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

Draft response to Australia ACMA's consultation on Five-year spectrum outlook 2025-2030 and 2025-2026 work program				
Date: 2025-03-20				
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This document contains a proposed response to Australian Communications and Media Authority (ACMA)'s consultation "Five-year spectrum outlook 2025–30 and 2025–26 work program".

Electronic filing March 9, 2025

Re: Consultation "Five-year spectrum outlook 2025–30 and 2025–26 work program"

Dear Respected Officer,

IEEE 802 LAN/MAN Standards Committee (LMSC) thanks Australian Communications and Media Authority (ACMA) for providing an opportunity to comment on the consultation "Five-year spectrum outlook 2025–30 and 2025–26 work program".

IEEE 802 LMSC is a leading consensus-based open standards development committee for networking standards that are used by industry globally. It produces standards for networking devices, including wired and wireless local area networks ("LANs" and "WLANs"), wireless specialty networks ("WSNs"), wireless metropolitan area networks ("Wireless MANs"), and wireless regional area networks ("WRANs"). Technologies produced by implementers of our standards are a critical element for all networked applications today.

IEEE 802 LMSC is a committee of the IEEE Standards Association and of Technical Activities, two of the Major Organizational Units of the IEEE. IEEE has over 460,000 members in more than 190 countries and its core purpose is to foster technological innovation and excellence for the benefit of humanity. IEEE is also a major accredited standards development organization whose standards are recognized worldwide. In submitting this document, IEEE 802 LMSC acknowledges that other components of IEEE Organizational Units may have perspectives that differ from, or compete with, those of IEEE 802 LMSC[1].

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

Enabling lower-power RLAN (Low Power Indoor (LPI) Wi-Fi) operation

IEEE 802 LMSC commends ACMA's decision to extend the operation of Wi-Fi devices, based on IEEE 802.11 technologies, to the 5925 MHz to 6425 MHz frequency band (a.k.a., the lower 6 GHz band). As recognized in this proceeding, many countries have authorized the lower 6 GHz band for license exempt operation at the proposed or similar transmit power limits. Adopting similar spectrum access rules will create economies of scale and produce a robust equipment market, benefitting businesses, consumers, as well as increasing the societal benefits. In the proceedings, ACMA has stated the allowance of LPI mode of operation for Wi-Fi devices in lower 6 GHz band by taking steps to make appropriate changes to the Low Interference Potential Devices Class License 2015 (LIPD class license).

We also commend the ACMA's decision to work towards extending the LIPD class license to include 6425 MHz to 6585 MHz for Wi-Fi LPI mode of operation. This decision by ACMA paves way for better interoperability between Wi-Fi devices operating in 6 GHz worldwide. While well intended, and providing one additional 320 MHz channel, that is this spectrum plan provides for a total of two 320 MHz channels, in dense deployments, at least three such channels are required for

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

RF channel planning to enable non-overlapping channels, which helps realize the use cases like AR, VR and XR which have low latency and high throughput traffic requirements.[2]

Enabling higher-power RLAN (Standard Power (SP) Wi-Fi) operation using Automated Frequency Co-ordination (AFC)

IEEE 802 LMSC commends ACMA's plan to initiate proceedings to authorize SP mode under supervision of an AFC system in the 6 GHz band. SP mode enables Wi-Fi operation at higher power than LPI mode, to optimally utilize the 6 GHz spectrum. AFC technology is used to protect incumbent services during SP outdoor and indoor Wi-Fi operation.

IEEE 802 LMSC notes the following concerns raised in the previous ACMA consultation "Future use of upper 6 GHz band – Options paper"[3] for AFC operations. The first concern is regarding the level of regulatory intervention versus the responsibility relegated to third parties to implement and maintain an AFC system. The second concern is related to data integrity, data accuracy, and ownership for both incumbent systems and Wi-Fi devices operating in 6 GHz.

