



Cisco Systems, Inc. Comments

November 2021

Response to ACMA Consultation on Proposed updates to the LIPD Class Licence for 6 GHz RLANs

Introduction

Cisco Systems, Inc. (Cisco) hereby files comments in response to the Australian Communications and Media Authority (ACMA) Public Consultation Paper on “Proposed updates to the LIPD Class Licence for 6 GHz RLANS” issued in October 2021. Cisco applauds the efforts of the ACMA to take steps to enable the latest generation of Wi-Fi in Australia by proposing to open up much needed spectrum in the 6 GHz range. Opening the lower 500 MHz to Low Power Indoor (LPI) and Very Low Power (VLP) devices would be an important first step in ensuring that Australian consumers and business users will have access to powerful new licence-exempt technologies. In this submission, Cisco responds to the specific questions called out by ACMA for industry inputs regarding the 6 GHz band, and how to improve the regulatory conditions for 5150-5350 MHz to better support today’s use cases. Cisco urges ACMA to move forward promptly to allocate 6425-7125 MHz to licence-exempt uses, adopt rules that would support subsequent implementation of “standard power” devices subject to Automated Frequency Coordination (AFC), and protect the adjacent Intelligent Transportation Services (ITS) band.

Cisco is a global provider of Internet Protocol (IP)-based networking solutions with a strong presence in Australia. Among Cisco’s many products are Wi-Fi network solutions for enterprise, enterprise networking solutions generally, and service provider networking solutions.

Enterprise networks are rapidly evolving to wireless as the edge technology of choice for reasons of networking efficiency, the expanded use of data in core business operations, and to supply new capabilities associated with digital transformation. Much of this data will never leave the enterprise’s own network, or will be transmitted via dedicated connections to a private, public, hybrid cloud or a multi-cloud environment.¹ The COVID-19 pandemic has accelerated and expanded this trend for business and government, as a variety of applications (including collaboration tools) must now operate on employee’s or student’s home network powered by Wi-Fi, or perhaps even support telehealth applications. Industry estimates that 90% of Australian households with broadband have installed a Wi-Fi access point.²³ Whether Wi-Fi is on the enterprise premises or relied upon by the enterprise to support remote working,

¹ Cloud capability enables enterprises to quickly increase or modify computing power without the need to order and install servers or other network hardware on premises. If properly incorporated into an IT strategy, cloud enables IT management and integration of applications with user devices in a secure way.

² When working from home and communicating with enterprise networks, employees are generally utilizing Virtual Private Networks (VPNs) that securely “tunnel” through a public service provider network to connect with the enterprise. VPN usage has surged to new never-before-seen levels during the pandemic. See <https://www.businesswire.com/news/home/20201127005318/en/Global-Virtual-Private-Network-VPN-Market-Report-2020-VPN-Adoption-Surges-as-COVID-19-Pandemic-Leads-to-a-Rise-in-Remote-Work-and-WFM-Culture---ResearchAndMarkets.com>

³ “Global Economic Value of Wi-Fi® (2021 – 2025)”, Wi-Fi Alliance, available at: <https://www.wi-fi.org/news-events/newsroom/wi-fi-global-economic-value-to-reach-5-trillion-in-2025>

telehealth or education, demands on the spectrum for licence-exempt technologies are rising quickly. While much of the public policy focus is on Wi-Fi at the edge of service provider networks (wired broadband, satellite, other), from Cisco's perspective, public policy should focus equally on whether business entities and governmental uses of licence-exempt spectrum are adequately supplied for the future.

Cisco believes that there is a need for more spectrum to be made available for licence-exempt use, including for Radio Local Area Network (RLAN) use, under LIPD class licensing. Having a single large contiguous block of spectrum in the 5925-7125 MHz range to support the current and coming generations of Wi-Fi is essential to support continued growth in connectivity needs of Australia and the expanding uses that Wi-Fi supports within enterprises. ACMA's proposal to open the lower 500 MHz of the 6 GHz band is an important step in the direction of addressing the necessary shortage of spectrum for licence-exempt technologies.

