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AMTA Submission

Australian Communications & Media Authority

Radio local area networks (RLANs) in the 6 GHz band



About AMTA

The Australian Mobile Telecommunications Association (AMTA) is the peak industry body representing Australia's mobile telecommunications industry. Its mission is to promote an environmentally, socially and economically responsible, successful and sustainable mobile telecommunications industry in Australia, with members including the mobile network operators and service providers, handset manufacturers, network equipment suppliers, retail outlets and other suppliers to the industry. For more details about AMTA, see <http://www.amta.org.au>.



Overview

AMTA welcomes the opportunity to provide comments in response to the ACMA's consultation on the use of radio local area networks (RLANs) in the 6 GHz band.

AMTA broadly supports the investigation of the 6 GHz band for RLAN use and agrees with the ACMA's proposed revision of the *Radiocommunications (Low Interference Potential Devices) Class Licence 2015* ("the LIPD Class Licence") to include authorisation of RLAN operation in the Lower 6 GHz Band (5925-6425 MHz).

We also anticipate that future demand may require spectrum-licensed, apparatus-licensed and/or class-licensed arrangements to be introduced in the Upper 6 GHz Band (6425-7125 MHz). This demand will be driven by the ongoing exponential growth in customer data consumption and demand for ever-faster speeds and higher quality delivery of telecommunication services.

However, AMTA supports the consideration of allocation to IMT in the Upper 6 GHz Band (6425-7125 MHz), with a review to be considered following the outcomes of WRC-23. As such, we oppose the ACMA's current view that it would seek to proceed with a decision prior to the completion of WRC-23. This is particularly the case if it is leaning towards making the band available to class-licensed deployments, which would not be reversible once consumer devices begin to proliferate, even if it didn't result in the highest value use (HVVU) of the spectrum.

While we would welcome a decision to allocate the Upper 6 GHz Band to wireless broadband (WBB) services using IMT technologies domestically, we note that Australia is *today* well-placed in terms of WBB spectrum holdings, with considerable work to be done on optimising existing holdings over the next couple of years, particularly in the 3.4-4.0 GHz range. We maintain that the 6 GHz Band is an important part of the future spectrum roadmap, and will be required over the 2025-2030 timeframe (see section below titled "*Demand for IMT*" below), but it is not required urgently. Additionally, we consider the opportunity cost of not releasing the Upper 6 GHz Band to Wi-Fi to be low, given that the doubling of existing Wi-Fi spectrum through the release of 500 MHz in the Lower 6 GHz Band will provide significant benefits and address the congestion concerns. As such and on balance, we don't see an urgent need to make decisions on the Upper 6 GHz Band prior to WRC-23, and we strongly support a more cautious "wait-and-see" approach as appropriate for Australia.

Such an approach preserves future flexibility and ensures the ability to allocate part of the upper band to IMT to support strong growth in demand for 5G. AMTA's view is that the likely economic benefits are maximised with shared allocation of the 6 GHz band spectrum as the short-and long-term economic benefits of improved IMT and Wi-Fi services can both be secured.

AMTA views regarding the Upper 6 GHz Band

Automatic Frequency Control (AFC) system vs Apparatus Licensing

We consider that questions 4 through 9 of the consultation paper are aimed at proponents or aspirant operators of an Automatic Frequency Control (AFC) system, and as such we reserve our view on these detailed matters.

Rather, while of course it is reasonable for the ACMA to seek to gather information on the respective advantages and challenges associated with such a system, we believe that the consideration of these specifics is premature.

Such AFC systems haven't been implemented in Australia to date. We would instead advocate for the "tried-and-tested approach" of apparatus licensing and registration which has proven effective in Australia over a number of decades.

We believe that any higher-power devices—including "*standard power*" devices exceeding the class-licensed power limit of 24 dBm—operating as part of WBB systems (be they based on IEEE 802.11 or IMT technologies) could be authorised under apparatus licences—even area-wide licences (AWLs) which could overlap the spectrum space occupied by fixed point to point licences. This would permit continued support and protection of the 6.x GHz band for microwave links for backhaul. It is acknowledged that this encumbered spectrum might not permit a wide-area licensee to provide connectivity in all locations throughout its AWL licensed channel, but this would be no different to being denied access by the AFC, assuming that demand for use of the spectrum in that area outstrips supply. And if there is free spectrum, the licensee could take out another licence for the 'denied' area. It would be important for any such apparatus licences/AWLs to be issued on a "no interference, no protection" basis with respect to fixed point to point licences, to avoid undue denial to long-haul microwave links. Licence tax could be adjusted accordingly to acknowledge the low priority of the licences and uncertainty caused by the encumbered spectrum, although certain regulatory measures may need to be put in place to avoid spectrum hoarding and anti-competitive behaviours.

Regardless of the approach adopted, we oppose the operation of higher power devices under a "hands-off" class-licensing approach. Appropriate regulations *must* be put in place to ensure the protection of microwave fixed point to point links, as well as the continued utility of the band for such links. As such, any higher power devices must be authorised by *either* AFC + registration, or apparatus licences.