Existing AFC systems are designed with the flexibility to enable an AFC system to be customized based on local spectrum regulatory requirements. Therefore, with proper consideration of protection criteria for the existing incumbent services, we believe that AFC systems can properly implement the frequency coordination and maximum allowable power settings for AFC-enabled devices. As an example, in the USA, AFC systems determine frequency and channel availability and maximum permissible power levels for AFC devices considering incumbent fixed services and radio astronomy services. AFC systems already consider neighboring country incumbent services at the country border. AFC systems are designed to automatically calculate and make available, to AFC devices, available frequencies and corresponding permissible transmit power levels. AFC systems are required to use the updated incumbent system database to keep calculations and frequency availability up to date as 6 GHz incumbent links are changed. This means that incumbent services are protected from harmful interference by AFC systems, and that any expansion of such incumbent services over time can be achieved without a need to redesign the AFC systems.

Additionally, since the issuance of the "Future use of upper 6 GHz band – Options paper" consultation, additional AFC systems have been and certified not only the Federal Communications Commission in the USA, but also Innovation, Science and Economic Development Canada, indicating a significant maturing of AFC system design and an industry-wide general acceptance of the AFC system-wide operational model. Of note is that the certification process for AFC systems and devices is based on the industry developed recommended compliance specifications[4,5]. Hence it is IEEE 802 LMSC's opinion that ACMA's concerns can be addressed by the industry progress to date and requests ACMA to initiate proceedings for enabling SP Wi-Fi operation in the 6 GHz band.

[2] See Plum Consulting's Wi-Fi spectrum requirements whitepaper, https://plumconsulting.co.uk/wi-fi-spectrum-requirements/ [accessed: 20 March 2025].
[33] See the ACMA's consultation on options for future of upper 6 GHz.
[4] See Wi-Fi Alliance: 6 GHz AFC resources, Specifications, test plans, and training modules to enable implementation of the 6 GHz standard power devices under AFC system control, https://www.wi-fi.org/discover-wi-fi/6-ghz-afc-resources [accessed: 20 March 2025].
[5] See Wireless Innovation Forum: Specifications, https://6ghz.wirelessinnovation.org/baseline-standards [accessed: 20 March 2025].

Initiate authorization proceedings for expanding the frequency allocation for Wi-Fi devices to operate in the 6585 MHz to 7125 MHz band

In considering further spectrum allocation in the 6585 MHz to 7125 MHz frequency band, IEEE 802 LMSC respectfully asks ACMA to consider the following points.

A growing number of countries, including Argentina, Canada, Saudi Arabia, South Korea, and the USA have already allocated the entire 6 GHz band (i.e., 5925 MHz to 7125 MHz) for license exempt operation. While the desire to consider potential IMT use of the upper 6 GHz band (i.e., 6425 MHz to 7125 MHz) is laudable, the result is that the spectrum remains unused, and the economic opportunity from use of the band, for example to support innovative uses and product developments is lost. For example, in February 2025, UK's Ofcom published a consultation[6] extending LPI operation to entire 6 GHz band and standard power (SP) mode operation under the supervision of AFC in the lower 6 GHz band.

In January 2024, Wi-Fi Alliance introduced[7] Wi-Fi CERTIFIED 7™ based on the IEEE Std 802.11be™-2024[8]. IEEE 802.11be introduces advanced features including channel bandwidths of up to 320 MHz, multiple resource units to a single station, multi-link operation that utilizes multiple links across frequency bands, enhanced quality of service (QoS), improved Target Wake Time, and improved spectrum management using spectrum puncturing to improve coexistence with incumbents effectively and efficiently. With Wi-Fi 7 products already in the market, Wi-Fi deployments are going through a second-generation upgrade in the entire 6 GHz band globally[9]. Of relevance is the multi-link operation feature which when used in the 6 GHz band, achieves and exceeds the performance expectations of Wi-Fi 7.

IEEE 802.11be's global 6 GHz channelization is designed to accommodate multiple 160 MHz and 320 MHz channels throughout the 5925 MHz to 7125 MHz frequency band, where available. ACMA's proposed designation of the 6 GHz band from 5925 MHz to 6825 MHz for Wi-Fi operation provides for only two contiguous 320 MHz channel, while the 5925 MHz to 7125 MHz frequency band would allow three such channels to support Gigabit Wi-Fi connectivity which is critical to enabling latency sensitive high throughput applications like real-time XR for health, education and gaming, robotics, and industrial automation and sensory. For example, innovative use cases such as medical school training using AR/VR technologies require the spectrum available in the entire 6 GHz band.[10] This is critical to enable relevant applications in dense residential environments in addition to scaling of applications in enterprise and industrial deployments when multiple of these application sessions are supported simultaneously and in close proximity.