The proliferation of additional, ever more powerful RLAN devices, and higher bandwidth broadband networks, such as the deployments under Australia's National Broadband Network, is enabling richer and more productive applications. Cisco's Annual Internet Report⁴ highlights that for Asia Pacific, the devices and connections per capita will grow from 2.1 in 2018 to 3.1 in 2023. There will be 6.6 billion network devices in Asia Pacific by 2023, up from 4.7 million in 2018 (7.2% CAGR). There will be 6.9 billion wired and Wi-Fi connected devices by 2023, up from 4.0 billion in 2018 (11.7% CAGR), with 51% of all networked devices in Asia Pacific having a wired or Wi-Fi connection. Specifically in Australia, more than 52% of the time, Australian smartphone users are connected to Wi-Fi instead of using cellular data.⁵ While on those Wi-Fi networks at home, at work, or on the go, users are consuming more data via Wi-Fi than when attached to mobile networks, consistent with long-standing industry trends globally. Moreover, it is becoming increasingly clear that much of the future growth will be based not just on devices that connect people to the Internet, but an increasingly broad array of "things" from consumer products (like connected appliances, television sets, security systems and gaming consoles) to vehicles, industrial machines and an array of smart building and other smart devices.

In addition, Wi-Fi is also part of the technology enabling today's smartphones, first introduced in 2007, *after* licence-exempt radio local area networking devices received their last significant infusion of radio spectrum from the World Radio Conference 2003. Since 2007, mobile devices have been getting more powerful with every generation, consuming more data with increases in processing power, screen resolution, more use of video in applications, and the mobile networks themselves transitioned from 3G to 4G and now, 5G. "Offloading" of mobile traffic to Wi-Fi networks refers to the circumstance that 60-70% of data originating on or terminating to a smartphone utilizes a Wi-Fi/fixed broadband instead of a mobile connection. Offloading

⁴ <https://www.cisco.com/c/en/us/solutions/executive-perspectives/annual-internet-report/air-highlights.html#>

⁵ "Global Economic Value of Wi-Fi® (2021 – 2025)", Wi-Fi Alliance, available at <http://www.wi-fi.org/file/global-economic-value-of-wi-fi-2021-2025>

therefore helps alleviate mobile congestion, enabling mobile operators to more easily adjust to demand spikes, and provides connectivity where the mobile networks do not provide adequate coverage. In short, Wi-Fi plays an important role in ensuring the 5G future will be successful.

Every part of the broadband ecosystem is speeding up in response to changing consumer demand. Broadband networks, whether fibre or wireless, are becoming more powerful. Through the transition from 3G to 4G, the use of licence-exempt spectrum has continually grown, and will continue to grow as 4G transitions to 5G. In the same period, while Australia has transitioned to a National Broadband Network and mobile to 4G and now 5G, Wi-Fi demand continued to grow without provision for more licence-exempt spectrum capacity.

The time has now come for more spectrum for licence-exempt LIPD devices, as ACMA's proposal recognizes. New technology is ready to address burgeoning demand and new, projected use cases. By acting boldly, regulators best ensure that consumers will benefit not just from today's technologies, but also from technologies now on the drawing boards in standards bodies. Regulators globally are seeing the benefits of opening the full 6 GHz to RLAN use. Doing so gives certainty to device and application developers who can take advantage of wide channelization made possible by the new technology. It also ensures that countries will participate in what is rapidly becoming a globally harmonized allocation for 5925-7125 MHz. Moreover, the economic value of opening the full band is estimated at US\$3.3 trillion globally in 2021, increasing to US\$4.8 trillion globally by 2025, assuming major economies open the 6 GHz band to RLAN. Australia's share of that would be US\$34.7 billion in 2021, increasing to US\$42 billion in 2025⁶. The main reasons for Wi-Fi's ability to deliver economic value lie in its ability to provide easy and readily available Internet access at home and on the go, along with productivity increases in enterprises as they increasingly rely on RLAN in their business operations. From Cisco's perspective, enterprises (governmental, non-profit or for profit) are still early in the process of digitizing their operations with wireless connectivity. However, one of the outcomes of the global pandemic of the past year has been an acceleration of digital transformation initiatives. It is now recognised that what can be delivered digitally, now *must* be delivered digitally.

