

The Manager
Spectrum Planning Section
Australian Communications and Media Authority
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Dear ACMA -

Federated Wireless Inc. (Federated Wireless) hereby responds to the request by the Australian Communications and Media Authority (ACMA) for additional input on its plans to introduce a new Low Interference Potential Devices (LIPD) Class Licence in the 6 GHz band for radio local area networks (RLANs). Federated Wireless supports ACMA's efforts to improve spectrum utilization and enable spectrum access to wider segments of potential spectrum users across various verticals and industries. We believe that new shared licensing approaches, together with the use of automated sharing technology, can greatly facilitate access to critical spectrum resources by a wider and more diverse group of users.

Federated Wireless recommends that ACMA move forward with allowing higher-power (Standard Power) RLAN devices and outdoor access points across the entire 6 GHz band under the control of an Automated Frequency Coordination (AFC) to mitigate interference potential to incumbent services. We believe that the use of an AFC will further enhance the utility of the 6 GHz band by supporting a wider variety of use cases than would be possible with only Low Power Indoor (LPI) devices, and we believe that an automated approach has significant benefits over a manual coordination process. Furthermore, we herein convey our interest in becoming an AFC system operator in Australia.

We appreciate the opportunity to share our experience with implementing automated spectrum sharing in the United States in the 3.5 GHz and 6 GHz bands and we offer our perspectives on how this same technology can help ACMA to achieve its goals for the Australian market.

I. Background on Federated Wireless

By way of background, Federated Wireless is a U.S.-based wireless technology company that has been certified by the U.S. Government to manage dynamic sharing of the 3550-3700 MHz band, known as the Citizens Broadband Radio Service (CBRS), between incumbent military and commercial uses, as well as between different tiers of commercial uses on both a licensed and unlicensed (licensed by rule) basis.

Federated Wireless is also a prospective Automated Frequency Coordination (AFC) system administrator in the United States, Canada, and other countries implementing rules like those adopted by the U.S. Federal Communications Commission (FCC) to permit the introduction of

unlicensed devices that will operate on a shared basis in the 5.925-7.125 GHz band (the 6 GHz Band). Federated Wireless is interested in becoming an AFC system administrator in Australia.

Our experience with automated spectrum sharing in the CBRS band demonstrates the power of cloud computing and software to improve the management of a critical resource like spectrum for wireless broadband services. The success of the CBRS band and the Spectrum Access System (SAS) that is used to protect three different classes of incumbent users is instructive to sharing in other bands. With over twenty-two months of commercial CBRS operations, there have been no reports of interference from itinerant federal, fixed satellite service (FSS), or point-to-multipoint incumbent users. This demonstrates that automated sharing of spectrum bands amongst different types of users – including both satellite and terrestrial as well as itinerant and fixed – is both achievable and manageable. Furthermore, the CBRS experience proves that automated spectrum sharing systems can protect incumbent operations as they exist today and as they change in the future.

Given this positive experience with sharing in the CBRS band, the FCC adopted new rules for the 6 GHz band in the United States to permit standard power and outdoor unlicensed devices to connect to a centralized database management system to determine what frequencies are available for use without impacting incumbent commercial operations. In early 2019, Federated Wireless began adapting our CBRS sharing technology to the 6 GHz Band and the FCC's requirements. The Federated Wireless AFC determines what frequencies are available after downloading information about incumbent services from the FCC's Universal Licensing System (ULS) database, analyzing the potential impact of unlicensed devices to incumbent operations, and identifying which frequencies can be used while implementing FCC-defined protection of those incumbents. Federated Wireless will submit our AFC system to the FCC for certification in November of 2021, per the FCC's certification schedule, and we anticipate commercial operations in the United States commencing in the second half of 2022.

II. Federated Wireless Responses to ACMA Questions

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?

