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

December 2, 2021

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

Re: DSA Comments to the Public Consultation on the "Proposed updates to the LIPD Class Licence for 6 GHz RLANs".

Dear Sir/Madam,

The Dynamic Spectrum Alliance (DSA[1]) respectfully submits its comments in response to the Public Consultation on the Proposed updates to the LIPD Class Licence for 6 GHz RLANs - Consultation 37/2021".[2]

The DSA commends ACMA's decision to proceed updating the LIPD Class Licence to include the 5925-6425 MHz band and believes that it is an important first step to provide greater capacity for data transfer, bridge the digital gap, and incentivize modern technologies in Australia. Additionally, DSA applauds the ACMA's determination to consult on the whole band and encourages the Authority to extend its decision to the 6425-7125 MHz (upper 6 GHz) band in the near future.

DSA appreciates the opportunity to participate in the consultation and to present our views and comments on the reference document. We are available to discuss these comments and provide any additional information.

Respectfully submitted,

Martha SUAREZ
President
Dynamic Spectrum Alliance

[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. Our membership spans multinationals, small-and medium-sized enterprises, as well as academic, research and other organizations from around the world all working to create innovative solutions that will benefit consumers and businesses alike by making spectrum abundant through dynamic spectrum sharing. A full list of DSA members is available on the DSA's website at www.dynamicspectrumalliance.org/members

[2] Available online at https://www.acma.gov.au/consultations/2021-10/radio-local-area-networks-rlans-6-ghz-band-consultation-372021

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

DSA
DYNAMIC • SPECTRUM • ALLIANCE

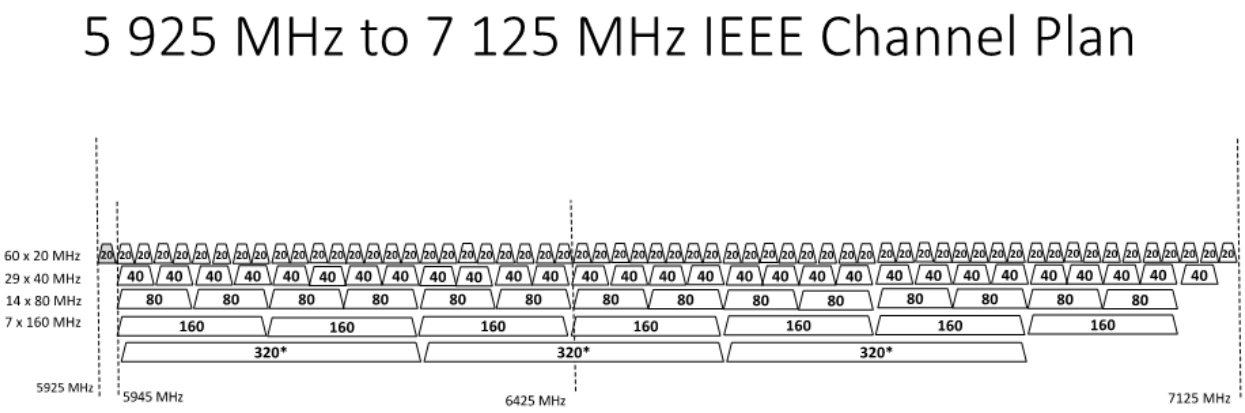
DSA RESPONSES TO QUESTIONS

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?

The DSA recommends an out of band emissions (OOBE) limit of -27 dBm/MHz in the spectrum band immediately below the lower edge (5.925 GHz) of the 6 GHz band for very low power devices and low power indoor devices. It is the same OOBE limit adopted for the previous generation of Wi-Fi technology (known 802.11ac or Wi-Fi 5) and has been in use for years.