ACMA's willingness to open 5925-6425 MHz, and to press onward to consider the 6425-7125 MHz band, is the correct and necessary response to these marketplace changes. Cisco completely agrees that Australian spectrum policy should not be held hostage to Region 1's decision to evaluate possible coexistence between IMT technologies and 6 GHz incumbent systems such as microwave and satellite uplink. We see little prospect that these studies will come to any different conclusion about power levels than the study CEPT recently completed

⁶ "The Economic Value of Wi-Fi: A Global View (2021-2025)" by Telecom Advisory Services on behalf of the Wi-Fi Alliance (2021) available at https://www.wi-fi.org/download.php?file=/sites/default/files/private/Economic_Value_of_Wi-Fi_Highlights_202102_0.pdf

for the lower 6 GHz band,⁷ and we doubt that imposing the same conditions on IMT as have been required for licence-exempt in the lower 6 GHz will make for a compelling business opportunity for IMT systems. But more importantly, the full 6 GHz band is well on its way to becoming a globally harmonized band for LIPD class devices. In fact, CEPT has now authorized a technical evaluation for the upper part of 6 GHz for licence-exempt.⁸ Even Europe is not waiting.

Cisco believes there is a huge demand for spectrum for Wi-Fi in the 6 GHz frequency band, and we can attest to our customers' strong interest in using more Wi-Fi within their business operations. We urge ACMA to recognize the critical role that Wi-Fi plays in delivering broadband access and the Internet of Things, by adopting the 5925-6425 MHz allocation promptly, adopting technology-neutral technical rules as proposed, and turning its immediate attention to upper portion of the 6 GHz band. This will cement Australia's position to continue its leadership role in licence-exempt technology in the region and beyond.

Cisco Responses to Consultation Questions

Lower 6 GHz band/proposed update to the LIPD Class Licence

- 1. Are the proposed out-of-band emission limits of -37 dBm/MHz for outdoor very low power (VLP) devices and -27 dBm/MHz for low power indoor devices suitable, both in terms of protecting intelligent transport systems (ITS) services and their effect on the operation of RLAN devices near/adjacent to the 5925 MHz boundary?***

Cisco has long been a proponent of ITS, and has been active in many stages of ITS development. We agree that the sooner ITS can be deployed on roadways and in vehicle fleets, the sooner we will realize the safety benefits of collision avoidance, real time warnings, and more. Because ITS is harmonized globally around the 5.9 GHz band, the lower boundary of 6 GHz must be regulated in order to ensure ITS can perform the functions intended for it. There are a couple of issues to discuss with ITS protection.

First, VLP devices are operated both indoors and outdoors. The device class is inherently portable, and it is expected that many use cases would be wearables. That means that VLP devices will be carried into vehicles and will operate there. If these devices operate at 14 dBm with an out-of-band emissions limit of -27 dBm/MHz, harmful interference with vehicular ITS radios will occur. Industry players representing companies that have a

⁷ See ECC report 302 (CEPT report with multiple studies developed by European administrations and industry): <https://www.ecodocdb.dk/download/cc03c766-35f8/ECC%20Report%20302.pdf>; ECC report 316 (CEPT report with multiple studies developed by European administrations and industry, focuses on VLP and short term criteria): <https://www.ecodocdb.dk/download/8951af9e-1932/ECC%20Report%20316.pdf>

⁸ See Electronic Communications Committee, Berlin Meeting 2 Nov - 5 Nov, Approved WI (Work Item) on WAS_RLAN in 6425-7125 MHz, Temporary Documents TEMP 22R3 available at: <https://cept.org/ecc/meeting-documents/?flid=29205>

business interest in licence-exempt devices and a business interest in both licence-exempt devices and ITS (such as Cisco) have mutually agreed on a solution that we believe would best balance competing interests and ensure ITS can be operated safely. The proposal is:

VLP devices at 5925 MHz operate with an OOB limit of -37 dBm/MHz.

