

Re: Consultation “ICT 2024 – 1 – Consultation Short Range Licence Exempt Devices”

Dear Utility Regulation and Competition Office,

IEEE 802 LAN/MAN Standards Committee (LMSC) thanks the Utility Regulation and Competition Office of the Cayman Islands (OfReg) for issuing the consultation “ICT 2024 – 1 – Consultation Short Range Licence Exempt Devices”.

IEEE 802 LAN/MAN Standards Committee (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 about 400,000 members in over 160 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 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.

It is the right time to authorize short range licence exempt devices to operate in 5925 MHz to 6425 MHz and 57 GHz to 71 GHz bands in Cayman Islands

IEEE 802 LMSC commends OfReg’s effort in creating a framework for expanding the operation of short range licence exempt devices. As recognized in this proceeding, many countries have authorized all or part of the 5925 MHz to 7125 MHz band and the 57 GHz to 71 GHz band for licence exempt operation at the proposed power limits. Adopting similar access will create economies of scale and produce a robust equipment market, benefitting Cayman Islands’ businesses, consumers, as well as increasing the societal benefits.

In the proceedings, OfReg proposes to allow short range licence exempt devices to operate between 5925 MHz and 6425 MHz using no greater than 25mW outdoors (a.k.a. very low power (VLP) mode) or no greater than 250mW indoors (a.k.a. low power indoor (LPI) mode) without causing harmful interference to existing authorized communications and without protection from any interference caused by existing authorized communications. IEEE 802 LMSC supports the authorization of short range licence exempt devices operating at the proposed power limits between 5925 MHz and 6425 MHz both indoors and outdoors.

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.

IEEE 802 LMSC kindly requests OfReg to consider the following changes to the proposed technical requirements for LPI, which are adopted by national regulatory authorities in other countries, such as the United States of America and Canada:

- Authorize max EIRP of 1W for access points under LPI mode and max EIRP of 250mW for clients under LPI mode, which are aligned with the USA FCC's requirements² to enable licence exempt operation at large channel bandwidth of 160 MHz and 320 MHz in the downlink.

In addition, IEEE 802 LMSC recommends OfReg to authorize max EIRP of 50mW for VLP mode with channel bandwidth of 320 MHz, to enable that the performance of a device under VLP mode to scale with the operational bandwidth.

Initiate authorization proceedings for standard power RLAN under supervision of AFC

IEEE 802 LMSC recommends OfReg to consider initiating proceedings to authorize Standard Power (SP) mode under supervision of an Automated Frequency Coordination (AFC) System in the 6 GHz band. SP mode enables Wi-Fi operation at higher power than both the VLP and the LPI modes to optimally utilize the 6 GHz spectrum. As OfReg plans to authorize VLP and LPI modes in the 6 GHz band, IEEE 802 LMSC kindly requests OfReg to consider initiating the process to authorize SP mode and certification of AFC controlled devices (SP access points or fixed clients) and AFC Systems.

AFC technology is widely adopted as a mitigation technique to protect incumbent licenced services for outdoor and indoor operation at the SP level. In this proceedings, OfReg refers to AFC “as the database assesses applications and only permits licensing in areas sufficiently removed from fixed links (and other users of the band) that no interference would be caused. Such a system would be overkill where only a few fixed links are licensed”. With proper consideration of protection criteria for the fixed point-to-point links, we believe that AFC Systems already developed for other regions can be readily adapted to provide the frequency coordination and maximum allowable power settings for AFC controlled devices to provide protection for these fixed links. As an example, in the USA, AFC Systems determine frequency and channel availability and maximum permissible power levels for AFC controlled devices considering incumbent Fixed Services (FS) and Radio Astronomy Services as well as neighboring countries incumbent services at the borders. While we understand OfReg's comment on the number of FS links, an AFC System based mechanism for SP operation will have the advantage of providing automated maintenance when FS links are changed (e.g., added or removed). An additional advantage is that the AFC system calculations can consider variable maximum allowable transmit power based on the location of access points, improving overall spectrum usage efficiency.

Authorizing SP mode at a maximum EIRP of 4W for access points and 1W for client devices for indoor and outdoor operation enables many key applications including metaverse, multigigabit per second outdoor coverage (e.g., parks, stadiums), multi-gigabit point-to-multipoint connectivity, and low-latency applications including industrial IoT and Voice over IP (Wi-Fi calling). SP operation also improves indoor Wi-Fi performance to match coverage performance already available in the 5 GHz band³.

² See FCC: 15.407 General technical requirements.

