IEEE P802.18
Radio Regulatory Technical Advisory Group (RR-TAG)

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| Proposed Response to ACMA Draft Five-Year Spectrum Outlook 2023-28 |
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This document drafts a proposed response to the Australia ACMA’s consultation “Draft Five-Year Spectrum Outlook 2023-28”.

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Re: Consultation “Five-year spectrum outlook 2023–28 and 2023–24 work program Draft for consultation”

Dear Australia ACMA,

IEEE 802 LAN/MAN Standards Committee (LMSC) thanks The Australian Communications and Media Authority (ACMA) for issuing the consultation “Five-year spectrum outlook 2023–28 and 2023–24 work program” and for the opportunity to provide feedback on this draft outlook and work program.

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 whole[[1]](#footnote-1).

Please find below the responses of IEEE 802 LMSC to this consultation focusing on the 6GHz band.

***2023–24 Annual Work Program: 6 GHz (5925–7125 MHz)***

The IEEE Std 802.11ax-2021 [1] standard supports operation in the 2.4 GHz, 5 GHz, 6 GHz (i.e., 5925 MHz to 7125 MHz) bands, and products based on this standard are seeing significant adoption where regulatory rules permit deployment [2]. IEEE 802 technologies are designed to not cause interference with incumbent services in these bands. Based on IEEE Std 802.11ax-2021, the Wi-Fi industry is taking the lead in developing Wi-Fi 6E certification program and specifying a number of complementing coexistence strategies for bands with incumbent users, such as automated frequency coordination (AFC) [3] [6] for the 6GHz band.

A new generation of IEEE 802.11 technologies, currently under development in the IEEE P802.11be amendment, will continue to improve performance and enhance spectrum coexistence capacities. In order to achieve these target performance measures, IEEE P802.11be introduces advanced features including channel bandwidths of up to 320 MHz, 4096-quadrature amplitude modulation (QAM), multiple resource units (RUs) to a single station (STA), multi-link operation, enhanced quality of service (QoS), improved Target Wake Time (for improved battery life for IoT or other applications), and improved punctured transmission/subchannels to accommodate coexistence with incumbents more effectively and efficiently.

IEEE P802.11be is designed to meet the target application performance requirements and at the same time to scale to meet the requirements of enterprise, commercial and dense deployments when multiple simultaneous sessions of similar or different applications on multiple Wi-Fi networks are coexisting with incumbent service operation. To effectively support this scaling requirement, IEEE P802.11be’s global 6 GHz channelization is designed to accommodate multiple 160 MHz and 320 MHz channels throughout the entire 6 GHz band, if available. ACMA’s designation of 500 MHz of the 6 GHz band for RLAN use provides for only one 320 MHz channel, while the full 5925 MHz to 7125 MHz band would allow three such channels.

Deployment of new applications targeted by the IEEE 802.11ax-2021 standard and the upcoming IEEE 802.11be standard can be effectively scaled when multiple 320 MHz channels (as defined in IEEE P802.11be) are enabled. Extension to the upper portion of the 6 GHz band would greatly facilitate scaling of services for enterprise and dense deployments. Even though the current target 6GHz band ends at 7125 MHz, expanded availability of the 6 GHz band from 7125 MHz to 7250 MHz for license-exempt shared use (indoor and outdoor) is also beneficial to IEEE 802 wireless technologies.

Significant economic value is provided by IEEE 802-based systems today. 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 [4]. In addition, the list of Wi-Fi 6E certified products (which are based on IEEE 802.11 technologies) is already growing. In 2022, over 350 million Wi-Fi 6E devices entered the market [5]. Many countries and regions including the USA, Canada, Brazil, South Korea, and Saudi Arabia have already allocated the entire 6 GHz band of license-exempt operation. Availability of the entire 6 GHz band for license-except use will create economies of scale and produce a robust equipment market, benefitting Australia’s businesses, consumers, and the economies as well as increasing the societal benefits in Australia. Only recently, Colombia ANE authorized license exempt operation in the entire 6GHz band.

As it was rightly recognized in ACMA’s “Proposed updates to the LIPD Class Licence for 6 GHz RLANs Outcomes paper” in March 2022, there is a strong argument for the introduction of arrangements for RLANs across the entire 6 GHz band and there are no good reasons to defer a decision on the upper 6 GHz band. IEEE 802 LMSC recommends that ACMA authorize LIPD Class Licence operation in the entire 6 GHz band.

IEEE 802 LMSC would like to use the opportunity to also update ACMA on Ultra Wideband technology, which is specified by IEEE 802.15 standards and is finding adoption for numerous short-range sensing and ranging applications. IEEE Std 802.15.4-2020 [9] and IEEE Std 802.15.4z-2020 [10] are standards for precision ranging that are capable of using both the 6 GHz and 7 GHz frequency bands and are increasingly used in many high value applications. The capability of IEEE Std 802.15.4z-2020 to support secure ranging has led to a renewed interest in UWB from both industry and regulators. The automotive industry was the driving force behind IEEE Std 802.15.4z-2020 and the first to include UWB in consumer products. Mobile handset makers have followed closely. This is generating significant economic and social value, attracting further interest in developing future UWB standards.

