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1 Introduction

Qualcomm Incorporated (Qualcomm) welcomes the opportunity to provide input to the Australian Communications and Media Authority (ACMA) consultation paper *Variation to the Low Interference Potential Device Class License* ("the Consultation").

Qualcomm is the world's leading wireless technology innovator and the driving force behind the development, launch, and expansion of 5G. When we connected the phone to the internet, the mobile revolution was born. Today, our foundational technologies enable the mobile ecosystem and are found in every 3G, 4G, and 5G smartphone. We bring the benefits of mobile to new industries, including automotive, the internet of things, and computing, and are leading the way to a world where everything and everyone can communicate and interact seamlessly. From our homes to airports, campuses, and the enterprise, Qualcomm's Wi-Fi solutions build on our world-class engineering capabilities to connect users and devices.

One of our major areas of focus is the development of advanced wireless technologies, including 5G and Wi-Fi-based technologies. Below please find Qualcomm responses and additional comments for consideration in future work.

2 Responses to ACMA consultation questions

2.1 RLAN radiocommunications transmitters in the 5150–5250 MHz band

2.1.1 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?

2.1.2 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?

Qualcomm supports the development of a new item, to be labeled "61A" as outlined in the table below, to facilitate higher-power RLAN transmitters in the 5150-5250 MHz range. Taking into account an

appropriate emission mask, RLAN transmitters can operate effectively with an EIRP of 1 W averaged over the entire transmission burst.

Qualcomm supports the implementation of the emission mask described below, consistent with ITU Resolution 229 (Rev. WRC-19). This mask is in alignment with existing regulatory requirements in other major global markets, such as the United States, leading to benefits for consumers and manufacturers derived from regulatory harmonization. This arrangement also allows flexibility for 200 mW transmitter power to indoor devices, which is an important capability for a number of in-home and industrial applications.

5 Schedule 1 (after table item 61)

Insert:

61A	Radio Local Area Network transmitters	5150–5250	1 W (averaged over the entire transmission burst)	The power spectral density of the transmitter must not exceed 125 mW (21 dBm) EIRP, in any direction, above 30 degrees of elevation.

2.1.3 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.

At this time Qualcomm does not see the need for a registration system to enable higher transmission power for the 5 GHz band. Outdoor deployments exceeding 200 mW can be managed effectively without the need for a device registration system. For example, in the United States, the FCC Part 15 regulation that establishes relevant limits on power levels specifies an output power limit of 1 W for outdoor access points, while noting that the maximum EIRP at any elevation angle above 30 must not exceed 125 mW (consistent with Qualcomm's suggested mask above).[1]

2.2 WMAS technologies for wireless audio transmitters, Underground Wireless Broadband

2.2.1 Questions 4-10

No comments.

2.3 Radiocommunications receivers communicating with satellites in the 915–928 MHz and 2400–2483.5 MHz bands

2.3.1 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

[1] FCC, Part 15 Rules, 47 CFR 15.407(a)(1).

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.

- 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.)

Given the large distance to satellites, and the significantly higher propagation loss observed in these scenarios, we do not see any issue with the ACMA's proposal provided that power levels for satellite usage are not increased. Future increases to the transmitter power allowed for space-to-earth usage would necessitate a detailed technical analysis to evaluate the impact on current applications in the 900 MHz and 2.4 GHz bands.

3 Additional comments

3.1 Addition of OOBE for 6 GHz

Qualcomm welcomes the proposed additions to the regulation regarding OOBE. Before final publication, we would like to highlight what we believe to be a necessary editorial adjustment in the proposed text: The emission limit should be expressed in units of "dBm/MHz," instead of only "dBm" as currently written. We suggest this unit measure be corrected in the two sections of the document identified below (emphasis added on proposed corrections):

6 Schedule 1 (table item 63AA, column 4, after paragraph (c))

Insert:

(d) Emissions below 5925 MHz must be no greater than –27 dBm**/MHz** EIRP.

7 Schedule 1 (table item 63AB, column 4, after paragraph (b))

Insert:

(c) Emissions below 5925 MHz must be no greater than –37 dBm**/MHz** EIRP.

