

January 27, 2023

Ms. Josephine Arnold
Senior Attorney-Advisor
National Telecommunications and Information Administration
U.S. Department of Commerce
1401 Constitution Avenue NW
Washington, DC 20230

Re: Public Wireless Supply Chain Innovation Fund Implementation, Docket No. 221202-0260

Dear Ms. Arnold -

The Dynamic Spectrum Alliance (DSA)¹ respectfully submits these comments in response to the National Telecommunications and Information Administration (NTIA) Notice and Request for Comment (Notice),² which seeks input on the implementation of the Public Wireless Supply Chain Innovation Fund (Innovation Fund), as directed by the CHIPS and Science Act of 2022.

The DSA appreciates the opportunity to provide NTIA with our perspectives on this important topic. The DSA works with telecommunications regulatory authorities worldwide to promote laws, regulations, and policies that will benefit competition, create conditions for innovation, and spur more rapid deployments of new wireless broadband networks and services – goals that are closely aligned with NTIA’s objectives for the Innovation Fund. We fully support NTIA’s efforts to drive a more competitive and diverse telecommunications supply chain to “foster competition, [and] lower costs for consumers and network operators.”³

Our response will focus on what we believe to be an important and direct connection between the growth of a competitive and diverse wireless telecommunications supply chain and spectrum licensing policies that provide multiple spectrum access options for a wide variety of wireless broadband network operators.

For the past three decades, the Federal Communications Commission (FCC) has auctioned licenses for exclusive rights to spectrum covering large geographic areas, whereby a small number of

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 U.S. Department of Commerce, National Telecommunications and Information Administration, Docket No. 221202-0260, RIN 0693-XC053, *Public Wireless Supply Chain Innovation Fund Implementation* (Notice).

³ Notice at I.

large mobile network operators acquire licenses and then select a similarly small number of vertically integrated and predominantly international equipment suppliers. As NTIA observed in the Notice, this pattern has resulted in an “infrastructure market [that] is highly consolidated, with a small group of vendors making up the majority of the marketplace. This lack of competition can reduce supply chain resilience and security, contribute to higher prices, make it challenging for new, innovative U.S. companies to break into the market, and ultimately will exacerbate the digital divide.”⁴

With the Citizens Broadband Radio Service (CBRS), however, the FCC broke that mold, increasing spectrum access options through a novel licensing framework and streamlining the spectrum access process for a wider, more diverse set of users. The innovative CBRS licensing approach has led not only to a larger and more diverse set of spectrum users, but has also resulted in a larger and more diverse ecosystem of equipment, software and technology developers supporting the CBRS band. The increased diversity in spectrum access and the related increase in ecosystem diversity ultimately benefits competition, creates conditions for innovation, and spurs more rapid deployments of new wireless broadband networks and services.

For these reasons, the DSA recommends that, as NTIA develops its goals for implementing the Innovation Fund, it recognizes and supports projects that will increase and streamline access to spectrum by more users for a wide variety of both public and private use cases. One way to achieve this is to support the development and validation of automated dynamic spectrum management systems (DSMS) together with innovative licensing frameworks for various spectrum bands. Automated frequency coordination lowers transaction costs, uses spectrum more efficiently, speeds time-to-market for new services, protects incumbents from interference with greater certainty, and generally expands the supply of wireless connectivity that is fast becoming, like electricity, a critical input for most other industries and economic activity. Depending on the types of incumbent services in bands being considered for 5G and 6G deployments, different DSMS solutions may be appropriate. For example, higher bands may be more appropriate for 5G /6G solutions focused on localized networks, which are ideal for DSMS. The result will be a supply chain supporting a larger group of spectrum users for new use cases that will similarly grow and diversify to meet demand.

In the whitepaper entitled “Automated Frequency Coordination - An established tool for modern spectrum management,”⁵ the DSA makes the case that the use of databases to coordinate spectrum assignments has evolved significantly since its first introduction, but at its heart, it is nothing new. The basic steps are the same as in a manual coordination process or where a regulator assesses the opportunities for local licensing on a case-by-case basis. However, what is new includes:

- (1) Surging consumer demand for wireless connectivity and hence the need to intensively share underutilized frequency bands;
- (2) Significant improvements in the computation power to efficiently and rapidly run advanced propagation analysis and coordinate devices and users in near real-time; and
- (3) More agile wireless equipment that can interact directly with dynamic frequency coordination databases.

⁴ Notice at I.

⁵ Available at http://dynamicspectrumalliance.org/wp-content/uploads/2019/03/DSA_DB-Report_Final_03122019.pdf.

The DSA anticipates that the FCC and regulatory authorities worldwide will need to rely increasingly on DSMS solutions to handle surging demand for wireless connectivity by sharing underutilized frequency bands. Significant improvements in computation power have enabled more efficient and rapid advanced propagation analysis capability, which in turn enables coordination of devices and users in near real-time. In addition, more agile wireless equipment is being developed that can interact directly with dynamic frequency coordination databases, increasing opportunities for even greater efficiency and scale. The United States has been a clear global leader in the development of DSMS solutions with the TV White Spaces database, the CBRS Spectrum Access System (SAS), and most recently the 6 GHz Automated Frequency Coordination (AFC). Other countries have also adopted innovative local licensing frameworks to increase access to new users by implementing DSMS tools to enable more efficient use of spectrum.

