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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Expanding Flexible Use of the 12.2-12.7 GHz Band	)	WT Docket No. 20-443
	)	
	)	GN Docket No. 17-183
	)	
Expanding Flexible Use in Mid-Band Spectrum Between 3.7-24 GHz	)	
	)	

COMMENTS OF THE DYNAMIC SPECTRUM ALLIANCE

The Dynamic Spectrum Alliance ("DSA")[1] hereby submits these comments in response to the Federal Communications Commission's ("FCC" or "the Commission") Notice of Proposed Rulemaking ("NPRM") seeking comments on how best to maximize efficient use of 500 MHz of mid-band spectrum between 12.2-12.7 GHz band ("12 GHz Band").[2] The Commission seeks comment on whether it "could add a new or expanded terrestrial Mobile

[1] The Dynamic Spectrum Alliance is a global, cross-industry alliance focused on increasing dynamic access to unused radio frequencies. The membership spans multinational companies, small- and medium-sized enterprises, academic, research, and other organizations from around the world, all working to create innovative solutions that will increase the utilization of available spectrum to the benefit of consumers and businesses alike. A full list of the DSA members is available on the DSA's website at www.dynamicspectrumalliance.org/members/.

[2] *Expanding Flexible Use of 12 GHz Band*, Notice of Proposed Rulemaking, 36 FCC Rcd. 606, at ¶ 1 (2021). (12 GHz NPRM)

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allocation in the 12 GHz band without causing harmful interference to incumbent licensees".[3] It also seeks comment on the cost and benefits of an underlay approach.[4]

DSA's goal is to increase spectrum access through shared and more efficient use. One way to achieve this goal is through the introduction of dynamic shared access – either through the use of an automated database system that actively manages new entrants' access to maximize use of spectrum while also ensuring protection of incumbents, or through a carefully crafted set of rules that allow new unlicensed or licensed-by-rule operations under specific circumstance and operating parameters. Such dynamic shared access approaches can:

- Connect people, particularly the next 4 billion under-served people throughout the world.
- Stimulate wireless innovation for next-generation broadband.
- Accelerate an inclusive digital economy.

As the Commission looks to solve challenges of unserved and under-served communities, the introduction of dynamic shared access can enable higher-capacity and lower-cost deployments, particularly in rural areas.

The 12 GHz band is allocated on a primary basis to Broadcasting Satellite Service (referred to as Direct Broadcast Satellite or DBS), Non-Geostationary-Satellite Orbit Fixed Satellite Service (NGSO FSS) systems operating in the space-to-earth direction, and the Fixed

[3] *See* Id. at ¶2.

[4] *See* Id. at ¶39.

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Service (FS). Multi-Channel Video and Data Distribution Service (MVDDS) licensees operate under the FS allocation. SpaceX's Starlink is an NGSO FSS system.

Although these three services are co-primary, the NGSO FSS and FS operate on a non-harmful interference basis to DBS.[5] Additionally, the Commission's rules enable sharing between co-primary NGSO FSS and MVDDS using a combination of technical limitations, information sharing, and first-in-time procedures.[6] Under the current approach, NGSO FSS receivers and MVDDS transmitting systems are given priority in the 12 GHz band with respect to one another based on which deployed earlier.[7]

The NPRM asks, "How could dynamic sharing mechanisms facilitate continued use by DBS, NGSO FSS, and MVDDS incumbents, while also accommodating potential new uses such as two-way mobile service?"[8] Conceptually, DSA believes that the possibility and promise of dynamic sharing mechanisms exists for the 12 GHz Band. However, the record developed in response to the MVDDS 5G Coalition petition did not include specific proposals on how the addition of a new or expanded terrestrial Mobile allocation in the 12 GHz Band for MVDDS licensees will protect incumbent licensees from receiving harmful interference. While the DSA generally supports the Commission considering expanded terrestrial use in the band with sharing, the DSA is specifically not taking a position on whether the Commission could add a new or

[5] *See* Id. at ¶3.

[6] *See* Id. at ¶5.

[7] *See* Id. at ¶9.

[8] *See* Id. at ¶45.

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expanded terrestrial Mobile allocation in the 12 GHz band without causing harmful interference to incumbent licensees. DSA welcomes submission of technical proposals detailing how dynamic spectrum sharing in the 12 GHz Band can protect the three primary services in the band.