[6] See Ofcom: Expanding access to the 6 GHz band for mobile and Wi-Fi services https://www.ofcom.org.uk/siteassets/resources/documents/consultations/category-3-4-weeks/consultation-expanding-access-to-the-6-ghz-band-for-commercial-mobile-and-wi-fi-services/main-document/expanding-access-to-the-6-ghz-band-for-mobile-and-wi-fi-services.pdf?v=391052 [accessed: 20 March 2025].

[7] See Wi-Fi Alliance: Wi-Fi Alliance® introduces Wi-Fi CERTIFIED 7™, https://www.wi-fi.org/news-events/newsroom/wi-fi-alliance-introduces-wi-fi-certified-7 [accessed: 20 March 2025].

[8] See IEEE Approved 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), https://standards.ieee.org/ieee/802.11be/7516 [accessed: 20 March 2025]. With introduction of 320 MHz channel bandwidth, Wi-Fi 7 doubles throughputs relative to Wi-Fi 6E and significantly improves latency for Extended Reality (XR), bringing determinism through enablement of Multi-Link Operation (MLO) over multiple bands in 2.4 GHz, 5 GHz, and 6 GHz bands. Wi-Fi 7 also provides higher efficiency, relative to Wi-Fi 6E, through offering of 4096 QAM. In addition, spectrum puncturing improves flexibility in utilizing spectrally efficient wide channel bandwidth, e.g., 160 MHz and 320 MHz, while protecting incumbent operation in the band.

[9] See Wi-Fi Alliance: Wi-Fi 7 market momentum: Wi-Fi 7 is here – is your network ready?, https://www.wi-fi.org/beacon/chris-hinsz/wi-fi-7-market-momentum-wi-fi-7-is-here-is-your-network-ready [accessed: 20 March 2025].

[10] See Wi-Fi Alliance: Wi-Fi Alliance® demonstrates the impact of 6 GHz Wi-Fi® for advanced AR/VR in healthcare (https://www.wi-fi.org/beacon/the-beacon/wi-fi-alliance-demonstrates-the-impact-of-6-ghz-wi-fi-for-advanced-arvr-in) [accessed: 20 March 2025].

With access to additional 320 MHz channels, Wi-Fi devices can build upon IEEE Std. 802.11az-2022[11] to offer sub-1 meter positioning accuracy, which results in new innovative use cases such as micro-targeting for retail and warehouse asset tracking. The availability of many channels at various channel widths (from 20 MHz to 320 MHz) is facilitating more modular and flexible deployments that allow scaled operation of services in the above-mentioned target industries. Some examples[12] include multi-layer operation, service segmentation and prioritization, context-aware wireless networks, and hyper-aware access point deployments. Highly secure communication with WPA3 security[13], which is being now mandated for Wi-Fi devices operating in the 6 GHz band, further enhances these services and addresses new uses cases as well.

Conclusion

IEEE 802 LMSC thanks ACMA for the opportunity to provide this submission and respectfully requests to consider:

- initiating authorization proceedings for standard power RLAN under supervision of AFC.
- initiating authorization proceedings to authorize expanded use of Wi-Fi devices operation in the 6425 MHz to 7125 MHz frequency band.

Respectfully submitted,

By: /ss/.
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[11] "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 4: Enhancements for Positioning," in IEEE Std 802.11az-2022 (Amendment to IEEE Std 802.11-2020 as amended by IEEE Std 802.11ax-2021, IEEE Std 802.11ay-2021, IEEE Std 802.11ba-2021, and IEEE Std 802.11-2020/Cor 1-2022) , vol., no., pp.1-248, 3 March 2023, doi: 10.1109/IEEESTD.2023.10058117.

[12] Selected examples of frequency-band-agnostic new services and architectures include smart automation facilities, https://community.hpe.com/t5/networking/hyper-aware-facilities-will-drive-the-future-of-smart-automation/ba-p/7219007, [accessed: 20 March 2025]

[13] See Wi-Fi Alliance: Discovery Wi-Fi Security, https://www.wi-fi.org/discover-wi-fi/security [accessed: 20 March 2025] ("WPA3 is a mandatory certification for Wi-Fi CERTIFIED™ devices."