VLP devices upon start up select channels above 6000 MHz.

Both parts of this agreement are essential to protecting ITS. If VLP devices are not encouraged to operate with some spectral separation from ITS, then the OOB limit would need to be lower.

Second, given the strong demand for Wi-Fi services inside moving vehicles, industry's goal is to enable vehicular Wi-Fi with 6 GHz channels. Since most regulators will likely treat terrestrial vehicles as an outdoor use case, there are two separate interference problems to consider. The first – protection of ITS – is easily solvable because vehicular access points are installed by the vehicle manufacturer as part of the vehicle's electronic system. Manufacturers can notch lower 6 GHz frequencies to prevent harmful interference to the ITS radio. Client radios operating in the car take direction on their use of frequencies from the access point radio embedded in the vehicle, and so would also avoid ITS. The second issue is protecting incumbent fixed link operations from vehicular Wi-Fi. This issue is solvable through the use of an AFC tool with accompanying rules requiring mobile access points to stay informed of their RF environment to avoid causing harmful interference. Just as automated maps tell you when to exit the highway, a standard power access point in motion would be informed when to exit the channel it is on and move to a different channel. This concept has been dubbed "mobile AFC" or "mAFC" and is under discussion now in the US in a Further Notice of Proposed Rulemaking. ACMA should monitor the US Federal Communications Commission (FCC) developments on the mAFC.

2. *Is the specification of contention management protocols in the LIPD Class Licence necessary to enable equitable access between potentially competing technologies such as RLANs and 5G new radio-unlicensed (NR-U) services? If so, is the proposed condition, and the language used to express it, appropriate?*

There are two very different issues that have given rise to the term "contention-based protocol" in the 6 GHz band. The first issue is that "contention-based protocols" are required by ETSI BRAN standards for licence-exempt technologies to ensure that, regardless of technology, there is a mechanism that allows all radios to reasonably share the band. The IEEE 802.11 EDCA protocol used by Wi-Fi is the most well-known and is captured in the ACMA consultation – Carrier Sense Multiple Access (CSMA) or Multiple Access Collision Avoidance (MACA), or as it is commonly known, "listen before talk." Characterized as an "example" (because other technologies may be different), the terms

as proposed are fine and ACMA's meaning is clear, although most in the industry refer to CSMA/CA (or CSMA with collision avoidance). To the extent Australian rules continue to point toward ETSI BRAN standards, there is no compelling reason to repeat the "contention-based protocol" requirement in national rules, although there is no harm in doing so. If the term is used, it should be understood that the term is purposefully loosely defined to allow industry to fill in the details in standards, and to evolve the method over time as needed.

The second contention-based protocol issue is specific to 6 GHz and was introduced by the FCC. When the US opened the 5925-7125 MHz band to LPI devices, one of the incumbent systems studied were temporary microwave links utilized for remote newsgathering (e.g., broadcast truck to station tower, camera backpack to broadcast truck). One issue involved newsgathering from inside a building, such as a legislative hall, where LPI access points were operating co-channel to newsgathering operations. Essentially what the FCC concluded is that the "always on" nature of newsgathering transmissions, coupled with contention-based protocol capability of the LPI devices, would mean that the polite "listen before talk" access points would yield the medium to broadcasters, and the access points would then pick a different channel. It then wrote the requirement into its rules at Section 15.407(d)(6), which also required the FCC to write a generic definition of the term:

Contention-based protocol. A protocol that allows multiple users to share the same spectrum by defining the events that must occur when two or more transmitters attempt to simultaneously access the same channel and establishing rules by which a transmitter provides reasonable opportunities for other transmitters to operate. Such a protocol may consist of procedures for initiating new transmissions, procedures for determining the state of the channel (available or unavailable), and procedures for managing retransmissions in the event of a busy channel.

Unless ACMA is presented with a similar set of incumbent users, and ACMA concludes that a contention-based protocol is needed, there is no independent reason for requiring a reference or a definition in its rules.

