Dynamic Spectrum Alliance Limited
3855 SW 153rd Drive
Beaverton, OR 97003
United States
http://www.dynamicspectrumalliance.org

December 19, 2022

The Manager
Spectrum Planning Section
Australian Communications and Media Authority
PO Box 78
Belconnen ACT 2616

Dear Spectrum Planning Section Manager,

The Dynamic Spectrum Alliance (DSA)[1] respectfully submits the following comments to the Australian Communications and Media Authority (ACMA) "Variation to the Low Interference Potential Device Class Licence Consultation Paper"[2] and the draft "Radiocommunications (Low Interference Potential Devices) Class Licence Variation 2022 (No. 2)."[3]

Variation to the Low Interference Potential Device Class Licence Consultation Paper

Question 1

Should a separate new item be introduced to facilitate higher-power RLAN transmitters in 5150–5250 MHz, or should existing item 61 be modified?

The DSA supports ACMA adding a separate new item 61A. This would allow indoor-only legacy devices to operate under rules under which they were certified. Otherwise, the way the item is drafted, legacy systems that operate up to 200 mW EIRP indoor-only, would have to be retrofitted to meet the new emissions mask requirements.

Question 2

Which of the 2 simple emission masks outlined in ITU Resolution 229 (Rev. WRC-19) should be implemented in Australia for 1 W RLAN transmitters in the 5150–5250 MHz band?

[1] The DSA is a global, cross-industry, not for profit organization advocating for laws, regulations, and economic best practices that will lead to more efficient utilization of spectrum, fostering innovation and affordable connectivity for all. We advocate for policies that promote unlicensed and dynamic access to spectrum to unleash economic growth and innovation. Additionally, we advocate for a variety of technologies that allow spectrum sharing enhancing broadband access. Our membership spans multinationals, small-and medium-sized enterprises, as well as academic, research and other organizations from around the world. A full list of DSA members is available on the DSA's website at www.dynamicspectrumalliance.org/members.

[2] ACMA, *Consultation paper: Variation to the LIPD class licence*, released 21 October 2022. New arrangements for low interference potential devices - consultation 35/2022 | ACMA.

[3] ACMA, *Radiocommunications (Low Interference Potential Devices) Class Licence Variation 2022 (No. 2),* Draft for Consultation, released 21 October 2022. New arrangements for low interference potential devices - consultation 35/2022 | ACMA.

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The DSA recognizes the need for RLANs to incorporate an emissions mask for outdoor operations to protect the sole MSS provider in the 5150-5250 MHz band. However, the DSA does not see such a need for RLANs operating indoors in the 5150-5250 MHz band. The majority of RLAN operations in the 5150-5250 MHz band occurs indoors, like other spectrum bands used by RLAN devices. Assuming the indoor building has a roof, it is hard to see how these RLAN devices will cause aggregate interference to the MSS receiver located on the satellite. There will be significant building entry loss through the roof. The DSA continues to disagree with this portion of "Resolves 3" of ITU-R Resolution 229 (WRC 19), which states:[4]

> *[that in the frequency band 5 150-5 250 MHz, administrations may exercise some flexibility by taking appropriate measures that would allow controlled and/or limited outdoor usage with a maximum mean e.i.r.p.1 of 200 mW; administrations have a further option to permit stations in the mobile service, for indoor or controlled outdoor use, to operate up to a maximum mean e.i.r.p of 30 dBm; in the case of indoor or controlled outdoor use, administrations are requested to either ensure that the maximum e.i.r.p. at any elevation angle above 5 degrees as measured from the horizon shall not exceed 200 mW (23 dBm), or to ensure that the maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon shall not exceed 125 mW (21 dBm) or to apply the emission mask described in resolves 5 below to maintain protection to the incumbent services; in that case, administrations shall take all appropriate measures, such as those described in recognizing k), to control the number of these higher power outdoor WAS/RLAN stations up to 2 per cent of the estimated total amount of WAS/RLAN stations; if the maximum e.i.r.p. is raised above 200 mW, unwanted emissions shall not increase above the existing levels already authorized within administrations for the existing systems that operate with an in-band e.i.r.p. of not greater than 200 mW in all cases, administrations are requested to maintain protection to the other primary services;]*

The challenge with the choice of the two emission masks presented is that one seemingly makes more sense for outdoor use where the goal is to protect satellites overhead from receiving aggregate interference (e.g., limiting EIRP in any direction above 30 degrees of elevation), while the other is seemingly better for indoor operations (e.g., a more uniform power spectral density). In countries where higher power RLAN use has already been permitted in the 5150-5250 MHz band, an ecosystem has been established for the mask that limits transmission to 125 mW above 30 degrees to the horizon.