Based on the proposed IEEE channel plan below, the lowest frequency 20 MHz wide channel in the 6 GHz band begins at 5925 MHz. The lowest frequency 40- , 80-, and 160 MHz wide channels begin at 5925 MHz. If the ACMA adopts a 'constant PSD approach', the channel's EIRP limit is reduced proportionately with the reduction in channel width. The expectation is that the larger Wi-Fi channel widths (80- and 160 MHz) will predominate in the 6 GHz band and smaller Wi-Fi channel widths (40- and 20 MHz) will predominate in the 5 GHz bands. Thus, the DSA sees an effective 20 MHz guard band between the lower portion of the 6 GHz band and the upper portion of the 5.9 GHz band.



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

The -27 dBm/MHz OOBE limit, when combined with indoor use, in the case of indoor Access Points and Subordinate Access Points and very low power, in the case of VLP devices, and the effective lower 20 MHz guard band created as a result of the 6 GHz band plan, should be more than sufficient to protect incumbents operating in frequency bands immediately below the 6 GHz band.

Additionally, when ACMA establishes its certification procedures for indoor Access Points and indoor Subordinate Access Points, DSA recommends it should permit manufacturers to verify the OOBE value using an RMS detector (or other appropriate techniques for measuring average power). In the United States, the Federal Communications Commission (FCC) believed that in the case of 6 GHz indoor access points and subordinate devices RMS measurement were more appropriate than peak power measurement as RMS measurements represent the continuous power being generated from a device. Additionally, the FCC noted that the key reason why peak power detection is used for restricted radiation devices operating in the U.S. 5 GHz band is because one of the incumbents that must be protected from harmful interference are military radars that are more susceptible to the peak power density level.[3]

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-unlicenced (NR-U) services? If so, is the proposed condition, and the language used to express it, appropriate?

DSA believes that the contention management protocols in the LIPD Class Licence and the descriptive language are acceptable and appropriate.

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

DSA encourages the ACMA to adopt the following technical conditions for wideband operations of 6 GHz Class License LPI equipment:

- Device Category: Low-Power Indoor

[3] At 197-198.

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

- Maximum Transmit power (e.i.r.p) 30 dBm
- Maximum Power Spectral Density (psd) 11 dBm/MHz

By specifying limits for both transmit power and power spectral density, ACMA can simultaneously enable improved performance for RLAN operation and protect incumbent services. A PSD of 11 dBm will enable 30 dBm operation in 80 MHz and 160 MHz channels, and 320 MHz channels as Wi-Fi 7 becomes available, which will significantly improve RLAN coverage in-home and for enterprise applications. At the same time, a PSD limit of 11 dBm allows 24 dBm in a 20 MHz channel, which is consistent with ACMA's current proposed power limits, and is sufficient to protect FS and other incumbent services.

ACMA should make available a LIPD class licensed across the entire 5925-7125 GHz band

By every measure, the demand for spectrum for RLAN use continues to grow unabated, driven largely by mobile video. RLANs have many unique uses in residential and enterprise settings but also support licensed use. In fact, "Wi-Fi" offloading has increased with each generation of mobile wireless service. According to the Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2017–2022 White Paper, Wi-Fi offloading has increased from 30 percent of the traffic for 2G phones to 40 percent of the traffic on 3G phones, 59 percent of the traffic on 4G phones, and is expected to transport 71 percent of the traffic on 5G phones. There is an insufficient amount of 5 GHz spectrum in Australia to meet this demand as most sub-bands where a LIPD class license is available come with lots of restrictions attached to protect incumbents. Even an additional 500 MHz in the 6 GHz will not fully address this demand.

As broadband speeds to a residence continue to increase, a bottleneck is starting to appear in the link from the home's Wi-Fi access point to the user's Wi-Fi enabled device, especially in households where there are multiple Wi-Fi enabled devices in operation at the same time. This has become more evident globally during the time of the COVID pandemic. As parents work from home and children learn remotely, there are often multiple video conference applications open on multiple devices concurrently. This can amount to a considerable amount of RLAN bandwidth. If ACMA makes available a LIPD class licensed across the entire 5925-7125 GHz band, it would allow it to get out in

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

front of this issue and ensure that the link from the homes access point to the Wi-Fi enabled device does not become the bottleneck in Australian residences. Furthermore, 1200 MHz of spectrum in the 6 GHz band will enable 7 channels of 160 MHz of bandwidth, and this will open up the full range of opportunity provided by the Fibre-to-the-Home (FTTH) and the Fibre-to-the-Node (FTTN).