Regarding authorized modes of operation in the 6 GHz band, IEEE 802 LMSC supports authorization of the VLP (very low power) and LPI (low power indoor) modes in the 6GHz band by ACMA but kindly requests ACMA to actively pursue enablement of other modes of operation in the 6GHz band. In addition to VLP and LPI modes, IEEE 802.11 technology supports Standard Power (SP) mode (under supervision of AFC System), in the complying devices, through protocol level regulatory messaging.

In the consultation paper, ACMA correctly refer to AFC as a potential mitigator for impact on incumbent services for outdoor operation along with VLP mode but at higher power level. IEEE 802 LMSC believes that AFC System, as an effective automated sharing technology, is critical in enabling essential Wi-Fi technology applications and use-cases not only for outdoor operation but also indoor operation as standard power level.

Authorizing SP mode at a max EIRP of 36 dBm for access points and 30 dBm for client devices for indoor and outdoor operation enables many key applications including multigigabit per second outdoor coverage (e.g., parks, stadiums), multigigabit point-to-multipoint connectivity, low-latency applications including industrial IoT and Voice over IP (Wi-Fi calling) applications, and next-generation experiences with AR/VR/XR for indoor and outdoor. The USA, Canada, and Brazil have already authorized SP mode and are currently developing certification process for AFC systems. Many other countries including Saudi Arabia, South Korea, and Japan are studying enablement of SP mode. Recommended compliance specifications are also being developed by industry stakeholders [7] [8] for consideration by the US FCC for its AFC system and device certification program.

To build on capabilities and use cases supported by already authorized VLP and LPI modes and to fully utilize the potential of the 6GHz spectrum, IEEE 802 LMSC recommends ACMA authorizes Standard Power mode under supervision of an AFC system.

**Conclusion**

IEEE 802 LMSC thanks the Australia ACMA for the opportunity to provide this submission and kindly requests Australia ACMA to take into account our responses in its future decisions towards the LIPD Class Licence of 6 GHz band for RLAN use.

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](https://www.wi-fi.org/news-events/newsroom/wi-fi-6e-momentum-underscores-need-for-entire-6-ghz-band) [accessed: 12 March 2023].

[3] Dynamic frequency coalition: Automated frequency coordination - an established tool for modern spectrum management, March 2019. [Available online](https://dynamicspectrumalliance.org/wp-content/uploads/2019/03/DSA_DB-Report_Final_03122019.pdf) [accessed: 12 March 2023].

[4] Wi-Fi Alliance: Value of Wi-Fi. [Available online](https://www.wi-fi.org/discover-wi-fi/value-of-wi-fi) [accessed: 12 March 2023]

[5] Wi-Fi Alliance: Wi-Fi 6E certified products. [Available online](https://www.wi-fi.org/product-finder-results?keywords=wi-fi+6E&op=Search&form_build_id=form-5F5bhfMUfZOoa0Xo4k9oQD8nsj0GQLww76EPepJC5QQ&form_id=wifi_cert_api_simple_search_form) [accessed: 12 March 2023]

[6] Intel: Spectrum sharing using automated frequency coordination. [Available online](https://www.intel.com/content/www/us/en/wireless-network/spectrum-using-automated-frequency-coordination.html#:~:text=Introducing%204th%20Gen%20Intel%C2%AE%20Xeon%C2%AE%20Scalable%20Processors%20Spectrum,and%20compliance%20considerations%20in%20the%206%20GHz%20band.) [accessed: 12 March 2023]

[7] Wi-Fi Alliance: AFC Specification and Test Plans. [Available online](https://www.wi-fi.org/file/afc-specification-and-test-plans) [accessed: 12 March 2023]

[8] Wireless Innovation Forum: Specifications. [Available online](https://6ghz.wirelessinnovation.org/baseline-standards) [accessed: 12 March 2023]

[9] “IEEE Standard for Low-Rate Wireless Networks,” in IEEE Std 802.15.4-2020 (Revision of IEEE Std 802.15.4-2015), vol., no., pp.1-800, 23 July 2020, doi: 10.1109/IEEESTD.2020.9144691.

[10] “IEEE Standard for Low-Rate Wireless Networks--Amendment 1: Enhanced Ultra Wideband (UWB) Physical Layers (PHYs) and Associated Ranging Techniques,” in IEEE Std 802.15.4z-2020 (Amendment to IEEE Std 802.15.4-2020), vol., no., pp.1-174, 25 Aug. 2020, doi: 10.1109/IEEESTD.2020.9179124.

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. [↑](#footnote-ref-1)