Consultation title	Improving spectrum access for Wi-Fi – spectrum use in the 5 and 6 GHz bands
Representing (delete as appropriate)	Organisation
Organisation name	UWB Alliance Inc.

Your response

Question	Your response
Question 1: Do you have any comments on our proposal to open access to the 5925-6425 MHz band for licence-exempt Wi-Fi use?	The consultation fails to note that Licence-exempt rules for the band already exist and that there are extensive deployments under the existing rules. The Current rules have worked well to protect incumbent services, promote innovation, and provide for effective multiple uses of the spectrum. The consultation (2.9) states that the band is lightly used. This statement fails to consider the large number of uses under current licence-exempt rules. It also fails to consider current trends in licence-exempt technologies other than RLAN. UWB is deployed widely in critical applications in the UK today, some are in environments the consultation identifies as targets for 6 GHz RLAN. New applications of UWB are expanding rapidly into consumer devices such as vehicle access and Smart Phones. UWB is used in critical Industrial applications in the UK. In Consideration of industrial use of Wi-Fi, the impact on existing wireless systems must be considered. This would include the effect on licensed-exempt systems such as UWB. As noted by Ofcom, reliability is critical in industrial uses. Measuring economic impact is not limited to the market size for industrial wireless devices. For example, the major auto manufacturers in the UK rely on UWB systems in the factory for eliminating errors in the

	assembly process by identifying specific vehicles and their location. As items are assembled the correct torque settings are automatically set to the proper values based on matching the tool settings to the vehicle. There are other examples of technologies that are better matches for applications (e.g., Bluetooth for wireless headset) that have better spectrum utilization. It should be noted that RLAN is not the be-all solution for all communication and location needs. UWB is not just for industry anymore: UWB has now been developed and adopted for consumer applications. Millions of UWB equipped iPhone 11s have already been shipped beginning Q4 2019 and conservative estimates are over 100 million will ship in 2020. The consultation fails to consider this significant use of existing licensed-exempt rules. Experience with UWB shows that the existing rules enable innovative new uses of the spectrum while protecting incumbent users. The consultation inaccurately understates the potential RLAN impacts. Many studies (see Q.2) refute the conclusion that there is no negative impacts. Many of the points in the consultation suggest that the need for more Wi-Fi spectrum is driven by poor sharing of Wi-Fi with other Wi-Fi. Paragraphs 2.5 and 2.6 note that interference (congestion) is a key limiting factor for RLAN in existing spectrum allocations. The proposal suggests that the primary solution is more channels. This is inherently an unsustainable solution to addressing congestion: there can never be an infinite number of channels. Long term viability of the goals stated in the consultation require improving sharing and spectral reuse. Much of the consultation identifies issues arising out of poor RLAN design, implementation, and use. In fact, much of this argues against rules favouring a specific technology. For example:

	Paragraph 3.18 Asserts that CSMA/CA fails under congestion (a debatable technical conclusion). This argues that more channels are needed because the channel access scheme doesn't work very well. This hardly seems like promoting innovation. Innovation would be finding better ways to share the channel, achieve more efficient access schemes, reducing the interference footprint of each RLAN device, and so on. Paragraph 3.20 likewise suggests that poor usage practices and poor design by manufactures is an excuse to allocate more spectrum. This again speaks against the goal of promoting innovation. Paragraph 3.22 illustrates that the primary limitation to RLAN capacity is interference from other RLANs. We favour requirements that reward reducing the interference footprint of RLAN devices. This would benefit RLAN users as well as all other spectrum users. We strongly support including requirements for transmit power control and duty cycle restrictions, which would reduce RLAN interference footprint. We strongly support incentives to use much lower power than traditional RLAN to improve device density (spectral reuse), reduce interference footprint, and improve coexistence. Ofcom notes RLAN congestion is a key limiting factor. Many of the examples given by Ofcom of applications driving the need for more Wi-Fi spectrum can be met with power limits proposed, and lower limits would improve Wi-Fi performance by reducing overall congestion.
Question 2: Do you have any comments on our technical analysis of coexistence in the 5925-6425 MHz band?	The assumptions in the document are heavily based on the ECC Report 302. A significant number of issues exist with the assumptions in that report. These have been identified in ECC working groups which lead to questions about the conclusions of the studies: • The consultation refers to VR/AR applications as a driving need for this

	proposal. Such applications require far less than the 250 mW, or in many cases even the 25 mW power levels suggested. These power levels increase interference between overlapping small RLANs and reduce overall capacity, counter to the goals stated in the consultation. The analysis should include the effect of transmit power on interference footprint and resulting reduction of capacity. • Paragraph 2.9 states that the band is lightly used. This analysis fails to consider the large number of uses under current licence-exempt rules and fails to consider current trends in licence-exempt technologies other than RLAN. • Paragraph 3.11 through 3.12 discuss industrial Wi-Fi while failing to account for existing industrial uses. There are currently many wireless technologies used in industrial applications. RLAN such as Wi-Fi is not an ideal nor efficient technology for many such applications. Various technologies are currently used because they efficiently match application need to spectrum used. • IoT examples given such as fitness trackers are also places where other technologies better fit the need. Applications in which only moderate data rates are required are currently served by technologies using less spectrum and it should be noted are not clamouring for more spectrum with as much enthusiasm. We point out these examples argue against the proposal. • Paragraph 4.18 through 4.31 Doesn't include currently licence-exempt uses. 4.18 through 4.31 Doesn't include currently licence-exempt uses. This gives a false impression that there is no impact.

Question 3: Do you agree with our proposal to remove DFS requirements for indoor Wi-Fi up to 200mW from the 5725-5850 MHz band?	
Question 4: Do you have any comments on other options that may be available for Wi-Fi and RLANs within the 5 GHz band?	Extremely Low Power (ELP) is an option for rapidly expanding market for AR and VR. These applications do not require long range communication. Power levels of 0 dBm EIRP are optimum in that many devices could now operate near each other for use in seminars, gaming contests, small shared spaced such as passenger trains, and other applications that require many devices to share a finite amount of space. Higher power levels would cause self-interference which be prohibitive to this type of application. A portion of the band set aside for ELP would optimize use in these environments and provide clear portions of the band for both licensed and unlicensed incumbent users. If a portion is not set aside for these types of uses, then devices in close proximity would automatically escalate their power levels in an attempt to improve the SNR from self-interference. This would lead to all the devices escalating to full power with all users failing to receive acceptable performance. To meet the goals stated in the consultation, we strongly recommend that the technical requirements enable innovation and not limit the band to conventional RLAN. Specifically, the technical requirements should not dictate a specific channel width or channelization of the band, nor a modulation technique. This enables innovative approaches that fit the spectral limitations (PSD, duty cycle, etc) in the future.