Consultation title	Improving spectrum access for Wi-Fi – spectrum use in the 5 and 6 GHz bands
Organisation name	Wi-Fi Alliance

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?	Wi-Fi Alliance supports Ofcom's proposal to allow licence-exempt access to the 5925-6425 MHz band. The evolution of Wi-Fi from a nascent technology to a critical component of broadband wireless infrastructure has not been met by a corresponding increase in spectrum access, despite the widely recognized need to provide additional spectrum capacity to support Wi-Fi and other unlicensed technologies. Today, Wi-Fi is the predominant on-ramp for Internet access; it supports a significant portion of wireless carrier's network traffic through offload; and it is, and will continue to play an important role in advance applications such as the Internet of Things ("IoT") augmented and virtual reality (AR/VR), ultra high-definition (Ultra HD) video, immersive internet experiences, industrial applications and many more. All these use-cases and applications require access to spectrum capacity which is simply unavailable in the current licence-exempt frequency bands (i.e., 2.4 GHz and 5 GHz). Moreover, regulatory constraints and signal congestion further limit Wi-Fi access to spectrum in these bands. (see Wi-Fi Alliance, *Spectrum Needs Study*). Wi-Fi Alliance praises Ofcom for making spectrum available for licence-exempt access in the millimeter wave bands (*i.e.*, in the 57-71 GHz), but that spectrum lacks propagation characteristics of mid-band spectrum which are necessary to accommodate growing number of Wi-Fi use-cases and wider area deployments. In short, rapidly growing demand for higher-performance and lower-latency Wi-Fi connectivity is outpacing available spectrum capacity. Only urgent regulatory action can prevent this looming spectrum crunch from degrading numerous socioeconomic benefits delivered by Wi-Fi. Wi-Fi Alliance urges Ofcom to implement its proposal on making the much-needed spectrum available for Wi-Fi access in the 5925-6425 MHz band. Lastly, recognizing ever-greater role Wi-Fi plays in delivering wireless connectivity to enterprises and consumers, there is no doubt that the demand on available Wi-Fi spectrum will continue

	to rise. As noted in the Consultation (Appendix 6), projected demand for Wi-Fi will increase by up to 10 to 15 times over the next 10 years. In light of this demand, significantly more spectrum capacity, beyond the 500 MHz (5925-6425 MHz) will be needed to support Wi-Fi connectivity. Future generations of Wi-Fi (beyond Wi-Fi 6), which are already under development, will be designed for extremely high throughput and, therefore, require even more spectrum capacity. Other countries are actively considering additional 6 GHz spectrum (6425-7125 MHz) for Wi-Fi. Recognizing Ofcom's historic leadership role in enabling Wi-Fi innovation, Wi-Fi Alliance urges Ofcom to initiate consideration of licence-exempt access on frequencies above 6425 MHz.
Question 2: Do you have any comments on our technical analysis of coexistence in the 5925-6425 MHz band?	Wi-Fi Alliance agrees with Ofcom's conclusion that license-exempt Wi-Fi with EIRP up to 250mW for indoor-only use and for Very Low Power uses (both indoor and outdoor) with EIRP up to 25mW will not affect incumbent operations in the 5925-6425 MHz band and that these technical conditions are sufficient for the technical and commercial viability. It is also important to note that even though Ofcom's compatibility analysis overestimated the risk of interference, for example, by applying a more conservative building entry loss value (i.e., 12 dB instead of generally accepted 20 dB), its results still confirm that sharing is feasible. These results are also supported by other independent analyses (e.g., ECC Report 302, draft ECC Report 316, CEPT Report 73). As noted in the Consultation, the studies also show that, whilst there are some scenarios where the long-term fixed link protection threshold could be exceeded when considering high power RLANs, the plausibility of these scenarios arising in practice is extremely unlikely. Moreover, given that the analyzed fixed-link protection criterion is theoretical, while actual fixed-links are designed with considerably more interference margin, Ofcom may wish to evaluate limited and site-restricted outdoor Wi-Fi deployments in the 5925-6425 MHz band. Such deployments entail significant public-interest benefit. As recognized in Ofcom's Mobile Matters Report, the demand for Wi-Fi is not limited only to indoor or very-low power transmissions. With over twice as many mobile connections over Wi-Fi than cellular and with Wi-Fi delivering the bulk of mobile data, the demand for Wi-Fi in public places is significant and growing. Allowing Wi-Fi access points to deploy in some high-user density outdoor locations (e.g., stadiums, convention centers, shopping malls,) will enable service providers to extend coverage and increase capacity of their networks. Wi-Fi Alliance urges, as a follow up action to this Consultation, for Ofcom to consider outdoor Wi-Fi deployments, possibly on frequency coordinated basis, while ensuring

