path loss depending on scenarios. • There is an ongoing concern that coexistence between IMT and incumbents will be challenging and require specific studies around its feasibility. • Deployment timescales can be problematic because certified Wi-Fi 6E is shipping today and cannot wait until this study on hybrid sharing ends. The timescales for upper 6 GHz IMT equipment availability are unknown.

	• Ofcom's suggestion to modify sensing and channel access - requiring Wi-Fi to detect IMT signal signatures would require modifications to existing standards which likely would take years to implement and increase the cost of Wi-Fi chipsets and equipment. Furthermore, modifying the sensing mechanism may also impact intra- and inter-RLAN coexistence, particularly in dense deployment scenarios. • Deploying IMT in the upper 6 GHz band would require clearing the band of incumbents. In the case of fixed service that would not be possible before 2030 (it is unclear at this stage how the UK would reduce the impact of IMT interference to fixed satellite services (FSS). • Sharing between high power outdoor IMT and low power indoor Wi-Fi will be challenging. • Mid-band frequencies have been essential in the initial roll-out of 5G with the 3.5 GHz band being deployed as the launchpad for 5G networks worldwide. However, traffic growth trends indicate that additional mid-band spectrum will be required beyond 2025. This will address increased urban connectivity demand in the places where people live, learn, commute, work and play. • Opening the upper 6 GHz band for Wi-Fi will be essential for extending the gigabit speeds potentially made available to users by the UK's fast-progressing fibre roll-out and for achieving the country's digitalisation objectives. • There is a dispute on whether there is a greater need for more IMT spectrum or more Wi-Fi spectrum. Some techUK members are supportive of Ofcom's proposals. In their view, although the long-term feasibility of hybrid sharing is not yet clear, allowing the development of feasible sharing mechanisms now may promote innovation in the short to medium-term. Releasing it at this stage before potential

	sharing mechanisms are in place for either only licence-exempt or only licenced use could prevent the immediate deployment of both license-exempt and licenced services. Reserving the upper 6 GHz for licenced IMT in the future will prevent the immediate deployment of licence-exempt applications and services delivered over Wi-Fi. Other techUK members believe that Ofcom should prioritise the upper 6 GHz band for licensed national mobile networks. They are sceptical as to the viability of hybrid sharing in terms of risks of interference, costs and complexity and whether given these issues Ofcom should instead be concerned that the hybrid use could actually reduce rather than improve the efficient use of this spectrum band. They are of the view that the 6 GHz band is best shared with part dedicated to licence-exempt use (the lower 6 GHz) and part dedicated to licensed use (the upper 6 GHz). Another group of techUK members believe that Ofcom should prioritise the upper 6 GHz for licence-exempt Wi-Fi to complement the lower 6 GHz band but share similar concerns to those expressed in the previous paragraph regarding efficient use of the band.
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? – No* techUK's members are open to at least exploring the possibilities offered by hybrid sharing. It is a new and interesting concept that members are prepared to understand if it is feasible and if so, what constraints would be required on IMT and/or Wi-Fi. But for now, many members consider that efficient use of the spectrum requires prioritising use and exploring shared use as a secondary issue. Supporters of the IMT use of the upper 6 GHz band argue that licensed use benefits society and is key to enable some 5G advanced use cases and applications. Nonetheless, if upper 6 GHz is to be made available for IMT it will be only to address capacity requirements in specific capacity constrained areas. The scope of this approach would serve particular scenarios, such as geographically bound areas,

	time limited to busy hour(s), and it would be available to base station level only.
Question 2(b): Similarly, what are the priorities from the point of view of Wi-Fi deployments?	*Is this response confidential? – No* Supporters of Wi-Fi use of the upper 6 GHz band point out that Wi-Fi is the technology of choice for connecting to the Internet for tens of millions of Britons and billions of people globally. Wi-Fi which is predominantly used indoors transports approximately 95% of data traffic in the UK, with mobile accounting for approximately 5%. Fixed network and Wi-Fi traffic are expected to experience double-digit annual growth through 2030. Considering the importance of Wi-Fi for indoor broadband connectivity, Wi-Fi should have priority indoors. Of particular importance is the protection of Wi-Fi enterprise networks from IMT interference. A sharing scheme should ensure that the QoS requirements specified for carefully coordinated enterprise networks would not be comprised. The ITU-R and UK sharing analysis shows that large or unlimited IMT geographical national deployments would most likely not be feasible with FSS in these bands. Based on CEPT and Ofcom sharing analysis for the lower 6 GHz band indoor W-Fi could be deployed now using the same effective isotropic radiated power (EIRP) levels as those currently allowed in the lower 6 GHz band.
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? – No* Members praise Ofcom's ambition to consider more sophisticated coexistence mechanisms for the future. Nevertheless, concerns were raised surrounding the following text in the consultation document: "Modifications to sensing and channel access: For example, Wi-Fi currently chooses when to transmit based on whether or not it detects other nearby users in the channel. However, Wi-Fi does not detect mobile signals in the same way as it detects other Wi-Fi signals: an enhancement of the current protocols may facilitate coexistence between Wi-Fi and licensed mobile."