I. USE OF AN AUTOMATED DYNAMIC SPECTRUM SHARING SYSTEM

Although the NPRM does not provide specific proposals, DSA's members do have extensive experience in the development and implementation of automated dynamic spectrum sharing technology and believe this approach can be adapted to the 12 GHz Band. At its core, an automated dynamic spectrum sharing system is a software-based embodiment of the Commission's rules for protecting incumbents in a given frequency band, while enabling broader access. Recent experience with successful sharing between terrestrial Citizens Broadband Radio Service (CBRS) and fixed satellite service (FSS) earth stations in the 3.5 GHz band under the Commission's Part 96 rules is instructive.

With knowledge of the location and operating parameters of the satellite receivers in need of protection, an automated sharing system can be designed and implemented to facilitate additional access to these frequencies. While there are significantly more satellite receivers operating in the 12 GHz Band than in the 3.5 GHz band, today's automated sharing systems are fully scalable and designed to handle the computational requirements necessary to protect large numbers of incumbent receivers. Furthermore, while 12 GHz Band satellite receiver location information may be less precise than what is available for CBRS, the automated sharing systems

are also capable of accounting for location uncertainty in their calculations. The DSA recognizes, though, that every frequency range is different, and there may be issues unique to the 12 GHz band that are not present in CBRS, the 6 GHz band, or the TV White Spaces that would have to be addressed.

Assuming there are one or more technical proposals that show sharing is possible, use of an automated sharing system could enable adoption of a 12 GHz Band "use-it-or-share-it" approach that authorizes secondary and coordinated access for fixed point-to-point and point-to-multipoint broadband deployments. The use-it-or-share-it approach can expand access to unused spectrum by smaller and non-traditional Internet Service Providers (ISPs) in rural and underserved areas, as well as provide for enterprise and institutional use. Given the greater propagation loss at these higher frequencies and the still to-be-determined (TBD) EIRP limits necessary to protect incumbent services, more work needs to be done to assess whether the TBD EIRP limits can support these use cases or if such use cases would be commercially viable.

Should the Commission modify MVDDS licenses to allow for flexible use, which DSA is not taking a position on, these more valuable rights can be conditioned with an obligation to accommodate opportunistic use. Until the spectrum is actually put into service in a local area it should be available for non-interfering use by networks and devices that are multi-band and required to regularly renew permission to transmit by checking a geolocation database. Primary licensees lose no rights whatsoever and bear a de minimus burden to simply inform the certified database coordinator prior to commencing service in a particular local area, so that any opportunistic users will be immediately denied permission to operate on that frequency band.

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There is now solid precedent for a use-it-or-share-it approach to encourage more efficient and intensive use of occupied but underutilized bands. Opportunistic access to locally vacant spectrum in the 12 GHz band could be managed in much the same way that the CBRS rules authorize General Authorized Access ("GAA") to unused Priority Access Licenses ("PAL") spectrum. The FCC recently granted the CBRS PALs,[9] and the CBRS SAS administrators are authorizing GAA use of unused PAL spectrum while fully protecting PAL operations.

This use-it-or-share-it approach is also consistent with the Commission's successful authorization of coordinated access to wireless internet service providers ("WISPs") to unused spectrum in the lower 45 megahertz of the 5.9 GHz band last year.[10] In response to the COVID pandemic, the Commission authorized at least 100 WISPs to make coordinated, secondary use of the spectrum to boost the capacity of their fixed wireless deployments in mostly rural, small town and historically underserved areas spectrum is helping address the increased demand for broadband associated with the pandemic."[11]

II. INDOOR UNLICENSED OR LICENSED BY RULE UNDERLAY CONTINGENT ON THE PROTECTION OF INCUMBENTS

[9] See FCC Public Notice, "Wireless Telecommunications Bureau Grants Auction 105 Priority Access Licenses," March 12, 2021. Available at: https://docs.fcc.gov/public/attachments/DA-21-300A1.pdf.

[10] See FCC Press Release, "5.9 GHz Band Boosts Consumer Internet Access During Covid-19 Pandemic," May 4, 2020. Available at: https://docs.fcc.gov/public/attachments/DOC-364138A1.pdf.

[11] Claude Aiken, "FCC 5.9 GHz STA Helps WISPs Serve Through COVID-19 Pandemic," Claude's Blog, Wireless Internet Service Providers Association (WISPA), available at http://wispa.org/news_manager.php?page=21979.