Demand for Wi-Fi

Even according to the Dynamic Spectrum Alliance (DSA), with Wi-Fi 6 (802.11ax), 80 MHz channels support speeds up to 1 Gbps in phones (or up to 2 Gbps with 160 MHz channels). As highlighted by Windsor Place Consulting (WPC)¹, the three latest versions of 802.11 technology support data rates from 600 Mbps to Gigabit speeds, while on the other hand, only the most developed Asian markets have fixed broadband speeds above 100 Mbps. Australia's median fixed line internet download speeds sit at approx. 50 Mbps, and in fact are lower than the median download speeds provided by mobile broadband². As such, we would challenge the ACMA's claim that it is lack of Wi-Fi spectrum that is causing the bottleneck limiting user throughput. This is of course in the context of an ACMA decision to grant an additional 500 MHz to Wi-Fi in the Lower 6 GHz Band, which we continue to support. While we agree that it could be shown that Wi-Fi needs more spectrum both for consumer and industrial/enterprise needs, it is also possible that 5G and its evolution could disrupt some of these requirements and cater to these use cases, in particular industry/enterprise.

Demand for IMT

Low band spectrum provides wide area coverage and good depth of coverage but has limited capacity. High bands can provide very high capacity over a localised area. Mid-band spectrum stands in the middle as a balance between coverage and capacity and is critical to meet forecast demand for mobile broadband. AMTA members agree that mid-band spectrum is their highest priority for the ACMA's forward allocation workplan, as outlined in our submission to the 2021-26 FYSO consultation.

AMTA considers that there is demand for both licensed and unlicensed use in the band and we strongly recommend that the ACMA gives due consideration to an allocation for IMT in the upper sub-band (6425-7125 MHz). Indeed, additional mid-band spectrum for IMT is required in the timeframe 2025-2030 as per recent studies. Coleago Consulting Ltd produced a report "*IMT spectrum demand: Estimating the mid-band spectrum needs in the 2025-2030 time frame in Australia*"³ and concluded that the most densely-populated Australian cities—Sydney, Melbourne and Brisbane—require between 387 and 827 MHz of *additional* mid-band spectrum, compared to the 703 MHz currently assigned to operators. This work complements the GSMA's July 2021 report "*Estimating the mid-band spectrum needs in the 2025-2030 time frame, Global outlook*", which concluded that between 1020 and 3690 MHz of mid-band spectrum was required in a range of 36 cities around the world, in order to deliver target performance of 100 Mbps downlink and 50 Mbps uplink and accommodate 1 million connections per square kilometer.

¹ Windsor Place Consulting, October 2021, Optimising IMT and Wi-Fi mid-band spectrum allocation: The compelling case for 6 GHz band partitioning in Asia-Pacific, available at:

https://www.mcmc.gov.my/skmmgovmy/media/Spectrum-File/23b_WPC.pdf

² <https://www.speedtest.net/global-index/australia#mobile>

³ Coleago Consulting Ltd, December 2021, *IMT spectrum demand: Estimating the mid-band spectrum needs in the 2025-2030 time frame in Australia*, available at: <https://amta.org.au/wp-content/uploads/2021/12/Coleago-Report-Demand-for-mid-bands-spectrum-in-Australia.pdf>

In its Policy Position Paper⁴, AMTA echoes the need for government policy supporting the allocation of additional spectrum for IMT over this decade: at least 300 MHz of mid-band spectrum by 2025 and 500 MHz by 2030.

In our response to IFC 12/2021, we stressed that due consideration of IMT in the upper 6 GHz sub-band cannot commence until after WRC-23 Agenda Item 1.2 has investigated the technical feasibility of operating IMT in that sub-band. In that response, AMTA proposed that consideration of an amendment to the LIPD class licence for deployment of Wi-Fi in the Upper 6 GHz sub-band cannot commence until after WRC-23 concludes.

Support for waiting until WRC-23

As such, with respect to the Upper 6 GHz Band, we are concerned to see the ACMA pressing forward and seeking to make a decision prematurely and unnecessarily, as per page 18 of the consultation paper: *“we do not currently intend to wait for WRC-23 outcomes and any subsequent global adoption”*. Part of the justification for this view is that *“how other major international jurisdictions choose to use the band will provide a better gauge than studies under/outcomes of that agenda item”*.

The comparison between sharing/compatibility studies on one hand and international policy developments on the other is potentially a valid one, considering that the sharing scenarios in the Upper 6 GHz band mainly involve only terrestrial services and therefore the interference management frameworks are a domestic matter and not reliant on international studies—with the exception of protection of space station receivers of the fixed-satellite service (FSS).

However, we do not necessarily agree with the ACMA’s implication regarding the *outcomes* of the WRC. We cannot underestimate the impact that the identification for IMT (or otherwise) in Region 1 may have on individual administrations in the Asia-Pacific, which may strengthen (or weaken) the case for IMT in the Upper 6 GHz Band. Of particular importance is China’s advocacy for the band for IMT, including their support for the inclusion of Agenda item 1.2 at WRC-23, its consideration of tests and the CAICT’s listing of the 6 GHz band as a frequency for 6G technology in its 6th Generation Whitepaper¹.