3. Are there any broader comments on the proposed update to the LIPD Class Licence?

As noted in the introduction, Cisco is very pleased that ACMA has taken the first step of proposing to open 5925-6425 MHz to licence-exempt, and in particular to LPI and VLP devices. Further, we support the power levels as proposed, as they align to levels that we have seen in other countries and that are emerging as an important global standard. This harmonization is vitally important to global manufacturers and also maximizes economies of scale, benefiting consumers. Moreover, Cisco's enterprise customers primarily use spectrum indoors, and the LPI device class gives us an opportunity to

introduce them to the latest 6 GHz technology of Wi-Fi 6E. However, it is also important to understand that the LPI device class is one piece of a broader puzzle that can only be solved if multiple device classes are enabled by rules. For Australia, the missing piece is standard power (1W) subject to AFC.

The reason for this that the LPI power levels are at the low end of the useful range of power, and are lower than power levels used in the 5 GHz band. Most enterprises already have networks established with 2.4 and 5 GHz radios, including ethernet cabling to reach the ceiling-mounted access points. If a new generation of technology is made available at lower powers, the placement of the existing ethernet cabling is likely to be sub-optimal, resulting in dead spots. The enterprise would thus be left with the choice of either replacing its cabling entirely, including ceiling repair, or overlaying new ethernet on the old but this time for access points that are closer together. Either option is undesirable. What businesses want is the opportunity to unplug one access point and plug a new one in. As a result, LPI without standard power is only for “greenfield” installations or only where the customer is prepared to ensure the pain of rewiring its ethernet connections. We are therefore pleased with ACMA’s proposal to provide us with the opportunity to deploy LPI, and we simultaneously urge ACMA to consider standard power devices subject to AFC as soon as possible.

Moreover, there is demand for outdoor access points from enterprises. Use cases include port operations, mining, petroleum processing, agriculture and more. These use cases today cannot be addressed with 6 GHz LPI rules. They require standard power.

Upper 6 GHz band/higher power RLAN devices

4. Should the ACMA make arrangements that permit high-gain directional antennas (for example, for wireless internet service providers in remote areas) under a class licensing regime?

The following answer applies to high-gain antennas. If the question is intended for high-gain antennas also operating at higher power, the answers to the questions about “high power” below (Question 5-7), apply.

For high-gain directional uses, the ACMA could consider a “light licensing” or registration system (not conferring any spectrum rights, but just for the purpose of creating a coordination requirement and a searchable licence record). Should a higher priority fixed operator wish to establish a link, it becomes possible to coordinate with the lightly licensed registrant to ensure that there is no interference to the fixed service. This coordination approach could also serve to warn light licensees away from co-channel operations near existing and higher priority links. ACMA should ensure that the light licence or registration record explain that the high-gain system is licence-exempt and has no prioritization over higher priority licensed systems or other licence-exempt operations. A geolocation record is also required – even if it is simply a datapoint

entered manually on the licence record. Geolocation will assist those with higher rights to identify the system, and will also facilitate future incorporation into the AFC should the ACMA require one. The drawback here is that only more sophisticated users would likely take advantage of such a system, and, due to its manual nature, the ACMA would carry more of the burden in administering the system. To the extent ACMA is interested in an AFC, it could further make these light licensees specifically subject to future operations with an AFC and add this as a condition of the licence.

5. *If ‘high power’ class-licensed devices were to be introduced under an AFC system, what aspects of the system would need to be considered in setting it up? Is there interest from industry in administering such a system?*

Standard power devices (e.g., 36 dBm EIRP) are needed for a range of enterprise use cases, both indoors and outdoors, although the number of outdoor transmitters will be relatively small compared to indoor ones.⁹ However, unfettered use of standard power transmitters can create interference issues for fixed link operations. For that reason, industry proposed a database mechanism that would ensure outdoor licence-exempt transmitters would not operate co-channel (or adjacent channel) in geographic proximity to fixed link receivers.¹⁰ The AFC database system was needed in the US because the US has over 100,000 fixed links, with modifications to those links, and new links, occurring all the time. Moreover, the FCC has a searchable database of licence information that is available to inform an AFC on a regular basis of the existence of an incumbent link and the associated frequencies in use. Canada has also embraced this approach.