CBRS has been a shining example of the myriad benefits of automated spectrum sharing, including the development of arguably the largest mobile broadband equipment ecosystem. Under the CBRS regulatory framework, the SAS coordinates CBRS frequency use (3550-3700 MHz) and manages coexistence among the three tiers of access: 1) incumbent (e.g., navy radar and commercial fixed satellite services); 2) priority access license (PAL); and 3) general authorized access (GAA). Commercial users in the CBRS band have multiple options for accessing this 150 MHz of spectrum:

- Acquisition of a PAL in the FCC's 2020 CBRS auction where use-or-share rights for county-based licenses were offered;
- Use of the GAA tier, which does not require an individual license to operate, but does require use of certified equipment and connectivity to a SAS to receive a spectrum grant for operations with a particular transmit power and antenna orientation at a specific location and height; or
- Leased rights from a PAL license holder.

The SAS not only coordinates protection of incumbent users from new commercial operations, but also manages the assignment of frequencies to PAL and GAA users, protection of PAL operations, and coexistence among GAA users to maximize spectrum efficiency and provide deterministic access for all users. The automated SAS process provides near real-time management of the CBRS band, speeding time-to-market while minimizing uncertainty and administrative burdens.

Through this automation of shared spectrum, a whole host of new services have emerged. In addition to densification of the nationwide public mobile networks, and use of these frequencies by rural wireless Internet service providers (WISPs), a wide variety of private networks are also using the CBRS band. From business to leisure, hundreds of smart office, airport and stadium private networks have been deployed using CBRS as the result of having access to spectrum without the need for an individual license. In fact, today there are over 300,000 CBRS cell sites deployed across the United States with the vast majority using the GAA tier.

Examples of such private wireless network deployments using the CBRS include:

Energy management:

<https://www.fiercewireless.com/private-wireless/schneider-electric-adds-private-wireless-smart-factories>

Retail:

<https://www.druidsoftware.com/2019/11/15/cbrs-ongo-at-american-dream-entertainment-retail-complex-nj-usa/>

Military logistics:

<https://www.fiercewireless.com/private-wireless/federated-demo-dod-highlights-benefits-shared-spectrum>

Municipal government:

<https://www.fiercewireless.com/private-wireless/motorola-and-harris-county-build-private-lte-network>

<https://www.fiercewireless.com/private-wireless/cox-launches-cbrs-pilot-city-las-vegas>

<https://www.fiercewireless.com/private-wireless/new-york-libraries-check-out-cbrs-wi-fi-alternative>

Transportation:

<https://www.fiercewireless.com/wireless/boingo-deploys-trial-cbrs-network-at-dallas-love-field-airport>

Education:

https://www.csrwire.com/press_releases/747561-private-wireless-helps-schools-close-digital-divide

<https://www.fiercewireless.com/private-wireless/fort-worth-isd-builds-sustainable-cbrs-network>

<https://www.fiercewireless.com/private-wireless/samsung-amdocs-deploy-private-cbrs-network-howard-university>

<https://www.fiercewireless.com/private-wireless/school-districts-buy-cbrs-wi-fi-affordable-broadband>

Entertainment:

<https://inbuildingtech.com/venues/connectivity-wireless-jma-stadium-cbrs/>

<https://www.rcrwireless.com/20230119/5g/comcast-and-celona-supply-cbrs-private-4g-5g-system-to-california-fairgrounds>

Hospitality:

<https://www.thefastmode.com/technology-solutions/24585-airspan-networks-deploys-5g-cbrs-private-network-for-hospitality-industry>

Manufacturing warehouse/supply chain:

<https://www.fiercewireless.com/private-wireless/calchip-connect-emerges-key-player-private-wireless>

<https://www.fiercewireless.com/private-wireless/mxd-adds-second-private-wireless-network>

Agriculture:

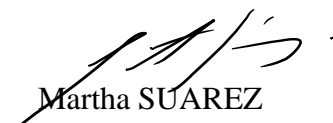
<https://www.fiercewireless.com/private-wireless/three-day-deployment-makes-tractors-autonomous>

<https://enterpriseiotinsights.com/20220607/smart-farm/how-robot-tractors-and-a-private-network-came-together-at-a-smart-vineyard>

Not only has the CBRS licensing framework resulted in a wide and diverse range of new users and use cases, it has also spurred the growth of the world’s largest ecosystem for 4G/5G equipment with over 40 different RAN, software and application developers. The diversity of new private users and use cases in the CBRS band has helped drive the diversification of equipment and software solutions. Without the need to acquire a license⁶ for 4G and 5G deployments, both WISP and private network deployments have accelerated, and an ecosystem of vendors has emerged to meet their needs.

In Questions 25 and 26 of the Notice, NTIA asks how it can ensure that the Innovation Fund programs promote U.S. competitiveness in the 5G market and how NTIA might collaborate with like-minded governments to achieve Innovation Fund goals. The DSA recommends that NTIA promote both domestically and internationally the adoption of licensing frameworks that include spectrum sharing and the use of DSMS solutions, many of which have been developed in the United States, to increase access to spectrum by a larger and more diverse community of users. Spectrum sharing frameworks that increase spectrum access options will enable NTIA achieve its goals of promoting U.S. leadership in the global telecommunications ecosystem, fostering competition, and lowering costs for consumers and network operators.

Respectfully submitted,



Martha SUAREZ
President
Dynamic Spectrum Alliance

⁶ The DSA looks forward to sharing with NTIA updates on new Wi-Fi 6E equipment coming to market as AFCs are certified by the FCC for sharing in the 6 GHz band.