The DSA encourages ACMA to authorize use of both emission masks and leave it up to the user to decide which RLAN / emissions mask combination is the most appropriate for their installed system. Both masks meet the goal of Resolves 3.

[4] International Telecommunications Union, *Use of the frequency bands 5 150-5 250 MHz, 5 250-5 350 MHz and 5 470-5 725 MHz by the mobile service for the implementation of wireless access systems including radio local area networks*, ITU-R Resolution 229 (WRC 19), at resolves 3.

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Question 3
Subject to which emission mask is implemented (see Question 2), would a device registration system (or similar – see Canadian approach above) be needed for outdoor deployments exceeding 200 mW (23 dBm) transmission power? Note that such a regime would require further regulatory development. Accordingly, a decision to implement such a regime may delay access under those arrangements.

The DSA believes that if ACMA adopts either of the emissions masks listed in Question 2, there is no need to adopt a device registration system. Our reading of Resolves 3 is that if ACMA adopts the emissions mask in Resolves 5,[5] an option not presented in Question 2, then it would need to consider a device registration system as a measure under "recognizing k"[6] to control the number of outdoor WAS/RLANs.

Question 4
What should be the maximum EIRP for WMAS devices in the 520–694 MHz and 1785–1800 MHz bands?

ACMA refers to the United States Federal Communications Commission (the FCC) Notice of Proposed Rule Making (NPRM) that seeks to amend Parts 15 and 74 of its rules for wireless microphones in several spectrum bands.[7] The DSA notes that the FCC proposal accounted for the fact that it has authorized licence-exempt TV white space operations in the broadcast television band and the 600 MHz band duplex gap. As ACMA is not considering license-exempt operations in the broadcast TV bands, the DSA will refrain from commenting on WMAS devices operating in the 520-694 MHz band, except to suggest that ACMA staff read the submitted comments and submitted replies to comments if it considers developing draft arrangements.

Question 5
Should a maximum bandwidth limitation be implemented for WMAS devices? If so, what should the maximum emission bandwidth be?

Please see responses above.

Question 6
Should a WMAS emission in 520–694 MHz be limited to fall entirely within a single TV channel? For emissions greater than a single TV channel, should a whole number of TV channels be required (for example, emission bandwidths of 7 MHz or 14 MHz)? Should any other limitations regarding the relative positioning of WMAS emissions with respect to the TV channel raster be implemented?

[5] *Id*. at resolves 5.

[6] *Id*. at recognizing k).

[7] United States Federal Communications Commissions, *In the Matter of Amendment of Parts 15 and 74 of the Rules for Wireless Microphones in the TV Bands, 600 MHz Guard Band, 600 MHz Duplex Gap, and the 941.5-944 MHz, 944-952 MHz, 952.850-956.250 MHz, 956.45-959.85 MHz, 1435-1525 MHz, 6875-6900 MHz and 7100-7125 MHz Bands*, ET Docket No. 21-115 RM-11821, 35 FCC Rcd 7908, (2021). FCC-21-46A1.pdf.

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Please see responses above.

Question 7
Should a minimum spectral efficiency limitation be implemented for WMAS devices? If so, what should the minimum spectral efficiency be?

Please see responses above.

Question 8
Should WMAS devices be required to comply with ETSI Standard EN 300 422?

Please see responses above.

Question 9
Should new items be added to Schedule 1 of the LIPD class licence to facilitate WMAS, or should existing items be modified?

Please see responses above.

Question 10
Have third-party access arrangements to spectrum-licensed bands been explored?

N/A

Should we consider the introduction of arrangements in the LIPD class licence to facilitate underground communications in the 700 MHz, 800 MHz and/or 900 MHz bands? What technical limitations should be included in these arrangements if they are introduced?