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Another approach the Commission might consider is an indoor underlay in the 12 GHz Band that is either unlicensed or licensed-by-rule contingent on the protection of incumbent operations.[12] Here too, the potential use cases will be driven by the EIRP limits of the unlicensed device(s) and any additional mitigations, if required. In the NPRM, the Commission cites its Technological Advisory Council 5G/IoT/O-RAN working group's recommendation that it consider private spectrum for enterprise Internet-of-things devices in locations such as confined geographic areas, buildings, and campuses and posits whether 12 GHz band spectrum can be used for this purpose.[13] DSA encourages proponents of unlicensed use to provide a technical analysis supporting introduction of unlicensed services.

With respect to potential outdoor unlicensed or licensed-by-rule use, DSA has identified a number of challenges that should be considered. DBS has a nationwide footprint. DSA expects that given the pace of SpaceX satellite launches, Starlink will also have a national footprint. Under the current rules for the 12 GHz Band, the separation distances required between first-in NGSO user terminals and MVDDS links is significant. MVDDS transmitters cannot operate within 10 km of earlier-in-time NGSO FSS earth stations without the NGSO FSS operator's consent.[14] It is important to note that MVDDS transmit powers are limited to 0 dBm/MHz

[12] The Commission has the authority to consider indoor unlicensed use in the 12 GHz band without having to expand the terrestrial rights of MVDDS providers.

[13] *See* 12 GHz NPRM at ¶32.

[14] 47 C.F.R. § 101.129(b).

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(24 dBm/14 MHz).[15] By way of comparison, 6 GHz standard power access points that will operate under automated frequency coordination have an EIRP limit of 36 dBm and a Power Spectral Density limit of 23 dBm/MHz and operate at a significantly lower frequency that has correspondingly better propagation characteristics.

Setting aside the large installed base of DBS subscribers, as the number of Starlink subscribers increases over time, it can be expected there will be an increasing amount of geographic area that will become part of an exclusion zone. These exclusions zone will be in urban, suburban, and rural areas. As DSA stated regarding use-it-or-share-it, given the size and number of exclusions zones, the TBD EIRP limit of prospective 12 GHz Band terrestrial devices, plus the less favorable propagation characteristics of the 12 GHz band, more work needs to be done to assess whether the outdoor unlicensed or licensed-by-rule use cases could be economically viable and lead to the development of an ecosystem.

III. ANY SHARING FRAMEWORK MUST MAINTAIN THE EXISTING PRIORITY BETWEEN FSS NGSO AND MVDDS SYSTEMS

DSA believes that any sharing proposal between FSS NGSO and a two-way mobile terrestrial service cannot change the priority (first-in-rights) relationship between FSS NGSO and MVDDS systems. The DSA notes that one of the MVDDS 5G Coalition's proposals in its petition was:

[15] 47 C.F.R. § 101.113 fn. 10.

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> "Delete or designate as secondary the existing unused non-geostationary satellite orbit ("NGSO") fixed satellite service ("FSS") allocation at 12.2-12.7 GHz (while preserving the adjacent co-primary allocation for NGSO FSS at 11.7-12.2 GHz23), and eliminate or modify MVDDS rules designed to protect NGSO FSS – a "service" that, after nearly 15 years, is neither licensed nor deployed in the 12.2-12.7 GHz band;"[16]

Were the Commission to delete the primary allocation to NGSO FSS in the 12.2 GHz Band or designate it a secondary allocation, sharing between the hypothetical two-way MVDDS 5G mobile and the NGSO FSS does become simpler, but one-sided, as the NGSO FSS would have to protect MVDDS mobile stations from receiving harmful interference and the NGSO user terminals would have to accept interference from MVDDS mobile operations. Current Starlink customers would lose their priority and protection from receiving harmful interference they have under the Commission's current rules. DSA believes that any sharing approach must not delete the primary spectrum allocation for NGSO FSS or downgrade it to a secondary spectrum allocation.

IV. CONCLUSION

DSA appreciates the opportunity to comment on the Commission's NPRM on the expanded use of the 12 GHz Band. DSA and its members have extensive experience in developing sharing frameworks that may be applicable to this band, including the use of an automated database shared access system or a carefully crafted set of rules that allow new

[16] Petition for Rulemaking of MVDDS 5G Coalition, RM-11768 (filed Apr. 26, 2016) ("MVDDS Coalition Petition") at 7.

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unlicensed or licensed by rule operations under specific circumstance and operating parameters, such as an indoor underlay. We look forward to reviewing detailed technical proposals that offer solutions to maximize the use of this important 500 MHz of spectrum while simultaneously ensuring incumbent protections and rights.

Respectfully submitted,

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May 7, 2021