Federated Wireless supports the introduction of high-gain directional antennas under the control of an AFC in the 6 GHz band in Australia. AFC systems can readily account for the directivity of an RLAN antenna when determining the available frequencies and power levels at a given location. AFC control over high-gain antennas will maximize flexibility and access opportunities for news services, especially those in rural areas, while also ensuring protection of incumbent services. The use of directional antennas, however, may necessitate the use of professional installation to ensure that the information provided to the AFC is accurate.

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?

Federated Wireless fully supports the introduction of an AFC to manage spectrum access for “high-power” class-licensed devices in the 6 GHz band in Australia. We note that there is significant industry interest in using the 6 GHz band for high-power unlicensed operations, and we also believe there is widespread interest in the use of AFC systems to manage those operations. We recommend that ACMA leverage the development of AFC systems and associated devices that are about to be launched commercially in other countries in order to take advantage of the growing ecosystem.

Federated Wireless notes that AFC systems are capable of offering the same level of protection to incumbents whether the class-licensed device is operating at lower or higher power levels. Unlicensed device transmit power does not need to be limited as a backstop to ensure protection of incumbents. By design, the AFC computes and resolves interference potential of unlicensed devices using information provided to it, including transmit power. As such, the AFC will always ensure incumbent protections are met and will only allow new RLAN devices to operate at power levels that will meet incumbent protection levels. Moreover, should unexpected interference occur to an incumbent, the closed loop nature of the AFC permits resolution via adjustment of operating parameters and interference protection requirements on a regional or nationwide basis on a near real-time basis.

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?

As mentioned above, Federated Wireless is interested in becoming an AFC system administrator in countries that are implementing rules like those adopted in the United States, Canada, South Korea and elsewhere to permit the introduction of unlicensed devices on a shared basis across the entire the 6 GHz Band. Should ACMA adopt similar rules that permit high-power class-licensed devices, or what is referred to as Standard Power devices and outdoor access points, Federated Wireless would be interested in offering its AFC services in Australia.

In addition to Federated Wireless, we anticipate several other shared spectrum companies will also be seeking to operate AFC systems in the United States and elsewhere. Today there are five commercial SAS providers in the United States, as well as four additional SAS systems going through certification. We anticipate several of these same companies will submit AFC system proposals to the FCC at the end of November 2021. Given this

level of interest in offering automated shared spectrum solutions, it is reasonable to assume that multiple AFC systems would also be available for the Australian market.

> 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?

Federated Wireless does not foresee impediments to developing or operating an AFC in Australia. Some development work may be necessary to ensure that the AFC system can interface properly and efficiently with ACMA's existing database system, the Register of Radiocommunications Licences (RRL). However, this additional work would likely take no more than 4-6 months.

> 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?

In order to encourage the development of AFC systems for the Australian market, Federated Wireless urges ACMA to make the entire 6 GHz band available for unlicensed device use and to leverage the lessons learned in implementing other sharing regimes globally. We believe that harmonization with other countries implementing AFC systems will provide significant advantages for the Australian market, including minimizing AFC development time and increasing speed-to-market, while ensuring that 6 GHz AFC systems meet both the present and future needs of incumbent licensed and newly authorized unlicensed users. We recommend that ACMA adopt rules similar to those adopted by the FCC and ISSED, including those in FCC Rule Part 15.407, that include the protection criteria for incumbent services, the information unlicensed devices must provide AFC systems along with the frequency of such notifications, as well as security/privacy requirements.

> 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

Federated Wireless recommends that ACMA require commitments from prospective AFC operators, including a 5-year term commitment, similar to those the FCC and ISSED have adopted.

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

Federated Wireless supports the introduction of class-licensed (unlicensed) devices in the 6 GHz band along with the use of an AFC to manage Standard Power devices and outdoor access points. We recommend that these class-licensed devices be allowed to

operate at the lowest tier (unprotected) with incumbent users operating in higher (protected) tiers.

> IT infrastructure and system design, including security and system reliability issues

As ACMA considers how to implement an AFC-based approach for the 6 GHz band, we recommend that it include a requirement, similar to what the FCC adopted in Rule 15.407(k)(13), that AFC system operators and unlicensed device manufacturers develop and implement a secure communication interface between AFC systems and standard power access points and fixed client devices. As discussed below, multiple standards development organizations have been developing standards for AFC-RLAN device communications that ACMA may consider as it develops its regulations.

