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Innovation, Science and Economic Development Canada
c/o Senior Director, Spectrum Planning and Engineering
Engineering, Planning and Standards Branch
235 Queen Street (6th Floor, East Tower)
Ottawa ON K1A 0H5
ic.spectrumengineering-genieduspectre.ic@canada.ca

Re: Consultation on the Technical and Policy Framework for Licence-Exempt Use in the 6 GHz Band; Nov. 2020, *Canada Gazette*, Part I, notice reference number SMSE-014-20

The Dynamic Spectrum Alliance (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.¹

DSA's goals are to make spectrum abundant for broadband to connect the next four billion people, stimulate wireless innovation for next generation broadband, and accelerate an inclusive digital economy. DSA appreciates the opportunity to respond to the invitation of Innovation, Science and Economic Development Canada (ISED) to comment on its "Consultation on the Technical and Policy Framework for Licence-Exempt Use in the 6 GHz Band" (the Consultation).²

DSA applauds ISED's recognition that dynamic spectrum access can maximize efficient use of the 6 GHz band by expanding unlicensed access while protecting the various incumbent users. DSA is convinced that opening the 6 GHz frequency band for new unlicensed devices will ensure that widely used unlicensed wireless technology, such as Wi-Fi, can deliver the necessary

¹ A full list of Dynamic Spectrum Alliance members is available on the DSA website at the [DSA Website](#).

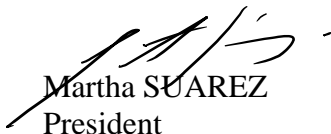
² "Consultation on the Technical and Policy Framework for Licence-Exempt Use in the 6 GHz Band" ISED; <https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf11643.html> ("Consultation Document").

performance for future applications and networks. Opening the 6 GHz band will support the introduction of Wi-Fi 6E, which needs access to wider channels to support new use cases for industrial IoT, smart homes, and support for high-density deployments, to name but a few.

DSA also supports ISED's proposal to rely on automated frequency coordination (AFC) systems to manage access to the 6 GHz band, building on the hard work of DSA's member companies to increase economic and consumer value of spectrum resources. Since its founding in 2013, 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 ISED's vision for the 6 GHz band, including the AFC.

The remainder of our response will address the questions posed by ISED in the Consultation. Please do not hesitate to contact me for further discussions or clarifications on the subject matter.

Best regards,



Martha SUAREZ
President
Dynamic Spectrum Alliance

- Q1: ISED is seeking comments on the timelines for the availability of:**
- a. low-power equipment ecosystems, both Wi-Fi 6E and 5G NR-U**
 - b. standard-power equipment ecosystems, both Wi-Fi 6E and 5G NR-U, under the control of an AFC**
 - c. AFC**

As ISED notes in the Consultation Document, plans for the license-exempt opening of the 6 GHz band are becoming ever-more prevalent, with final regulations already adopted by the United Kingdom, the United States, the Republic of Korea, Chile, the United Arab Emirates and Guatemala. The European Member States are expected to designate and make available 5945-6425 MHz for the implementation of WAS/RLANs in early 2021. Wi-Fi 6E consultations have taken or are also taking place in Brazil, Mexico, Colombia, Costa Rica, Honduras, Peru, Argentina, Taiwan, Saudi Arabia and Jordan.

- a. The IEEE is extending the frequency range of its High Efficiency WLAN standard, marketed by the Wi-Fi Alliance as Wi-Fi 6, to cover the entire 5925-7125 MHz band. The updated standard for these Wi-Fi 6E products is expected to be published early this year. Even so, Wi-Fi chipsets for Wi-Fi 6E products are already available. Last December, the U.S. Federal Communications Commission (FCC) certified its first 6 GHz Wi-Fi device.³ In early January of 2021, the Wi-Fi Alliance began certifying Wi-Fi 6E devices, paving the way for new gadgets that can transmit across the entire 6 GHz band.⁴ Wi-Fi 6E products are being announced at this year's (virtual) Consumer Electronics Show.⁵ On January 14th, Samsung announced a new mobile phone that incorporated a Wi-Fi 6E client.⁶