	protection of the incumbent operations in the 5925-6425 MHz band.
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?	Wi-Fi Alliance agrees with Ofcom's proposal to remove the DFS requirements from the 5725-5850 MHz band for Wi-Fi use. As appropriately recognized in the Consultation, the 5725-5850 MHz band is lightly used by Wi-Fi routers in the UK, due to the UK-specific requirements mandating DFS implementation. The DFS constraint, reduces spectrum access and raises equipment cost and complexity for Wi-Fi equipment and operations. This observation is confirmed by Wi-Fi Alliance membership survey which identified the following challenges for Wi-Fi implementations in DFS constrained frequency bands: (1) DFS limits the use of some applications (e.g., cannot be implemented for peer-to-peer and tethering). (2) Additional time is needed to obtain equipment approval for products using DFS frequencies, delaying time-to-market. (3) There is added complexity in designing and producing equipment with DFS capabilities. (4) Once successfully engineered into devices, DFS result in an ongoing operational burden due to regulatory obligations for channel availability check time, in-service monitoring, and non-occupancy period, among other requirements. These requirements make a system operating on DFS-restricted channels less available than one that uses only unencumbered channels, particularly if the system detects false radar patterns. (5) Lastly, the DFS requirements in the 5725-5850 MHz band is unique to UK. Requiring a widespread technology, such as Wi-Fi, to conform to a patchwork of national regulations is challenging to realizing the benefits of economies of scale and detrimental to technological advancement, consumers and economic interests. Ofcom, also, correctly concludes that the interference risk to radars from indoor Wi-Fi use is very low. Most of the energy from indoor deployed Wi-Fi device's transmission will be contained indoors and will not reach the radars. The limited amount of the Wi-Fi signal energy that may propagate outside of a building structure would be further attenuated by separation distances and obstacles between the Wi-Fi device and the radar receiver. Under most conservative assumptions, the aggregate attenuation of the Wi-Fi signal at a radar site should exceed 20 dB. Finally, it is important to emphasize that even though removing the DFS requirement in the 5725-5850 MHz band could increase Wi-Fi spectrum access, it will not alleviate the urgent need for additional licence-exempt spectrum capacity (see Wi-Fi Alliance response to Question 1).

Question 4: Do you have any comments on other options that may be available for Wi-Fi and RLANs within the 5 GHz band?	The answer below is based on Wi-Fi Alliance understanding that Question 4 of the Consultation pertains specifically to the 2019 World Radio Conference (WRC-19) decision to amend the international Radio Regulations for RLAN use in 5150-5250 MHz band in order to allow outdoor operations (see Consultation, Question 4 on page 24). Wi-Fi Alliance appreciates Ofcom's efforts to better understand Wi-Fi requirements in the 5150-5250 MHz band. Growing demand for Wi-Fi connectivity necessitates both indoor and outdoor applications. Outdoor Wi-Fi is necessary to deliver expanded connectivity, particularly in public venues such as sports stadiums, campuses, consumer oriented (e.g., coffee shops) and industrial (e.g., factories) settings and other public areas. The 5150-5250 MHz band offers unique advantages in addressing the growing need for Wi-Fi outdoor access. This frequency band is the only worldwide harmonized spectrum for RLANs in the 5 GHz range that is not subject to the DFS constraint. Recognizing this fact, at WRC-19, administrations agreed to revise international regulations to allow Wi-Fi outdoor operations with EIRP of up to 1W and limitations on antenna elevation angles. A number of countries at WRC-19, however, confirmed i(n the treaty) that they plan to operate outdoor Wi-Fi at an even higher EIRP level (see WRC-19 Declarations and Reservations, 88). The higher EIRP level is necessary to realize the benefits of expanded outdoor connectivity. Over the years of application in practice, the 4W EIRP limit with appropriate antenna elevation mask has been proven as an effective mitigation constraint for outdoor RLAN deployments in the 5150-5250 MHz band. In the United States, for example, the 4W EIRP limit has been applied since 2014 and US confirmed its practicality in a proposal to WRC-19 (see here). The national regulations governing outdoor RLAN operations in the 5150-5250 MHz band in several countries (e.g., Canada, Japan, S. Korea, US) were specifically designed to protect satellite receivers from aggregate interference, and there is no evidence to suggest that a similar approach in UK would have a different results. Also, it is important to recall that the original "indoor-only at 200 mW EIRP" constraint was adopted at the 2003 World Radio Conference primarily to protect a single mobile satellite system network – Globalstar. Noting that the US acts as the "notifying administration" for the Globalstar satellite network at the International Telecommunications Union ("ITU"), it is incongruous for other countries, such as UK, to unnecessarily restrict RLAN operations to a more stringent limit than the country (i.e., US) which advocated for this limit in the first place. In light of the above, Wi-Fi Alliance urges Ofcom to modify applicable regulations in the 5150-5250 MHz frequency band to allow outdoor Wi-Fi deployments at a maximum EIRP level of 4W.