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?

Yes, the ACMA should permit high-gain directional antennas under a class licensing regime, while also protecting incumbent services in the band. DSA believes that WISPs providing broadband access to residential consumers in less densely populated areas of Australia could benefit from that decision. If the ACMA permits outdoor standard power access points, WISPs can either provide greater bandwidth capacity to each home served by a local network or can serve more homes on the same network with the current bandwidth capacity.

The DSA encourages the ACMA to consider adopting rules permitting standard power operations, including those using high-gain directional antennas, under an automated frequency coordination system (AFC). There are unique high-power indoor and outdoor RLAN operations that can benefit from this category of device. With less than 15,000 incumbent frequency assignments recorded over the entire Australian landmass, and the majority of them being terrestrial fixed services, the DSA believes that Standard Power access points (and client devices) could operate throughout the band under AFC control, making efficient use of the spectrum without any detrimental impact on current users.

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?

The DSA would entirely support the proposal to rely on AFC systems to manage access to the 6 GHz band by "high-power" class devices, building on the hard work of DSA's member companies to

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

increase economic and consumer value of spectrum resources. Since its founding in 2013, the DSA has been at the forefront of advancing automated dynamic shared spectrum technology and regulatory frameworks - from Television White Spaces to the Citizens Broadband Radio Service to the 6 GHz AFC – DSA has worked with regulators and industry around the world to drive adoption of proven shared spectrum techniques. Our members are well positioned to deliver on the ACMA's vision for the 6 GHz band, including the AFC.

The DSA suggests that the ACMA performs a first order assessment regarding the comprehensiveness and accuracy of the registered information about fixed links across the country. DSA understands that there are military users in portions of the 6 GHz band (e.g., defence radars). Some thinking would have to be done regarding how to protect these incumbents, protect any location sensitive information, and still allow the AFC to function properly.

Furthermore, taking into account the recent progresses in the U.S. regarding the request of 6 GHz AFC proposals, the DSA suggests the ACMA adopt the same model.

6. If 'high power' class-licensed devices were to be introduced under an AFC system:

- **Is there interest from industry in administering such a system?**

DSA believes there is interest from industry associations and/or companies in administering AFC systems in Australia. Multiple DSA members have already or are poised to file proposals with the FCC for AFC systems in the United States. We anticipate that these same companies will be interested in offering AFC services in Australia as well.

One Australian WISP organisation previously suggested to the ACMA that it would be prepared to operate an AFC-like system on behalf of industry in another band. We believe it is likely other industry associations and/or individual companies would be interested in doing so in the 6 GHz band.

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

- **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?**

None that DSA is aware of. DSA encourages the ACMA to provide clear rules and to set up an efficient path for AFC system certification in Australia.

- **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?**

If an Australian system is aligned with those implemented elsewhere, it will lower barriers to adoption and scale. DSA encourages the ACMA to adopt rules and a certification process similar to those defined by the FCC in the United States.

Other than customizing the AFC system implementation to accommodate the specifics of the ACMA database of licensed FS, we do not see any reason for the ACMA not to follow the FCC approach.

- **What aspects of an AFC system would need to be considered in the design, establishment, and ongoing operation, of such a system, including:**
    - **regulator and industry commitments**

Industry would need to ensure the system is open access, while the regulator would need to ensure ongoing access to, and accuracy of, the database.

    - **IT infrastructure and system design, including security and system reliability issues**

Future tiered access would enable better access to the spectrum for users. Currently, FS is protected by way of RALI-FX3, but these levels of protection may not lead to the best use of the spectrum. While existing systems may need to be grandfathered for a defined period, an increase in required design fade margin for future systems would improve FS resilience and allow greater and more flexible use of the spectrum in regional and remote areas of Australia.