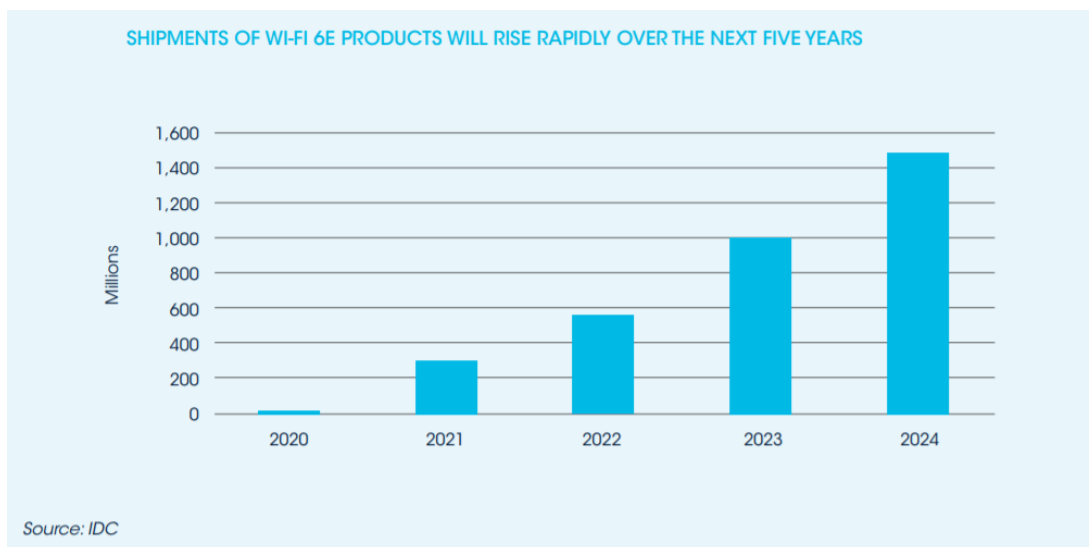
In light of this momentum, the research firm IDC has forecast that more than 316 million Wi-Fi 6E devices will enter the market in 2021 and shipments will rise rapidly over the next three years (see Figure below).

³ See "Chairman Pai Statement on FCC Authorization of First 6 GHz Wi-Fi Device" (December 7, 2020). [DOC-368593A1.pdf \(fcc.gov\)](#)

⁴ See "Wi-Fi Alliance® delivers Wi-Fi 6E certification program" (January 7, 2021). [Wi-Fi Alliance® delivers Wi-Fi 6E certification program | Wi-Fi Alliance \(wi-fi.org\)](#)

⁵ See "Linksys Introduces Fastest and Most Powerful Wi-Fi 6E Mesh System and Enhanced Motion Detection" (January 11, 2021). <https://www.prnewswire.com/news-releases/linksys-introduces-fastest-and-most-powerful-wi-fi-6e-mesh-system-and-enhanced-motion-detection-301205475.html>; See "Nighthawk® Tri-Band WiFi 6E Router (up to 10.8Gbps) with new 6GHz band, NETGEAR Armor™" (January 11, 2021). [AXE11000 WiFi Router \(netgear.com\)](#); See "TP-Link Unveils New Networking Offerings, Bringing a Blazing-Fast, Ultra-Secure Broadband Experience to Consumers and Businesses" (January 11, 2021). <https://www.tp-link.com/us/press/news/19331/>; .

⁶ Samsung Press Release, "Samsung Galaxy S21 Ultra: The Ultimate Smartphone Experience, Designed To Be Epic In Every Way". <https://news.samsung.com/global/samsung-galaxy-s21-ultra-the-ultimate-smartphone-experience-designed-to-be-epic-in-every-way>



- b. DSA understands that there are prototypes of standard-power RLAN devices that can operate in those portions of the 6 GHz band allowed in the United States. Once the certification procedures are approved, for standard-power devices to become certified, they will have to demonstrate that they work with at least one Automated Frequency Control (AFC) system, in addition to conforming to the technical rules regarding the transmitter itself.
- c. DSA understands that AFC system prototypes have been developed, including one by one of our members, Federated Wireless. AFC system developers are awaiting an FCC announcement regarding the process it will use to certify AFC systems, which we anticipate will occur in the first half of 2021.

Q2: ISED is seeking comments on its proposals to allow licence-exempt RLAN use in the 5925-7125 MHz band.