We are particularly concerned about the uncontrolled nature of RLAN device proliferation that may result from a premature decision to allocate the band for WiFi. Once the band is authorised for class-licensed WiFi devices and they are imported into Australia and proliferate, the decision will not be able to be reversed. The fact that IMT networks are infrastructure-based—in combination with apparatus- and spectrum-licensing approaches in which licensees are legally responsible for the authorised operations—means that these can be controlled and reigned back in, in the unlikely case that IMT did not result in the HVU of the spectrum. In fact, if strong economic activity is not generated through the use of IMT systems in the band, it is likely that

⁴ AMTA, Dec 2021, *AMTA Policy Position Paper: Spectrum for 5G and Beyond*, available at: <https://amta.org.au/wp-content/uploads/2021/12/AMTA-Policy-Position-Paper-Spectrum-for-5G-and-Beyond-Nov-2021.pdf>

licensing and operating costs could lead to a voluntary surrender of the spectrum, which is not the case with class-licensed spectrum which is freely accessible by users.

In combination with the fact that the benefits of additional spectrum for Wi-Fi will be addressed to a large degree with an additional 500 MHz of spectrum in the Lower 6 GHz Band, the preservation of the Upper 6 GHz Band for IMT networks presents a low-risk approach for the ACMA at this stage, in light of the ongoing international developments.

High-gain Antennas

The consultation paper seeks views on permitting high-gain directional antennas, *“for example, for fixed wireless access to be deployed by wireless internet service providers (WISPs) in regional and remote locations”*.⁵ AMTA assumes that ACMA are referring to point-to-multipoint systems that are commonly used by WISPs to deliver services to their customers. The ACMA however does not make clear what it intends to define as a “high-gain” antenna, however, in the context of WISPs, we are aware of readily available devices with antenna gains of between 17 dBi (90° sector) and 23 dBi (10° sector) operating with a TRP of 28 dBm (EIRP of 43 dBm) such as the Cambium PMP 450i Access Point⁶ and Subscriber Module.⁷

AMTA members use fixed Point-to-Point (P2P) links for backhaul from base-stations back to the core network, and there is a strong need to protect these links from interference. Systems like those mentioned above can produce an EIRP that is clearly well above the 250 mW (24 dBm) EIRP class licence limit the ACMA is proposing in the LIPD licence amendment.⁸ As such, high-gain antennas **must not be permitted** in conjunction with any device that would be **class licensed**. Devices exceeding the class licence EIRP limit (250 mW) should be considered “standard-power”.

In relation to the possible use of high-gain antennas in conjunction with standard-power devices (i.e. anything above the class licence limit), AMTA members also have concerns about the potential for them to cause interference to incumbent and future P2P links especially where external antennas are employed. Noting our comments in the section above on AFC systems, where we expect that all standard-power devices will either be apparatus-licensed and subject to coordination requirements, or have both AFC and registration, we consider this will apply where a standard-power device is used in conjunction with **any** external antenna, regardless of whether it is high-gain or not. For clarity, we consider the above requirements—i.e. to either coordinate and license or to employ AFC and register the device—will apply to both central stations (“base-station” in mobile parlance) and importantly to customer premises equipment (CPE).

⁵ Consultation paper, p.11.

⁶ Cambium PMP 450i Access Point data sheet available at https://www.cambiumnetworks.com/wp-content/uploads/2019/01/Cambium_Networks_data_sheet_PMP_450i_AP.pdf

⁷ Cambium PMP 450i Access Point data sheet available at https://www.cambiumnetworks.com/wp-content/uploads/2018/08/Cambium_Networks_data_sheet_PMP_450i_Subscriber_Module.pdf

⁸ Draft LIPD Class Licence Variation Instrument, clause 63AA.

There is an existing precedent for additional measures to act as a counter-balance the additional flexibility provided by allowing higher EIRPs. In the 5.8 GHz Band, there is a “Point to Point (5.8GHz) Band” licensing option which permits fixed links to operate in rural and remote areas at higher power levels—exactly the scenario that the ACMA is proposing in the consultation paper—but users have the added responsibility to obtain apparatus licences for these links. Apparatus-licensing of such links could be on a “no interference, no protection” basis to avoid undue spectrum denial to long-haul links in the 6.x GHz microwave bands, balanced by much lower licence tax, as is the case with mm-wave links in the 75 and 85 GHz bands.

It may be possible, in the future when co-existence studies have been conducted, to consider a registration exemption threshold for CPE similar to that used in spectrum-licensed spectrum. It is important to note that this will be first band in which class-licensed RLANs are sharing spectrum with licensed terrestrial receivers—with the exception of Defence and Amateur services, and a couple of radars. Therefore, the existing conditions applicable to RLANs in the 2.4 GHz and 5.x GHz Bands are not directly extendable to the 6 GHz Bands, hence AMTA’s advocacy for additional restrictions.

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