In the US, AFCs are in the process now of being established, with significant standards and forum work focusing on technical requirements. Once established, those standards (e.g., a standardized approach for a standard power access point to talk to an AFC) can be put to work globally. From a regulatory perspective, the requirements that regulators need to specify are fairly light. The FCC’s rules on what AFCs must accomplish can easily be adopted by any administration.¹¹ These are rules that are “outcome” rules – they establish what the regulator wants the AFC to accomplish. In contrast, the industry activity in standards and forums looks at “how” to achieve the outcomes, with some

⁹ Regulators generally estimate less than 5% of all licence-exempt RLAN transmitters will be outside because the primary use of the technology is indoor networking, and even at 36 dBm, the signal has limited coverage. As a general rule of thumb, we expect outdoor networking to be mostly delivered by IMT and indoor networking to be delivered mostly by Wi-Fi. That said, when an enterprise requires outdoor RLAN to meet a need, there is no substitute.

¹⁰ In addition to a database mechanism, industry also agreed that a emissions mask on standard power outdoor devices could help long term with coexistence with FSS uplink, limiting their maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon to 21 dBm (125 mW) to protect fixed satellite services.

¹¹ See generally 47 U.S.C. Section 15.407(k) available at: <https://www.ecfr.gov/current/title-47/chapter-I/subchapter-A/part-15>

measure of flexibility for individual AFC approaches. The FCC has called for specific written proposals from prospective AFC operators by 30 November 2021. Individual AFCs will be required to submit to testing so that the FCC can understand how the applicant has produced an AFC compliant with its rules. It is expected that such testing would occur beginning in 2022. AFCs could become commercially operational as early as late 2022.

Moreover, when AFCs are stood up in the US and in Canada, most of the software is universally applicable provided there is a harmonized approach to standard power. The software engine that calculates available channels in a particular location and returns those to a device need not be different by country. As such, AFCs provide a reasonably low-cost approach to establish such a sharing mechanism in Australia. Note that in the US and Canada, it is expected that both vendor-specific, carrier, and third-party AFCs will operate in the band. As one example, Cisco has partnered with Broadcom and Facebook to create the Open Automated Frequency Coordination (OpenAFC) Software Group within the Telecom Infra Project (TIP), with the objective to develop a common reference open source software for an AFC system.

- 6. *If ‘high power’ class-licensed devices were to be introduced under an AFC system:***
- a. *Is there interest from industry in administering such a system?***

Yes, there is strong interest. LPI by itself will not address numerous use cases and customer requirements. A standard power option is therefore necessary. As a result, there is a business driver to operationalize AFCs.

- b. *Are there any impediments to developing and/or operating a system in Australia? What could be done to help enable, or otherwise encourage, the development and/or operation of a system in Australia?***

ACMA should consider adopting the same rules as the US – Section 15.407(k). These provide the high level, outcome-driven requirements for AFCs. Once AFCs are established in the US (and/or Canada), ACMA could then invite applications from interested parties.

ACMA should also consider what licence information is necessary for AFCs to access in an automated fashion for the AFC to acquire enough information about priority incumbents to make its calculations. If that information is not available electronically for download, ACMA should take steps now to make it available to AFCs.

- c. *To what extent would an Australian system need to be aligned with those to be implemented elsewhere? What scope could there be for customisation in an Australian system?***

To the extent the problem that ACMA is solving for is the same – protection of microwave receivers, there is no need to deviate from the work of other countries. To the extent ACMA has special considerations beyond those already identified in the US and Canada (e.g., radio astronomy or satellite downlink) an AFC could protect a limited geography for co-channel operation. Identifying those special cases and making decisions about the degree of protection would speed implementation in Australia.

d. What aspects of an AFC system would need to be considered in the design, establishment, and ongoing operation, of such a system, including:

i. regulator and industry commitments

Regulator commitments are made by adopting enabling rules as discussed above.