DSA fully supports ISED’s proposals to allow licence-exempt RLAN use in the 5925-7125 MHz band. License-exempt access on a shared basis throughout the 1200 MHz of the 6 GHz band will enable three different and important operating classes:

- Very Low Power (VLP): devices which would be permitted to operate at very low power levels for indoor or outdoor use. They provide low latency and very high throughput over short distances. VLP portable usages are, for example, mobile augmented reality / virtual reality (AR/VR), ultra-high definition (UHD) video streaming, high speed tethering and in-vehicle entertainment.

- Low Power Indoor (LPI): such as an access point or client device, which would be permitted to operate for indoor use only. LPI use cases include residential Multi-access point (AP)/mesh networks, multiple dwelling unit (MDU), single-AP networks, high-density enterprise networks, indoor public venues and industrial IoT.
- Standard Power (SP): license-exempt devices operating at 36 dBm EIRP that are only permitted access to spectrum under the control of an AFC system, which would establish the list of available channels and the maximum EIRP available on each available channel at that location for the access point and any standard power client devices. High throughput capabilities for outdoors and indoors. Relevant for rural connectivity.

Additionally, ISED should consider permitting indoor client-to-client communications, which would enable additional types of innovative license-exempt operations across the band. DSA believes that such client-to-client communication is viable and can be implemented in a manner that protects incumbent operations. The FCC recently released a Public Notice seeking additional information on this important mode of indoor operation.⁷ DSA encourages ISED to consider authorizing indoor client-to-client communications as well.

Licence-exempt access to the entire 6 GHz band is required to meet the unprecedented demand for Wi-Fi and enable innovative use cases. With it comes the opportunity for more effective spectrum use allowing support for new applications and laying the foundation for innovation.

Q3: ISED is seeking comments on the proposed footnote Cxx and the changes to the CTFA as shown in table 2.

DSA supports ISED's proposal to add a footnote authorizing licence-exempt RLAN applications in the 5925-6700, 6700-7075, and 7075-7145 MHz bands.

Q4: ISED is seeking comments on the proposed rules for standard-power RLANs:

- a. indoor and outdoor operation would be permitted**
- b. RLAN access points would only be permitted to operate under the control of an AFC system in the 5925-6875 MHz frequency range**
- c. maximum permitted e.i.r.p. would be 36 dBm**
- d. maximum permitted power spectral density would be limited to 23 dBm/MHz**

⁷ United States Federal Communications Commission, 'The Office of Engineer & Technology Seeks Additional Information Regarding Client-to-Client Device Communications in the 6 GHz Band, Public Notice', ET Docket No. 18-295; GN Docket No. 17-183, (released January 11, 2021). [DA-21-7A1.pdf \(fcc.gov\)](#)

e. use of a vertical elevation mask, with a maximum e.i.r.p. of 125 mW at elevation angles above 30 degrees over the horizon, would be required

DSA, by-and-large, supports ISED’s proposed rules for standard-power RLANs and the use of AFC systems to identify available channels and the maximum EIRP on each available channel for their operation at that location. DSA agrees that standard-power access points and client devices should be permitted to operate both indoors and outdoors. The primary difference between the indoor and outdoor standard-power access points is that outdoor access points will require use of a vertical elevation mask that limits the amount of radiation directed towards the sky, while indoor access points will not require use of such a mask.

Where DSA does differ with ISED’s proposal is that we believe standard-power access points should be allowed to operate throughout the 5925-6930 MHz band. ISED acknowledges that transportable TV pick up services currently do not operate in the 6875-6930 MHz frequency range⁸. ISED’s intent for not permitting standard-power RLAN operations in this frequency range is to “allow flexibility for additional spectrum for broadcasting auxiliary service (BAS) if needed in the future.”⁹ Without getting into relative merit of taking such action, DSA maintains that the inherent functionality of the AFC provides ISED with the regulatory flexibility necessary to authorize future BAS operations in the frequency band. Such as ISED rule change would lead to changes in the information stored in its database (e.g., additional frequencies made unavailable throughout Canada). After this change is made, when the AFC checks ISED’s database, the frequencies in question would no longer be available.