UK Ofcom have changed the fade margin requirement for new FS in the upper 6 GHz band (35 dB as opposed to 10 dB), which also provides greater protection against a raised noise floor due to other licensed users. This has the side benefit of making these links more robust in the unlikely event that an RLAN is somehow in a location where its transmissions temporarily reduce the fade margin of a given FS receiver. The ACMA could adopt similar provisions in regional areas over the entire 6 GHz RLAN band, perhaps based on a reduced system availability for future FS. Given that, other than some long hauls systems in Queensland and western Australia, the majority of FS are deployed within a few 100km of the coast along the population 'J Curve', making the spectrum available to 'open' systems by way of AFC would remove significant regulatory burden and reduce the cost of deploying both feeder and reticulation systems in regional and remote areas.

Other systems using the band are small in number, comprising mostly Earth Receive stations and TV Outside Broadcast (TVOB). As the Earth Station assignments are limited in number, the current internationally recognised protection levels continue to apply. TVOB is a light use of the band and is not generally fixed in nature.

Earth Receive stations would receive the required protection via the AFC system. Other systems in the band including transportable Earth stations are transmitters; because RLAN would be secondary, this should not pose a problem.

Mobile Satellite Services (MSS) feeder link receivers (space receive) systems also require consideration. These systems are applications of the FSS (Earth-to-space), operating under RR No. 5.458B, and were 'dimensioned' considering large numbers of existing and planned fixed service assignments common in (most countries). Australian RLAN distribution will mirror Australia's population distribution which coupled with RLAN operational characteristics indicates that they will produce no greater interference than FS links to a spaceborne MSS receiver in orbit.

- **ongoing interaction between the ACMA and system operators?**

Again, the DSA recommends that ACMA follow a similar approach with regard to these issues as have the FCC in the United States and ISED in Canada. In addition, the DSA notes that industry

has been actively working for more than two years to develop the necessary standards to facilitate the introduction of Standard Power devices and AFC systems. For example, the Wi-Fi Alliance formed its AFC Task Group in July 2019 to develop recommendations on the AFC System and Device compliance test specification for consideration by FCC and other regulatory bodies as input for their certification processes. Specifically, the Wi-Fi Alliance has developed compliance specifications for the AFC Reference Model, AFC System, AFC Device and the Interface between AFC System and AFC Device. The specifications are flexible and scalable manner and can be revised and customized to address region specific AFC requirements such as those presented by ACMA.[4]

The Wi-Fi Alliance formed its AFC Task Group in July 2019 to develop recommendations on the AFC System and Device compliance test specification for consideration by the FCC and other regulatory bodies as input for their certification processes. Specifically, the Wi-Fi Alliance has developed compliance specifications for the AFC Reference Model, AFC System, AFC Device and the Interface between AFC System and AFC Device. The specifications are flexible and scalable in manner and can be revised and customized to address region- specific AFC requirements such as those presented by the ACMA. The Wi-Fi Alliance specifications can be found here.

Building upon the Wi-Fi Alliance AFC model, and to drive the global 6 GHz standard power Wi-Fi market forward, Broadcom, Cisco, and Meta Platforms have created an open-source project in the Telecom Infra Project (TIP) called Open AFC Software Group. Open AFC will allow the Wi-Fi industry to collaborate on an AFC system, share knowledge and learnings, and reduce costs. This will allow non-profit organizations and trade associations to provide service for their members, operators to cost-effectively enable AFC based standard power Wi-Fi for their subscribers, and/or device makers to enable standard power Wi-Fi for their customers.

[4] The Wi-Fi Alliance specifications are available online at here.

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

In summary, Open AFC will ensure a robust market, allowing anyone wanting to provision standard power Wi-Fi to be able to do so, and thereby catalysing a new era for the Wi-Fi industry.

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?

DSA believes that instead of a manual registration process, an AFC-coordinated approach would provide the maximum benefit for the use of "high power" devices.

This would appear to be identical to the current FX-3 process already available for point-to-point systems. For these deployments, AFC is a far more flexible option that places less burden on the user and will deliver optimum use of the spectrum, especially in regional Australia.