N/A

Question 11
Should we consider the introduction of arrangements to facilitate systems that utilise space-based transmitters that operate in the bands 915–928 MHz and 2400–2483.5 MHz at power levels higher than currently permitted under the LIPD class licence? If so, what matters should be considered in the regulatory framework? In particular, comment is sought on:

- *What is an appropriate power for such services so that there is no impact on other services?*
- *While some might operate at power levels slightly higher than those currently supported under the LIPD class licence, others could at operate higher levels. The impact also depends on other technical parameters such the orbital characteristics, number of satellites and what types of services are sharing the band. Such considerations suggest a case-by-case approach (more akin to an apparatus licensing regime) may be required.*

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- *What effect, if any, will the proposed use have on existing services such as the amateur-satellite services and services authorised under the LIPD class licence? For example, Wi-Fi, Bluetooth and radio frequency identification devices (RFID).*

- *Do systems need to be brought under the scope of the Radiocommunications Act via variations to the Radiocommunications (Australian Space Objects) Determination 2014 or the Radiocommunications (Foreign Space Objects) Determination 2014?*

- *Is the LIPD class licence or the communication with space objects (CSO) class licence the appropriate legislative instrument to be used to facilitate such systems?*

- *If apparatus licensing is used, are the current apparatus licence fees and taxes appropriate? (Assuming the entire band is licensed, for the 915–928 MHz band, the annual tax for an Australia-wide space licence is estimated as $36,673; for the 2400–2483.5 MHz band, the annual tax for an Australia-wide space licence is $235,194.)*

The DSA's understanding is that there are licensed satellite systems in several administrations that emit and receive transmissions in the 800 MHz, 900 MHz, and /or 2.4 GHz ISM bands. Typically, these ISM frequencies are used for IoT data transmission and reception. However, these ISM bands could also be used for higher-bandwidth licence-exempt communications.

The DSA sees satellite IoT operations in the ISM bands as a use case that AMCA and other administrations should examine. Understanding how different potential IoT uplink and downlink operating parameters will impact spectrum sharing with other licence-exempt operations in these bands is critical and should be fully considered before any regulatory decision is taken. The DSA encourages ACMA and other regulatory authorities to continue to study this issue. The DSA is not supportive of wide-channel satellite communications in the ISM bands.

Radiocommunications (Low Interference Potential Devices) Class Licence Variation 2022

- **ACMA's definition of "indoors" should be replaced by a description of the features of an indoor device for the given spectrum band**

ACMA proposes the following definition of indoors
"***indoors*** means a space on or above land that is:

(a) enclosed by permanent walls on all sides, a permanent roof and a permanent floor; and
(b) permanently fixed to the land."

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The DSA notes that the word 'indoors" can be found in the "limitations column" for a number of different classes of transmitter in the Radiocommunications (Low Interference Potential Devices) Class License 2015.[8] These include:

- Item 30 – Wireless audio transmitter (indoor only 1785-1800 MHz)
- Item 31 – Indoor wireless audio transmitters, Item 46 – RFID transmitters (operating in the 22000-23470 MHz and 24100-26500 MHz bands)
- Item 61 - RLAN Network transmitters (operating 5150-5250 MHz that will be removed)
- Item 62 – RLAN Network transmitters (operating 5250-5350 MHz)
- Item 63AA – RLAN Network transmitters (operating 5925-6425 MHz)
- Item 63A – Data communications transmitters used indoors in or on controlled premises (operates 24250-24700 MHz and "(g) Indoor operation is limited to an area enclosed by permanent walls on all sides and having a permanent roof")
- Item 63B – Data communications transmitters used indoors or outdoors in or on controlled premises (operates 247000-25100 MHz and "(g) Indoor operation is limited to an area enclosed by permanent walls on all sides and having a permanent roof").

The DSA assumes that this proposed definition would apply to all LIPD devices, which covers a broad swath of technologies.

For this reason, the DSA recommends that ACMA not apply this definition of "indoors," which was developed for the 24 GHz band, to all LIPD devices. Rather than attempt to define indoors, the DSA urges ACMA to define the features that constitute an indoor device for each of these items. Indoor operation for wireless microphones in the TV bands will be different than for indoor operation of RFID devices in the millimetre wave band, which will be in turn be different for indoor RLAN transmitters operations in the 5 and 6 GHz bands.