While the additional 55 MHz may seem like a relatively small amount of spectrum, based on the proposed IEEE channel plan it would enable standard power RLANs to access an additional 160 MHz (and 80 MHz) channel. The DSA believes that standard-power APs and the AFC system can easily be adapted for operation in the 6875-6930 MHz band.

Q5: ISED is seeking comments on allowing access to the additional 100 MHz of spectrum in the 6425-6525 MHz sub-band for standard-power operation.

DSA agrees with ISED’s view that standard-power APs and the AFC systems can be easily adapted for operation into the 6425-6525 MHz sub-band.

Q6: ISED is seeking comments on the equipment availability of standard-power RLANs in the 6425-6525 MHz band and the impact on the development of AFC systems for Canada due to a potential lack of international harmonization for that sub-band.

⁸ See 6 GHz Consultation Document at paragraph 53.

⁹ Ibid.

DSA's understanding is that standard-power RLANs will be capable of transmitting across the entire 6 GHz band.

Q7: ISED is seeking comments on the proposed rules for low-power indoor-only RLANs:

- a. operation would be permitted indoor only across the 5925-7125 MHz band**
- b. the use of a contention-based protocol (e.g. listen-before-talk) would be required**
- c. maximum permitted e.i.r.p. would be 30 dBm**
- d. maximum permitted power spectral density would be limited to 5 dBm/MHz**

By-and-large, DSA supports ISED's proposal for low-power indoor-only RLAN device requirements.

- a. DSA agrees that low-power indoor-only access points and client devices should be permitted to operate across the entire 5925-7125 MHz frequency range.
- b. The FCC's contention-based protocol requirement addresses specific concerns raised with respect to the 6425-6525 MHz and 6875-7125 MHz bands in the United States. Nevertheless, given the relative size of the Canadian market to that of the United States and the importance of leveraging economies of scale, DSA understands why ISED is considering such a requirement.
- c. DSA assumes that the 30 dBm EIRP limit is based on a 320 MHz channel.
- d. The FCC's current rules limit the EIRP power spectrum density of an indoor low power RLAN device to 5 dBm/MHz. Based on studies submitted to the record, the FCC initiated a Further Notice of Proposed Rulemaking that asks whether an indoor low power RLAN device operating at a EIRP power spectral density of 8 dBm/MHz will cause harmful interference to incumbent operations.¹⁰ The FCC has not yet decided on this new proposal. The DSA urges ISED also consider this higher EIRP power spectral density limit.

Q8: ISED is seeking comments on the proposed rules to allow very low-power RLAN devices:

- a. operation would be permitted indoors and outdoors across the frequency range 5925-7125 MHz band**

¹⁰ United States Federal Communications Commission, 'Unlicensed Use of the 6 GHz Band, Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz', Report & Order and Further Notice of Proposed Rulemaking, 35 FCC Rcd (2020) at ¶¶244-245. ('Report and Order' and 'Further Notice', respectively).

- b. the use of a contention-based protocol (e.g. listen-before-talk) would be required**
- c. maximum permitted e.i.r.p. would be 14 dBm**
- d. maximum permitted power spectral density would be limited to -8 dBm/MHz**

By and large, DSA supports ISED’s proposal for very low-power RLAN device requirements. Based on record developed in ECC Decision 20(01), “On the harmonised use of the frequency band 5945-6425 MHz for Wireless Access Systems including Radio Local Area Networks (WAS/RLAN),” ISED should consider an EIRP power spectral density limit of 1 dBm/MHz.¹¹ DSA refers ISED to review the record developed in Europe used to justify the 1 dBm/MHz EIRP power spectral density limit.

Q9: ISED is seeking comments on potential business models for AFC administrators to operate their AFC systems in Canada.

DSA supports an approach whereby ISED allows AFC operators to develop, and for consumers to choose among, different compliant AFC approaches that are reflective of geography, market sector, and user needs. Just as RLAN operators will vary greatly and in numerous ways, so will their need for access to AFC capabilities. For example, consumers, enterprises, educational institutions, hospitals, municipalities, and military users will expect different capabilities and be willing to spend greater or lesser sums of money on access points. The geographic coverage needs of these user classes will differ, as will their proximity to incumbent users. Consequently, some will prefer sophisticated, professionally installed AFC implementations that account for details like the precise height of their devices in order to increase the number of available channels. Others might prefer simpler and lower-cost implementations that do not account for factors such as device height, even if that means sacrificing potentially available frequencies or power levels. By providing AFC operators with flexibility to determine their own business models, ISED can foster innovative, competitive approaches.