³ The improvement is based on an assumption on the FCC: 15.407 General technical requirements.

The USA and Canada have authorized SP mode and have certified seven AFC systems. The certification process for AFC systems and devices is based on the industry developed recommended compliance specifications^{4,5}. On 21 August 2023, Innovation, Science and Economic Development Canada (ISED) approved⁶ an AFC System for operation in Canada. On 23 February 2024, FCC announced⁷ approval of seven AFC systems for commercial operation in the USA. A number of AFC devices and Fixed Client devices are already certified. A growing number of countries, including Japan, Saudi Arabia, South Korea, and Brazil, are also studying the enablement of SP mode.

As AFC devices are being certified and introduced in the market, the Wi-Fi industry expects the first significant deployments of SP mode to be indoor through upgrading of LPI access points to indoor SP access points, i.e., SP/LPI converged access points. These converged access points are targeting simultaneous support of LPI-only clients, SP clients, and dual LPI/SP clients in the same indoor network to improve overall system efficiency and spectrum utilization while protecting incumbent services.

Initiate authorization proceedings for expanding the frequency allocation for short range licence exempt devices to operate in the 6425 MHz to 7125 MHz band

In considering further allocation in the 6425 MHz to 7125 MHz frequency band, IEEE 802 LMSC respectfully asks OfReg to consider the following points.

As of today, ITU Region 2 countries including Argentina, Brazil, Canada, Colombia, Costa Rica, Dominican Republic El Salvador, Guatemala, Honduras, Peru, and the United States of America, as well as other countries from other regions such as South Korea, and Saudi Arabia have all allocated 1200 MHz bandwidth of the 6 GHz band for licence-exempt operation. A similar availability of the entire 6 GHz band for licence exempt use will create economies of scale and produce a robust equipment market in the Cayman Islands. In addition, the above-mentioned countries in ITU Region 2 contribute about 90% of the Gross Domestic Product (GDP)⁸ to the region, so the economy of Cayman Island can also benefit from harmonization with the region.

A growing number of countries, including the USA, Canada, Brazil, South Korea, and Saudi Arabia, have already allocated the entire 6 GHz band for licence exempt operation.

In January 2024, Wi-Fi Alliance introduced⁹ Wi-Fi CERTIFIED 7™ based on the IEEE P802.11be draft standard¹⁰. IEEE P802.11be introduces advanced features including channel bandwidths of

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: 27 June 2024].

⁵ See Wireless Innovation Forum: Specifications, <https://6ghz.wirelessinnovation.org/baseline-standards> [accessed: 27 June 2024].

⁶ See Innovation, Science and Economic Development Canada: List of designated Dynamic Spectrum Access System Administrators (DSASAs), Automated Frequency Coordination System Administrators (AFCSAs), issue 1 of DBS-06, <https://ised-isde.canada.ca/site/certification-engineering-bureau/en/node/116> [accessed: 27 June 2024].

⁷ See Federal Communications Commission: OET announces approval of seven 6 GHz band automated frequency coordination systems for commercial operation and seeks comment on C3 Spectra's proposed AFC system, <https://docs.fcc.gov/public/attachments/DA-24-166A1.pdf> [accessed: 27 June 2024].

⁸ Trading Economics. <https://tradingeconomics.com/country-list/gdp?continent=america> [accessed: 27 June 2024].

⁹ 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: 27 June 2024].

¹⁰ See "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/D5.0, November 2023, vol., no., pp.1-1045, 3 Jan. 2024. 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

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 globally¹¹. Of particular 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 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, where available. OfReg's current designation of 500 MHz of the 6 GHz band from 5925 MHz to 6425 MHz for licence exempt operation provides for only one contiguous 320 MHz channel, while the 5925 MHz to 7125 MHz band would allow three such channels to support Gigabit connectivity in Cayman Islands.

Conclusion

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

- updating the technical requirements for both the very low power and low power short range licence exempt devices operating in the 5925 MHz to 6425 MHz band;
- initiating authorization proceedings for standard power RLAN under supervision of AFC, and authorize standard power mode at a maximum EIRP of 4W for access points and 1W for client devices;
- initiating authorization proceedings to authorize expanded use of short range licence exempt devices operation in the 6425 MHz to 7125 MHz band.

Respectfully submitted,

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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.

¹¹ See Wi-Fi Alliance: Wi-Fi 7 market momentum: Wi-Fi 7 is here – is your network ready?, <https://www.wi-fi.org/beamcon/chris-hinsz/wi-fi-7-market-momentum-wi-fi-7-is-here-is-your-network-ready> [accessed: 27 June 2024].