	techUK's members have expressed that IMT would likely require reallocation of some fixed links to achieve Ofcom's goals with hybrid sharing. The Wi-Fi Energy Detect/Preamble Detect (ED/PD) thresholds are the very carefully crafted compromises. Trying to modify standards to accommodate different operations in the upper 6 GHz band could take years to implement and consequently delay introduction of full-band gigabit fibre services in the UK. Furthermore, it might result in higher costs of Wi-Fi chipsets and equipment which could widen the digital divide, with impacts to British consumers and businesses.
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? – No* The modifications to licence-exempt protocols to enable hybrid sharing with licenced mobile is something that needs study and further investigation, followed by international standardisation. At this time techUK does not have proposals as to how existing access protocols and sensing mechanisms could be leveraged. This might be something that individual members may address in their responses to the consultation.
Question 5: What mechanisms could potentially enable device-to-device connectivity?	*Is this response confidential? – No* No comments.
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? – No* techUK considers hybrid sharing is a new and interesting concept. We would commit to helping our members engage with Ofcom so that industry can understand the feasibility, should hybrid sharing be adopted, of IMT networks using the upper 6 GHz band and the constraints that would be required. However, some members have noted that restricting IMT to medium power would significantly affect the economics of deployment and would not represent most optimal and efficient use of the spectrum.
Question 7: How would you suggest that the mechanisms presented here can be used, enhanced, or combined to enable hybrid	*Is this response confidential? – No*

sharing or are there any other mechanisms that would be suitable that we have not addressed?	According to some techUK members, existing licence-exempt, certified, and commercially available equipment should not have to implement country-specific solutions should the UK open upper 6 GHz to IMT. Modifications of the IMT channel access mechanism, such as implementing a polite protocol, should be considered.
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? – No* Sharing IMT with fixed links will require coordination in the vicinity of the fixed links and may require removal of fixed links in urban areas. Wi-Fi, in contrast, would not require the removal of fixed links.
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? – No* Several studies conducted in ITU WP5D and ECC have shown that IMT and incumbents (FSS, FS, RAS) cannot share the upper 6 GHz band, unless stringent restrictions would be imposed on IMT. Incumbents would most likely have to be migrated to other bands if IMT was introduced in the band. For coexistence with FS and RAS, separation distances of up to 200 and 500 km, resp. would be required.
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? – No* No comments.
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? – No* Unlike IMT, Wi-Fi at low power and indoors is known to be able to coexist with incumbents, a fact that is also acknowledged by Ofcom in the consultation.
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? – No* Studies have shown that fixed links (FS), fixed satellite service (FSS), and radio astronomy services (RAS) will not be able to coexist with IMT. These services would have to be migrated

	to other bands. Because of governmental and other critical usage, some administrations may not be able or willing to migrate their fixed links, but even if they were, the migration of fixed links to other bands could take several years to accomplish.
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? – No* One element that needs further thought is how to address licence-exempt very low power (VLP) portable equipment that can be indoors as well as outdoors. Additionally, Ofcom has not addressed the issue of interference between mobile devices indoors and Wi-Fi indoors, which is a scenario that can commonly arise. Some members of techUK would like Ofcom to take into account that alternatives to the upper 6 GHz band exist for IMT to address the envisaged use cases. The mmWave frequencies, 24.25-27.5 GHz, 37-43.5 GHz, 45.5-47 GHz, 47.2-48.2 GHz, and 66-71 GHz, that were identified at WRC-19 for IMT, and add an additional 17.25 GHz of bandwidth to the total available for IMT, have been identified as capacity bands. An analysis by the GSMA found that in dense urban environments, deploying mmWave in a 3.5GHz 5G network can lower total cost of ownership (TCO) by up to 35%. In suburban and rural fixed wireless access (FWA) deployments, 5G mmWave can provide a TCO reduction of up to 34%. 5G phones supporting mmWave bands are available on the market today. Other members consider this to be irrelevant to the consultation and that these bands do not deliver the required technical capability for coverage and point out that Wi-Fi also has very substantial spectrum available at 60 GHz but acknowledge market certainty has been adversely impacted by the IMT identification in 66-71 GHz. It should be noted that a large part of the licence-exempt spectrum available for WiGig (not Wi-Fi!) in the 60 GHz band was subsequently identified for IMT, and the resulting market uncertainty led to the collapse