Q10: ISED is seeking comments on its proposal to permit the approval of multiple, third party AFC systems, taking into account the potential for the development of a sustainable market for AFC systems in Canada.

DSA urges ISED ensure that its technical and operational rules for the AFC allow innovators to realize the 6 GHz band’s full potential. ISED can adopt simple, flexible, ends-oriented rules that allow diverse AFC system implementations to address a broad range of use cases and business models. Such rules will facilitate the creation of multiple third-party AFC

¹¹ ECC Decision 20(01), On the harmonised use of the frequency band 5945-6425 MHz for Wireless Access Systems including Radio Local Area Networks (WAS/RLAN), Annex 1 – Technical Conditions, A1.2 Very Low Power (VLP) WAS/RLAN Devices, approved 20 November 2020. <https://docdb.cept.org/document/16737>

administrators and the establishment of a competitive marketplace for AFC systems and services. Thus, DSA supports ISED's proposal to approve multiple, third-party AFC administrators to operate AFC systems in Canada. Furthermore, DSA agrees with ISED that alignment of AFC requirements with other countries, such as the United States, will leverage the larger U.S. ecosystem and facilitate business viability for Canadian AFC system administrators.

Q11: ISED is seeking comments on potential exit strategies if the AFC administrator decides to cease operation in Canada.

DSA recommends that ISED consider adopting rules similar to those in the United States governing the authorization of AFC system operators, including a five-year authorization term which, at ISED's discretion, may be renewed. In addition, in the event an AFC system operator does not wish to continue to provide services, or if its term is not renewed, ISED may require the system operator to transfer its database along with the information necessary to access the database to another designated AFC system. By requiring AFC system operators to transfer this information, ISED can assure operational continuity for existing devices.

Q12: ISED is seeking comments on adopting an AFC system model that is harmonized to the maximum extent possible with the AFC system model being implemented in the U.S. and other international markets.

In the U.S. 6 GHz rulemaking proceeding, DSA requested that the FCC consider both centralized and decentralized AFC system models. We believe that there are certain use cases where a centralized AFC models makes sense and other use cases where a decentralized model can work without increasing the risk of harmful interference to incumbent operations. The FCC decided to pursue a centralized AFC model at this time. The FCC has years of experience with the White Space Database and the Spectrum Access System used in the Citizens Broadband Radio Service and has a high degree of confidence that centralized automated spectrum management systems work as advertised. DSA agrees with ISED that alignment of AFC requirements with other countries, such as the United States, will leverage a larger ecosystem and facilitate business viability for Canadian AFC system administrators. We take this to mean that ISED intends to pursue a centralized AFC system approach only.

Q13: ISED is seeking comments on the implementation considerations for the operation of an AFC system, specifically:

- a. information required from licensed users
- b. interference protection criteria for computation of exclusion zones
- c. information required from standard-power APs
- d. frequency of AFC update of licensee information

e. security and privacy requirements

As mentioned previously, DSA recommends that ISED consider implementing AFC operational requirements, as well as interference protection criteria that align with other countries, such as the United States, to leverage the existing AFC system and ecosystem development. To that end, DSA recommends that ISED's rules for standard-power RLAN devices connecting to an AFC harmonize with FCC Rule Part § 15.407(k) *Automated frequency coordination (AFC) system*, Part § 15.407(l) *Incumbent Protection by AFC system: Fixed Microwave Services*, Part § 15.407(m) *Incumbent Protection by AFC system: Radio Astronomy Services*, and Part § 15.407(n) *Incumbent Protection by AFC system: Fixed-Satellite Services*.

Q14: ISED is seeking comments on any additional considerations, limits or general concerns that should be taken into account in setting detailed standards and procedures for AFC operation.

DSA recommends that ISED monitor the FCC's progress in certifying AFC systems and RLAN devices that will connect to an AFC. Multiple standards development organizations, including the WiFi Alliance and the WInnForum, are in the process of developing standards and best practices related to AFC operations that will likely also be relevant to the Canadian and other markets.