In particular, the DSA believes that for Item 63AA, ACMA should consider using the U.S. FCC's definition of an indoor access point, namely "For the purpose of this subpart, an access point that operates in the 5.925-7.125 GHz band, is supplied power from a wired connection, has an integrated antenna, is not battery powered, and does not have a weatherized enclosure."[9] In this way, "indoors" is built into the device.

- **Addition of frequency hopping devices in the 5925-6425 MHz band should occur after the completion of the ETSI process in Europe**

European 6 GHz rules allow for frequency hopping very low power (VLP) devices to operate in the 5925-6425 MHz band. ESTI is currently working out arrangements for how these frequency hopping devices can share the spectrum with LPI and other types of VLP RLAN devices operating in the same

[8] ACAM, *Radiocommunications (Low Interference Potential Devices) Class Licence 2015 as amended made under section 132 of the Radiocommunications Act 1992*, Compilation No. 8, Compilation date: 5 March 2022.

[9] United States Code of Federal Regulations, Volume 47, Part 15, Subpart E - Unlicensed National Information Infrastructure Devices, Section 403 – Definitions, "Indoor Access Point". (47 CFR 15.403)

frequency band. ACMA may want to consider waiting until ETSI's work is complete before adopting proposed new Item 57 A. To date, as frequency hopping VLP devices are only authorized in Europe, the agreement coming out of ETSI will guide the commercial development. There may be some additional limitations coming out of the ETSI effort that ACMA will want to incorporate.

- **Out of band emissions (OOBE) below 5925 MHz for RLAN transmitters operating with a maximum power of 25 mW EIRP under table 63 AB should be no greater than –27 dBm EIRP**

Under ACMA's proposed change to table item 63AA, the OOBE for RLAN transmitters operating up to 250 mW EIRP must be no greater than –27 dBm EIRP below 5925 MHz. The DSA supports the proposed change. The DSA supports the proposed change to table item 63AB as it will allow for the protection of incumbent operations without being too burdensome to implement.

For table item 63 AB, the DSA recommends ACMA establish that the OOBE for RLAN transmitters operating up to 25 mW EIRP must be no greater than –27 dBm EIRP below 5925 MHz. It is DSA's understanding that -27 dBm/MHz OOBE limit is sufficient to protect services (including Intelligent Transportation Systems - ITS) from all RLANs operating in the 6 GHz band, including VLP devices that can operate both indoors and outdoors. ACMA should look carefully at the OOBE criteria for the ITS band in the United States that operates between 5895 and 5925 MHz. Under the U.S. RLAN regulations for operations for a client device or an outdoor access point operating solely in the 5850-5895 MHz band or operating on a channel that spans across 5725-5895 MHz band, the OOBE limit at or above 5895 MHz must be no greater than -27 dBm EIRP.[10] The U.S. FCC's Report and Order on the 5.9 GHz band provides its rationale for the -27 dBm OOBE limit.[11] Further, the FCC recognized that the Root Mean Square measurement method is the most appropriate method to measure the OOBE limit measured for RLANs operating in both the 5.9 GHz and 6 GHz band[12]

The DSA believes it is important for AMCA to recognize that the operating characteristics of ITS and RLAN technologies protect the former from harmful interference without special mitigation requirements (i.e., a large guard band or very stringent OOBE limit). VLP device are low-power, low duty cycle devices that will not operate co-channel with an ITS device. ITS devices are low duty cycle devices with a high permissible packet error rate. The risk of harmful interference to an ITS receiver from a 6 GHz VLP is very low.

[10] United States Code of Federal Regulation, Chapter 47, Part 15, Section 407, paragraph (b)(5)(ii), 47 CFR 15.407(b)(5(ii).

[11] United States Federal Communication Commission, *Use of the 5.850-5.925 GHz Band, First Report and Order, Further Notice of Proposed Rulemaking, and Order of Proposed Modification*, ET Docket No. 19-138, 35 FCC Rcd 13440, ¶¶ 180-183, (2020). FCC-20-164A1.pdf

[12] *Id*. at ¶ 85.

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Conclusion

The DSA appreciates the opportunity to provide input on ACMA's LIPD class license proposals. We look forward to working with ACMA as it seeks to facilitate spectrum access by a variety of entities and use cases, including next generation license-exempt technology solutions.

Respectfully submitted,

Martha SUAREZ
President
Dynamic Spectrum Alliance