

Re: Consultation “Technical requirements and test methods for new type approval of wireless LAN equipment adopting IEEE 802.11be technical standards”.

Dear Sir/Madam,

IEEE 802 LAN/MAN Standards Committee (LMSC) thanks the Ministry of Industry and Information Technology (MIIT) of the People’s Republic of China for issuing the consultation “Technical requirements and test methods for new type approval of wireless LAN equipment adopting IEEE 802.11be technical standards” and for the opportunity to provide feedback on this topic.

IEEE 802 LMSC is a leading consensus-based industry standards body, producing standards for wireless networking devices, including wireless local area networks (“WLANs”), wireless specialty networks (“WSNs”), wireless metropolitan area networks (“Wireless MANs”), and wireless regional area networks (“WRANs”). We also produce standards for wired Ethernet networks, and technologies produced by implementers of our standards are critical for all networked applications today.

IEEE 802 LMSC is a committee of the IEEE Standards Association and Technical Activities, two of the Major Organizational Units of the Institute of Electrical and Electronics Engineers (IEEE). IEEE has about 400,000 members in over 160 countries. IEEE’s core purpose is to foster technological innovation and excellence for the benefit of humanity. In submitting this document, IEEE 802 LMSC acknowledges and respects that other components of IEEE Organizational Units may have perspectives that differ from, or compete with, those of IEEE 802 LMSC. Therefore, this submission should not be construed as representing the views of IEEE as a whole¹.

Please find below the responses of IEEE 802 LMSC to this consultation.

The IEEE Std 802.11ax-2021 standard [1] supports operation in the 2.4 GHz, 5 GHz, and 6 GHz bands, and products based on this standard are seeing significant adoption where regulatory rules permit deployment [2]. Based on IEEE Std 802.11ax-2021, the Wi-Fi industry is taking the lead in developing the Wi-Fi 6E certification program and specifying a number of complementary coexistence strategies for bands with incumbent users, such as automated frequency coordination (AFC) [3] [4] for the 6 GHz band. Wi-Fi technology, based on the IEEE 802.11 standard, has an estimated 18 billion devices in use world-wide, with over 4 billion devices added annually [5]. In addition, the list of Wi-Fi 6E [2] certified products (which are based on IEEE 802.11 technologies) is growing. In 2022, over 350 million Wi-Fi 6E devices entered the market [6].

A new generation of IEEE 802.11 technologies, currently under development in the IEEE P802.11be amendment [7], will continue to improve performance and enhance spectrum coexistence capacities. To achieve the targeted performance improvements, IEEE P802.11be introduces advanced features including channel bandwidths of up to 320 MHz, multiple resource units to a single station, multi-link operation, enhanced quality of service (QoS), improved Target Wake Time, and improved spectrum management to accommodate coexistence with incumbents

¹ This document solely represents the views of IEEE 802 LMSC and does not necessarily represent a position of either the IEEE or the IEEE Standards Association.

more effectively and efficiently. Please note that the P802.11be amendment currently supports carrier frequency operation between 1000 MHz and 7125 MHz with extension to 7250 MHz under consideration.

IEEE 802 LMSC commends MIIT's proposal of technical requirements and test methods for new type approval of wireless LAN equipment adopting the IEEE 802.11be technical standard and kindly requests MIIT to consider the following three topics.

Allocate more spectrum (e.g., 5470 MHz to 5725 MHz, part of or the entire 6 GHz band) for license-exempt use

IEEE P802.11be's global 6 GHz channelization is designed to accommodate multiple 160 MHz and 320 MHz channels throughout the 5925 MHz to 7125 MHz band, if available. Many countries and cities in the Asia Pacific regions, including Singapore, Thailand, and Hong Kong S.A.R, have recently authorized license-exempt operation in the 5925 MHz to 6425 MHz band, which allows multiple 160 MHz channels and one 320 MHz channel. Many other countries, including Saudi Arabia and Brazil have allocated the entire 6 GHz band for license-exempt operation, which allows multiple 160 MHz channels and three 320 MHz channels. Availability of the 5470 MHz to 5725 MHz band, and/or part of or the entire 6 GHz band for license-exempt use will create economies of scale and produce a robust equipment market, benefitting businesses, consumers, and economy, while providing societal benefits.

Recommend adoption of in-channel segments of the proposed Multiple Resource Unit (MRU) spectrum mask only

The spectrum mask for MRU operation is specified in IEEE P802.11be draft specification [7]. IEEE 802 LMSC welcomes MIIT's proposed adoption of a similar spectrum mask for MRU operation as described in the consultation. IEEE 802 LMSC would like to bring to MIIT's attention that, in the case of 5 GHz band, only in-channel segments of the spectrum mask in the punctured subchannels are to be considered and that any out-of-channel segments of the baseline or MRU spectrum mask should not be required. The main reason is that there are no incumbent protection requirements that necessitate imposing a channel spectrum mask within the 5 GHz bands.

In the case of the 6 GHz band, the situation may be different as some regulatory domains are considering imposing a channel spectrum mask within the 6 GHz band for license-exempt operation to protect incumbent fixed services. In this case, the entire spectrum mask for MRU proposed by MIIT, which is similar to that of IEEE P802.11be, may be considered for punctured channels.

IEEE 802 LMSC would like to mention that the IEEE P802.11be spectrum mask for MRU is also consistent with that in ETSI BRAN EN 303 687 [8].

Recommend removing the proposed Error Vector Magnitude (EVM) requirement

IEEE 802 LMSC recommends not placing a regulatory restriction on the EVM requirement for 4096-QAM modulation as we believe that performance requirements such as this, on the performance of a transmitted signal, are more appropriately addressed by industry standards and specifications. We note that such requirements are defined today in multiple industry standards and are derived based on simulation and implementation characteristics of the specific technology.

Conclusion

IEEE 802 LMSC thanks the MIIT for the opportunity to provide this submission and kindly requests MIIT to consider our responses in its future decisions.

Respectfully submitted

By: /ss/.

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References:

- [1] "IEEE Standard for Information Technology - Telecommunications and Information Exchange between Systems Local and Metropolitan Area Networks - Specific Requirements Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications Amendment 1: Enhancements for High-Efficiency WLAN," in *IEEE Std 802.11ax-2021 (Amendment to IEEE Std 802.11-2020)*, vol., no., pp.1-767, 19 May 2021, doi: 10.1109/IEEESTD.2021.9442429.
- [2] Wi-Fi Alliance: Wi-Fi 6E momentum underscores need for entire 6 GHz band, November 2022. [Available online](#) [accessed: 30 June 2023].
- [3] Dynamic Spectrum Alliance: Automated frequency coordination - an established tool for modern spectrum management, March 2019. [Available online](#) [accessed: 30 June 2023].
- [4] Intel Corporation: Spectrum sharing using automated frequency coordination. [Available online](#) [accessed: 30 June 2023]
- [5] Wi-Fi Alliance: Value of Wi-Fi. [Available online](#) [accessed: 30 June 2023]
- [6] Wi-Fi Alliance: Wi-Fi 6E certified products. [Available online](#) [accessed: 30 June 2023]
- [7] IEEE Draft Standard for Information technology--Telecommunications and information exchange between systems Local and metropolitan area networks--Specific requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications Amendment: Enhancements for Extremely High Throughput (EHT)," in *IEEE P802.11be/D3.0*, January 2023 , vol., no., pp.1-999, 1 March 2023.
- [8] ETSI BRAN: 6 GHz WAS/RLAN; Harmonised Standard for access to radio spectrum, ETSI BRAN EN 303 687 v1.1.0 (2023-03).