3.2 Frequency-Hopping Narrowband

Qualcomm understands the ACMA's efforts towards international harmonization of its regulation on narrowband frequency-hopping. As discussed in the Consultation, ACMA's proposal is to align their regulation with European rules by allowing frequency-hopping devices to use higher PSD, described in item 57A.

Considering the ACMA's inclination to align with European standards, it is important to highlight that proper sharing mechanisms are required to account for the higher power densities proposed in the Consultation. This condition is included in comparable regulatory frameworks at the international level. For example, in Europe, ECC Decision 20(01) states that "An adequate spectrum sharing mechanism shall be implemented."[2] It is important for the ACMA to require an adequate spectrum sharing mechanism in order to ensure efficient and fair use of this spectrum.

The ETSI standard EN 303 687 specifies the specific requirements for narrowband frequency-hopping systems to satisfy the spectrum sharing mandate. EN 303 687 defines the mechanism to be "listen before talk (LBT) with a 20 MHz clear channel assessment (CCA)". Qualcomm suggests that the ACMA establish appropriate spectrum access mechanisms that will ensure coexistence and fair spectrum sharing between different LIPD technologies in the 5925-6425 MHz band.

3.3 Prioritization of frequencies above 6000 MHz

Although not directly addressed in the Consultation, Qualcomm would like to take this opportunity to refer the ACMA to our previous comments regarding support for the prioritization of frequencies above 6000 MHz.[3] Qualcomm continues to recommend that the ACMA adopt measures that an industry coalition comprised of Broadcom, Cisco Systems, Intel, Meta Platforms, and Qualcomm has proposed for adoption in the United States, Canada, and Brazil:

1. VLP devices shall comply with an out-of-band emissions level of -37 dBm/MHz measured by root mean square (RMS) at 5925 MHz.
2. VLP devices shall prioritize unlicensed operations in channels above 6000 MHz before beginning operation below 6000 MHz. Manufacturers should be required to submit with their application for equipment authorization a declaration that the equipment complies with this prioritization rule.

The requirement for VLP devices to prioritize unlicensed operations in channels above 6000 MHz will reduce the likelihood of VLP traffic in the channel adjacent to the 5.9 GHz ITS band when VLP devices operate in vehicles. In the incidences when VLP traffic occurs in the channel adjacent to ITS, the out-of-band emissions limit of -37 dBm/MHz RMS should further help to ensure coexistence.

3.4 Definition of "indoor"

Recognizing the ACMA's proposed definition of "indoor," Qualcomm notes that there remain edge cases for which further clarity may be required. For example, underground locations (e.g., mines, basements) and non-stationary enclosed environments (e.g., cruise ships, school buses) may be best served by categorization as "indoor." We recommend further refinement of the definition to avoid negative impacts on these LIPDs operating in these edge cases.

4 Conclusion

Qualcomm is encouraged by the ACMA's continued focus on wireless broadband services and the importance of spectrum arrangements that will enable the deployment of advanced services in Australia.

[2] ECC Decision 20(01), On the harmonised use of the frequency band 5945-6425 MHz for Wireless Access Systems including Radio Local Area Networks (WAS/RLAN) (November 20, 2020).

[3] See Qualcomm's comments in response to the ACMA's 2021 discussion paper, *Proposed updates to the LIPD Class Licence for 6 GHz RLANs Consultation paper.*

The ACMA's stated plans enable all stakeholders to plan for successful wireless technology deployments that deliver enhanced and innovative services to users in Australia while maximizing harmonization with global and regional developments.

Qualcomm's systems-level research and ecosystem support efforts are both helping the ecosystem with 5G deployments and contributing to the next evolution of 5G and Wi-Fi. Thank you again for the opportunity to provide feedback.

Should you have any questions or comments on this submission, please do not hesitate to contact me at jgwelch@qualcomm.com .

Sincerely,

Julie G. Welch
Vice President, Government Affairs, APAC

cc: Alex Fernandez, Senior Director of Business Development, Qualcomm