> communication interfaces between an AFC system, the ACMA's Register of Radiocommunications Licences (RRL) and devices

As ACMA may be aware, plans for certification of AFC systems in the United States are in the process of being finalized. Certification is expected to include the testing of the interfaces between AFC systems and the FCC's ULS database as well as between AFC systems and Standard Power devices and outdoor access points. As part of this effort, multiple standards development organizations, including the WiFi Alliance (WFA) and the Wireless Innovation Forum (WInnForum), have defined a number of key parameters that will contribute to effective AFC and Standard Power device and outdoor access point operations, such as:

- Message types between AFC systems and Standard Power access points;
- Test framework for System Under Test (SUT) and Device Under Test (DUT) using a standardized test harness; and
- Test cases for AFC systems and Standard Power device and outdoor access points.

Much of this work may likely be relevant to the development and implementation of AFC systems in Australia to support the operation of Standard Power devices and outdoor access points.

> ongoing interaction between the ACMA and system operators

Federated Wireless recognizes the importance of effective communications between regulatory authorities and automated dynamic spectrum sharing system operators, particularly in terms of databases interfaces and enforcement matters. We recommend that ACMA reach out to interested AFC system operators to establish procedures and

protocols for managing those interactions. For example, establishing a point of contact at an AFC system operator and a process for addressing interference complaints in advance of any real-world incidents will facilitate effective troubleshooting and speed resolution.

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?

Federated Wireless recommends that, rather than reverting to unscalable manual coordination approaches, ACMA instead introduce high-power devices under an automated approach as soon as practicable. We anticipate that our AFC system will be certified by the FCC and in commercial use in the second half of 2022 and that it could be readily adapted to the Australian market within a matter of months. We understand this timeline is in keeping with industry expectations for Standard Power device and outdoor access point availability. By leveraging automation in the implementation of high-power class-licensed devices, the Australian market will benefit from this ecosystem development as well as economies of scale. It will also speed time-to-market for new unlicensed operations throughout Australia.

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?

Federated Wireless recommends that ACMA authorize AFC system operators on a nationwide basis, rather than on a regional or local basis, in order to effectively protect incumbent services. For example, one end of an incumbent fixed link might be within or close to one geographic boundary while the other end of the link is in a different area. Ensuring that all incumbent systems are adequately protected will be critical for successful sharing of the 6 GHz band. For this reason, we recommend a nationwide approach towards licensing and protection of incumbent services.

With regard to implementing different power levels for new LIPD operations in different geographic areas, Federated Wireless notes that use of an AFC system is capable of supporting such an approach. AFC systems can be adjusted to manage different incumbent protection levels as well as different new entrant transmit levels in any given geographic area.

However, as mentioned above, the AFC is capable of offering the same level of protection to incumbents whether the class-licensed device is operating at lower or higher power levels. Unlicensed device transmit power does not need to be limited as a backstop to ensure protection of incumbents. By design, the AFC computes and resolves interference potential of unlicensed devices using information provided to it, including the transmit power of the device seeking to access the band.

Therefore, given the flexibility that AFC systems provide, we recommend that ACMA permit higher-power operations throughout Australia and that it rely on AFC systems to ensure incumbent users are adequately protected from new RLAN devices regardless of the power at which they seek to operate.

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

Federated Wireless does not have any additional comments at this point, but we are available to discuss other sharing scenarios and/or studies should ACMA need further input.

II. Conclusion

Federated Wireless appreciates the opportunity to share our perspectives on ACMA's plans to introduce high-power class-licensed devices in the 6 GHz band. Federated Wireless stands ready to work with ACMA on introducing its AFC system to expand use of the 6 GHz band. Automated spectrum management technology is commercially available and proving to be a huge success. We look forward to adapting our AFC solution to assist ACMA in meeting its objectives and vision for Australia.

Respectfully submitted,

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