Industry commitments are made by AFCs who file pursuant to an application process.

ii. technical spectrum coordination and coexistence rules – for example, a tiered hierarchy framework for spectrum uses

There is no “tiered” hierarchy required. There are priority licensees – whose receivers must be protected. There are licence-exempt devices that coexist with each other according to the technology developed by standards bodies – e.g., contention-based protocols. Standard power access points are not seeking priority among licence-exempt transmitters.

iii. IT infrastructure and system design, including security and system reliability issues

Security is important and AFCs must be required to demonstrate to regulators that they have designed their system to prevent security breaches that would put priority transmitters at risk either due to a security issue or a reliability issue.

iv. communication interfaces between an AFC system, the ACMA’s Register of Radiocommunications Licences (RRL) and devices

AFCs must be able to download electronic records of priority licences to be able to use those inputs to protect those licensed receivers. ACMA must decide in what format these records would be available. Devices do not need to interact with ACMA’s systems. Devices only interact with the

AFC – first for registering and authenticating, and then for requesting available channels (a request that is repeated on a regular basis). Interfaces between devices and AFCs may use standardized interfaces developed by the Wi-Fi Alliance or other groups.

v. ongoing interaction between the ACMA and system operators

As AFCs would be stood up subject to regulatory approval, the expectation is that AFCs would operate pursuant to ACMA's rules. If upon audit or oversight that proved compliance not to be true, ACMA should be legally capable of negating any approval and requiring the offending AFC to cease operations. Any connected access points would then revert to using the 2.4 or 5 GHz band unless the end customer made arrangements to point to another, authorized AFC.

AFCs can also be utilized to assist should there be an interference complaint – such as by excluding a frequency from a list of available channels to learn if notching the frequency stops the interference event.

7. If 'high power' devices were to be introduced under a manual registration process, what might those arrangements look like? Would the introduction of apparatus licensing for such devices be an appropriate option?

We do not favour a manual process for several reasons. The first and most important one is that the market for standard power devices is global. Once AFC-connected devices are in the market, it is far better if regulators harmonize on the solution. Having different classes of standard power devices is not practical, and greatly complicates supply chain and servicing.

If ACMA does not want to undertake the process of "approving" AFCs, then ACMA could create a very simple registration process for access points while allowing users to take advantage of AFC capabilities. For example, in Saudi Arabia, the CITC has announced that it intends to clear the 6 GHz band of microwave links (note – this is not at the licence-exempt industry's request). There, the CITC may decide not to authorize AFCs. As long as AFCs can operate "behind the scenes," the Kingdom will have access to the same standard power devices as everyone else, and the AFC software can be set to report that all channels at all locations are available. In Australia's case, where there may continue to be fixed microwave uses, the process is not as straightforward. AFCs will need to download that microwave licence information and keep licence records up to date. Finally, from the perspective of preventing harmful interference to priority systems, if ACMA does not wish to approve AFCs, the general licence-exempt rules continue to apply – and licence-exempt devices cannot cause harmful interference to licensed incumbents. How a standard power access point achieves that would be up to the user.

However, in Cisco's view, if there are going to be AFCs, it is a far preferable policy to approve them, as opposed to simply allowing them to operate. In that way, all licence-exempt transmitters operating at standard power are subject to an AFC. This has proven to be a much more acceptable outcome to priority licensees in the US and Canada.

8. *Would there be advantages in implementing different licensing and/or access management arrangements in different geographic areas for the use of high power RLAN devices?*

No. Splitting the market and applying different rules ruin the economies of scale. For enterprises that are national in scope, having devices in one geography pointing to a different AFC than devices in another is not manageable.

9. *Are there additional sharing scenarios and/or studies relevant to this band that have not been identified in this paper?*

Broadband India Forum released a study report on *Frequency Sharing for Radio Local Area Networks in the 6 GHz Band in India*¹² prepared by RKF Engineering Solutions. The report studied the impact of the use of licence-exempt devices at different power levels to assess whether such use was compatible with existing incumbent services in the band such as Fixed Satellite Services and Fixed Services. The study modelled real-life operational conditions based on the population density in India and expected usage patterns based on time-of-day and location (indoor/outdoor). The study demonstrated that the use of licence-exempt technology such as Wi-Fi in the entire 6 GHz band would not cause harmful interference to incumbents. The study could be a useful reference for ACMA in the context of Australia.