In the case of point-to-multipoint, high-power RLAN AFC combined with channel agility provides a viable tool for coordinating these systems with legacy fixed links and other services. Light-touch regulation will be key to maximising the benefit derived from the spectrum, especially for regional areas.

Given the accuracy of the ACMA database and ease of access, maximum benefit from the use of the spectrum would be delivered by an open, but AFC-coordinated, use of the band by RLAN devices and other LIPD.

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?

DSA believes there would be no advantages in implementing different licensing and/or access management arrangements in different geographic areas. Having different access management arrangements in different parts of the country raises costs, complexity and destroys the opportunity for national enterprises to utilize consistent standard power arrangements. AFC technology is a consistent approach for high power RLAN devices that would serve Australia's economy. AFC

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

approach could facilitate the establishment of different rulesets for different geographic coverage areas across the continent.

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

Results of RKF Engineering Solutions LLC's Monte Carlo Simulation for MSS Gateways in Mexico are Applicable to Australia.

The DSA would like to bring to ACMA's attention a coexistence study conducted by RKF Engineering Solutions, LLC (RKF) and included as part of our submission in response to the Instituto Federal de Telecomunicaciones – Mexico's consultation on the prospective use of the entire 6 GHz band (5925- 7125 MHz) by three classes of license-exempt devices.[5] DSA contracted with RKF to study the risk of harmful interference for the proposed RLAN usage (e.g., standard power, low power indoor and very low power license-exempt devices; operations up to the proposed EIRP limit for each device class, and with each class of device permitted to operate throughout the entire 5925-7125 MHz frequency range) to incumbent FSS satellite uplink services in Mexico, select FS links in Mexico City, and the new MSS (space-to-earth) gateway site located outside of Mexico City. The MSS gateway antenna will receive transmissions from the MSS satellite stations in 6875 to 7075 MHz frequency range. The Mont-Carlo Simulation and accompanying analysis showed that the risk of harmful interference to FSS uplinks, the FS links, and the earth station antennas at the MSS gateway site is extremely low. With respect to the MSS gateway site, the MSS operator could create physical barriers (e.g., plant trees, build a berm) and work with its neighbours in the vicinity of the site to further reduce the already minimal probability of an exceedance of the interference protections criteria.

Fourteen companies and organizations have applied to become AFC system operators in the US

In September 2021, the United States FCC requested proposals from interested parties to become 6 GHz AFC system operators. On November 30th, a total of fourteen companies and organizations,

[5] Study available online at http://dynamicspectrumalliance.org/wp-content/uploads/2021/10/2021-08-RKF-Frequency-Sharing-for-RLAN-in-Mexico.pdf

submitted proposals, including several from organizations domiciled outside the United States. In alphabetical order, the AFC Coordinator system applicants are Amdocs, Inc.; Broadcom, Inc.; Comsearch, a CommScope Company; Federated Wireless, Inc.; Google LLC; Keybridge Wireless LLC; Kyrio, Inc.; Nokia; Plume Design Inc.; Qualcomm Incorporated; RED Technologies SAS; Sony Group Corporation; Wi-Fi Alliance; and Wireless Broadband Alliance Ltd.

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 in the 5150 to 5350 MHz band. The DSA believes that the ACMA should amend its rules to allow use of wider channels in the lower part of the 5 GHz range.

Additionally, the DSA believes that the ACMA should consider higher power regulatory arrangements for the 5150-5250 MHz band, but not necessarily the ones included in Resolution 229 (Rev WRC-19). In the WRC-19 Final Acts FA Declarations and Reservations, the delegations of a number of Administrations reserve the right to allow operations of stations in the mobile service in the band 5150-5 250 MHz subject to other conditions than those contained in that Resolution, including higher power levels.

Based on several years of track record in the United States, we believe that a 4 W EIRP limit plus the emissions mask to limit the amount of energy above 30 degrees to the horizon has been effective in preventing harmful interference to the incumbent's system. ISED in Canada took a somewhat different approach. There are Globalstar gateways both in the United States and Canada and the DSA suggests that ACMA review how the United States and Canada each addressed the concerns raised by Globalstar.

***