	of the WiGig ecosystem. Furthermore, the propagation characteristics of the 60 GHz band cannot be compared to those of the 24 GHz band which is very well suited to provide additional capacity for IMT in dense urban areas. Over the coming years it is necessary to provide mobile network operators access to dedicated, licensed spectrum for the wireless industry to continue to provide these considerable, widespread positive socio-economic benefits. The only remaining midband spectrum in which mobile can grow is the upper 6 GHz band and this will be required to avoid not enough network capacity. The projected massive growth of fixed network traffic calls for more mid-band spectrum to be made available for Wi-Fi. This 'additional' spectrum comes at no cost, because Wi-Fi can share the band with the incumbent users. The upper 6 GHz band is the only remaining mid-band spectrum in which Wi-Fi can grow adequately in order to satisfy user needs and protect the massive investments made in fibre deployments.
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? – No* Summary of viewpoints from within techUK membership: Wi-Fi While Wi-Fi has been an essential element of enterprise and the home networks for years, it has also become a key complementary technology for enterprise and carrier telecommunications networks. Its value is expected to grow further as next generation products are becoming available and deployed. With an estimated 26% growth between 2017 and 2022, Wi-Fi accounted for 80-90% of all internet traffic. The upper 6 GHz band is essential for Wi-Fi to be able to extend the gigabit speeds potentially made available to users by the UK's fast-progressing fibre roll-out. By 2030, gigabit-broadband is supposed to be available nationwide, i.e., to at least 99%" of premises. Already now, 10 Gigabits/s home broadband is

	available from internet service providers in the UK. Acknowledging the importance of Wi-Fi for the digitalization of their societies, governments in all three ITU regions have authorized the use of the full 6 GHz band (5925-7125 MHz) by licence-exempt systems such as Wi-Fi. Global harmonization of the 6 GHz band for licence-exempt use will further reduce product cost and enable reducing the digital divide. The upper 6 GHz band is the only band still available for Wi-Fi that provides a sufficiently large amount of contiguous mid-band spectrum. Unlike IMT, which is predominantly deployed indoors and hence needs to operate at frequencies that propagate well inside buildings. Some members believe the need for more Wi-Fi spectrum is evident from the official FTTH coverage and performance targets while other members, including those that provide fixed networks consider that existing Wi-Fi spectrum is sufficient, or at least is less pressing than the needs of mobile. Without the upper 6 GHz band being made available to Wi-Fi, enterprises, consumers, public institutions and other users will not be able to fully benefit from the UK's gigabit fibre deployments, and consequently, they will have no incentive to subscribe to gigabit services will negatively affect fixed network operators' return on investment and greatly reduce societal benefits. The upper 6 GHz band is a crucial resource for expansion of licence-exempt applications and services currently restricted to the lower 6 GHz band since it will support any applications and use cases that require wider channel bandwidths and channel diversity currently supported by Wi-Fi 6E and in the future Wi-Fi 7. IMT By the end of 2028, Ericsson forecast 4.6 billion 5G subscriptions globally, accounting for more than 50% of all mobile subscriptions. 5G will become the dominant mobile access technology by subscriptions in 2028. The most recent Ericsson mobility report showed that in Q2 2023, 5G subscriptions grew by 175 million,

	lifting the total to close to 1.3 billion. 4G subscriptions increased by 11 million to around 5.2 billion, representing 62 percent of all mobile subscriptions, while WCDMA/HSPA subscriptions declined by 85 million. GSM/EDGE-only subscriptions dropped by 59 million during the quarter. Mobile network data traffic grew 33% between Q2 2022 and Q2 2023, reaching 134 EB per month. Some techUK members are of the opinion that the upper 6 GHz band is a crucial capacity resource for the future development of public mobile networks and allows similar performance to 3.5 GHz spectrum. For most countries worldwide, it represents the only opportunity in the mid-band range in which mobile can continue to grow. Without additional mid-band spectrum, operators will not be able to offer 5G performance and services in a cost-effective manner citywide. Over the long term this will impact the ability for industry and society to realise the full socio-economic benefits.

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