Q15: ISED is seeking comments on its proposal to require AFC systems to protect the following types of licensed stations from standard-power APs:

- a. fixed microwave stations
- b. fixed point-to-point television auxiliary stations
- c. radio astronomy stations

DSA supports ISED's proposal to require AFC systems to protect incumbent fixed service links, which includes fixed microwave stations and fixed point-to-point television auxiliary stations. DSA agrees that AFC systems should protect the DRAO radio astronomy site in British Columbia through the creation of an appropriately sized exclusion zone. DSA concurs that the most appropriate mechanism for providing an additional layer of protection to ensure that outdoor standard-power RLANs do not cause harmful interference to FSS receivers aboard satellite stations is through a vertical elevation mask. While DSA agrees with FCC that the risk of aggregate interference from RLANs at the proposed power levels to FSS receivers aboard satellite stations is negligible¹², the fact that this additional mitigation is incorporated in the U.S. rules means that its will be incorporated into outdoor standard-power access points and fixed

¹² See 6 GHz Report and Order at ¶91.

client devices. Given the size of the U.S. market, DSA expects this to become a *de facto* requirement in countries where outdoor use of 6 GHz standard power access points is permitted.

Q16: ISED is seeking comments on the sample agreement related to the designation and operation of an AFC system in Canada.

DSA does not have any comments on the proposed “Sample terms and conditions of an AFC system administrator agreement.”

Q17: ISED is seeking comments on the proposed approach to incremental implementation of an AFC system in Canada.

DSA supports ISED’s proposal to facilitate different AFC business models by allowing AFC operators to serve limited geographic areas and/or limited portions of the 6 GHz band so long as they otherwise meet or exceed ISED’s AFC requirements. DSA understands the challenges of starting up and sustaining a business ecosystem that focuses on spectrum management. We strongly support ISED’s efforts to reduce barriers to entry for AFC system providers.

Q18: ISED is seeking comments on the objective to maximize the potential for synergies, where possible, in defining the technical and administrative requirements for the respective databases addressing different bands under different technical regimes.

DSA supports ISED’s proposal to align the technical and administrative requirements and procedures between those for White Space Databases and 6 GHz AFCs to the greatest extent practicable. The FCC applied many of its White Space Database and Spectrum Access System learnings in its approach to the AFC system. Even so, the Commission took a very conservative approach. DSA recognizes that ISED has its own unique experience in its development of Canadian White Space Database regulations, certification of administrators, and commercial implementation that will no doubt shape its views on Canadian AFC regulations. With that said, in DSA’s response to Question 12, we agreed that ISED should adopt an AFC system model that is harmonized to the maximum extent possible with the AFC system model being implemented in the U.S. and other international markets. Our view is that the synergies in regulations should be related to the administrative rules/procedures rather than technical rules.

DSA is very supportive of the use of dynamic spectrum management tools and techniques to make more efficient use of spectrum. In 2019, DSA released a report entitled, *Automated Frequency Coordination: An Established Tool for Modern Spectrum Management*, in

which place the AFC system within a continuum of spectrum management techniques.¹³ As this report details, while spectrum database coordination is nothing new, it has in recent years evolved from manual, to automated, to dynamic – adding automation and propagation modeling to static licensing data. This evolution has generally progressed from the manual, database-informed coordination of fixed links and satellite earth stations; to database-assisted coordination of point to-point links on a semi-automated basis (e.g., in the 70/80/90 GHz bands); to the fully-automated frequency coordination of unlicensed sharing of vacant TV channels (TV White Space); to, most recently, the dynamic coordination of a three-tier hierarchy of sharing by Spectrum Access System databases across the 3550-3700 MHz band with U.S. Navy radar (the Citizens Broadband Radio Service).¹⁴

Automated frequency coordination (AFC) systems are known by different names in different frequency bands. They can also be more or less dynamic with respect to inputs. However, the basic steps are the same and the outcome is determined by the rules and framework adopted by each national regulatory authority.¹⁵

¹³ *Automated Frequency Coordination: An Established Tool for Modern Spectrum Management*, Dynamic Spectrum Alliance, March 2019. http://dynamicspectrumalliance.org/wp-content/uploads/2019/03/DSA_DB-Report_Final_03122019.pdf

¹⁴ *Ibid* at 2.

¹⁵ *Ibid* at 3.