5 GHz Band

10. *In addition to comments made to the April 2021 consultation paper, do you have any comments on the other proposals for updates to the 5 GHz band listed in this paper?*

Currently, the ACMA Class Licence for Short Range Device specifies upper and lower frequency limits of allowable frequency bands, lower limit exclusive and upper limit inclusive. This prevents the operation of a 5 GHz transmitter with continuous 160 MHz and contiguous 80+80 MHz channels at 5150 to 5350 MHz band. ACMA should amend its rules to allow use of wider channels in the lower part of the 5 GHz range.

¹² See <https://broadbandindiaforum.com/wp-content/uploads/2021/10/Frequency-Sharing-for-RLANs-in-the-6GHz-band-in-India.pdf>

11. If outdoor and/or higher power RLAN devices were authorised in parts of the 5 GHz band (for example, 5150–5250 MHz), would it be appropriate to implement measures similar to those being considered for high power devices in the 6 GHz band (for example, a registration system, or apparatus licensing)?

ACMA should adopt the same criteria that the FCC did in 2014. No harm has come to incumbent Globalstar from implementation of FCC rules, and the need for spectrum that can accommodate outdoor uses by enterprise is great. Per the FCC –

We conclude that generally allowing fixed access point outdoor operations at a conducted power level of up to 1 W (30 dBm), and a PSD of 17 dBm/MHz with an allowance for a 6 dBi antenna gain (i.e. a total 36 dBm EIRP), and limiting the maximum EIRP above 30 degrees elevation to 125 mW (21 dBm) EIRP, provides reasonable protection from harmful interference to Globalstar’s system. Both NCTA [National Cable Telecommunications Association] and Globalstar agree that this protocol would provide interference protection to Globalstar, while permitting access to the spectrum for U-NII users.¹³

There is no reason for complicating the protections as the ITU agreement does with respect to aggregate interference protection.¹⁴ There has never been regulatory agreement with any study produced by Globalstar demonstrating that aggregate interference is a concern. To the extent outdoor sharing is a concern at all, the antenna elevation masks are far more important to protect the sole satellite system in the band. Moreover, the limit of 2% outdoor devices deployed is entirely arbitrary and imposes awkward market limitations that are practically impossible for the private sector to administer. Finally, the notion that outdoor devices in the band are not permitted to exceed the current aggregate emissions levels is self-defeating if the purpose of allowing outdoor use is to expand the use of RLAN by addressing new use cases.

12. If high power devices were to be authorised in both the 5 GHz and 6 GHz band, would it be appropriate to use the registration/authorisation method and system for both?

¹³ In the Matter of Revision of Part 15 of the Commission’s Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band, Docket 13-49, Report and Order, released April 1, 2014 at para 37 (footnotes omitted).

¹⁴ Per the ITU, individual administrations can choose to allow outdoor use with a maximum EIRP of 200 mW (23 dBm) or to increase power to 1 W if an appropriate antenna pointing mask is applied. Appropriate masks are: (a) 200 mW (23 dBm) limit in any direction above 5 degrees of elevation; (b) 125 mW (21 dBm) limit in any direction above 30 degrees of elevation; or (c) a specific (and more detailed) emission mask, which is set out in ITU Resolution 229 (Rev. WRC-19). The ITU decision also contains a protection against aggregate interference to satellite, either: (a) no more than 2% of all devices should be operating with the 1 W limit, or (b) the total unwanted power from all devices should not exceed the current level.

No. The purpose of an AFC authorization in 6 GHz is to protect incumbent microwave systems in the 6 GHz range. There are no such systems in the lower portion of 5 GHz.

Conclusion

Cisco appreciates the opportunity to provide the above input to the ACMA on the questions raised. This topic is important for the future of Australia, for connecting citizens and accelerating the industry digitalisation of your economy. We would be happy to discuss further on any further questions or follow up that you may have.

Contact Information

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