

**Before the
Federal Communications Commission
Washington, DC 20554**

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

To: The Commission

COMMENTS OF
NEW AMERICA’S OPEN TECHNOLOGY INSTITUTE
PUBLIC KNOWLEDGE
NEXT CENTURY CITIES
CENTER FOR RURAL STRATEGIES
CONSUMER FEDERATION OF AMERICA
NATIONAL DIGITAL INCLUSION ALLIANCE
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MVDDS 5G Coalition)	RM-11768 (Proceeding Terminated)
Petition for Rulemaking to Permit MVDDS Use of)	
the 12.2-12.7 GHz Band for Two-Way Mobile)	
Broadband Service)	

To: The Commission

**COMMENTS OF
THE PUBLIC INTEREST ORGANIZATIONS**

New America’s Open Technology Institute, Public Knowledge, Next Century Cities, Consumer Federation of America, Center for Rural Strategies, National Digital Inclusion Alliance, Tribal Digital Village, the Institute for Local Self-Reliance, Access Humboldt, and National Consumer Law Center, on behalf of its low-income clients (together the “Public Interest Organizations” or “PIOs”) submit these Comments in response to the Commission’s Notice of Proposed Rulemaking on the rules for opening up the 12 GHz band for mobile service.¹

I. INTRODUCTION & SUMMARY

The Public Interest Organizations (“PIOs”) believe that expanding access to spectrum for terrestrial broadband use in the currently very underutilized 500 megahertz between 12.2-12.7

¹ *Expanding Flexible Use of the 12.2-12.7 GHz Band*, Notice of Proposed Rulemaking, WT Docket No. 20-443, GN Docket No. 17-183, 36 FCC Rcd. 606 (Jan. 15, 2021) (“NPRM”).

GHz band (“12 GHz band”) can promote the deployment of 5G services, promote competition, enhance the benefits of next generation Wi-Fi, spur innovation, and help to address the digital divide in underserved communities.

First, the PIOs urge the Commission to give considerable weight to how increasing the spectrum use rights for current terrestrial licensees in the 12 GHz band will positively enhance broadband competition. Increasing competition within the broadband space has profound public interest benefits ranging from better quality of service to more affordable broadband access. Expanding non-interfering access in 12 GHz will help maximize the number of potential 5G broadband providers, particularly in rural areas, and increase competitive broadband offerings, which in turn will benefit consumers by improving access, affordability and quality of service. The Commission should balance expanding the spectrum rights of existing licensees in the 12 GHz band with aggressive build out requirements and allow opportunistic, shared access to fallow spectrum. These policies will help incentivize build out and ensure that the 12 GHz band meets its full potential.

Second, the PIOs urge the Commission to authorize an unlicensed underlay for at least low-power, indoor use across the entire band. An unlicensed underlay will add 500 MHz of contiguous spectrum for new unlicensed applications. While the recent addition of 1,240 MHz in the 5.9 GHz and 6 GHz bands will help ease the existing unlicensed spectrum crunch, the continued projected growth of unlicensed spectrum use in a 5G wireless ecosystem—including at very low power for augmented reality (AR) and virtual reality (VR) wearable devices—requires a pipeline that will make more wide-channel, contiguous spectrum available as the need increases. Wi-Fi 7, the next generation of Wi-Fi technology currently being designed, will require a channel size of 360 MHz to support enhanced gigabit throughput. The 500 MHz of

contiguous spectrum here represents a unique opportunity to create the necessary capacity to encourage development of these new technologies and facilitate their deployment in the future.

Third, the PIOs urge the Commission to authorize opportunistic access to unused capacity in the 12 GHz band outdoors to the extent technically feasible and consistent with protecting the primary licensed services from harmful interference. Opportunistic access to up to 500 megahertz of unused spectrum in a community can help meet the demand for higher-capacity fixed wireless services and thereby improve broadband access in rural, Tribal, and other underserved areas. Opportunistic access for fixed, point-to-multipoint (“P2MP”) terrestrial broadband can ensure the most intensive and efficient use of the band. This is particularly relevant if the Commission reallocates all or a portion of the band to flexible use licensing. Mobile carriers incorporating 12 GHz spectrum in their 5G networks are very likely to focus on urban, inner suburban and other high-traffic areas for the foreseeable future. In the meantime, opening access to unused capacity in the 12 GHz band would provide rural ISPs and other entities with the spectrum-for-infrastructure they need to expand broadband services and help to bridge the digital divide.

This proceeding provides an excellent opportunity for the Commission to take another innovative leap forward in spectrum management policy to fuel the nation’s wireless future. Any grant of new flexible use spectrum rights should be accompanied by a corresponding obligation to cooperate with opportunistic sharing, whether on a use-it-or-share-it basis or based on a low-power unlicensed underlay. Opportunistic and unlicensed access to unused capacity can be put to use by a wide variety of users across the country, serving the unique needs of diverse communities, community anchor institutions, business establishments and consumers at home.

II. THE COMMISSION SHOULD EXPAND SPECTRUM USE RIGHTS FOR EXISTING LICENSEES IN THE 12 GHZ BAND BECAUSE IT WILL INCREASE BROADBAND COMPETITION AND PROVIDE NECESSARY CAPACITY FOR EXISTING AND FUTURE WI-FI.

The Commission seeks comment on the costs and benefits of increasing terrestrial use of the 12 GHz Band.² In particular, the Commission asks how it can balance the potential public interest benefits as it proceeds with this rulemaking.³ The PIOs urge the Commission to give considerable weight to how increasing the spectrum use rights of current terrestrial licensees in the 12 GHz band will positively impact broadband competition. Increasing competition within the broadband space has profound public interest benefits ranging from better quality of service to more affordable broadband access. Expanding non-interfering access to the 12 GHz band will help maximize the number of potential broadband providers and benefit consumers, particularly those in rural areas, by increasing competitive broadband offerings.

In addition, creating an unlicensed underlay will add 500 megahertz of contiguous spectrum for new unlicensed applications. Although the recent addition of 1,240 megahertz in the 5.9 GHz and 6 GHz bands will help ease the existing unlicensed spectrum crunch, the continued projected growth of unlicensed spectrum uses—including at very low power for augmented reality (AR) and virtual reality (VR) wearable devices—requires a pipeline that will make more contiguous spectrum available as the need increases. Wi-Fi 7, the next generation of Wi-Fi technology currently being designed, will require a channel size of 360 MHz to support enhanced gigabit throughput.⁴ The 500 MHz of contiguous spectrum here represents a unique

² NPRM at ¶19.

³ NPRM at ¶58.

⁴ See Catherine Sbeglia, “Wi-Fi 7: What it is and When You Should Expect It,” *RCR Wireless News* (January 27, 2021), available at: <https://www.rcrwireless.com/20210127/network-infrastructure/wi-fi/wi-fi-7-what-is-it-and-when-should-you-expect-it>.

opportunity to create the necessary capacity to encourage development of these new technologies and facilitate their deployment in the future.

A. Increasing Competition Amongst Broadband Providers Benefits the Public by Improving Broadband Affordability, Quality of Service, and Access.

The benefits of competition for broadband access, quality and affordability are well known.⁵ The Commission itself acknowledges this in the NPRM by explicitly stating that it “values the public interest benefits that could flow from NGSOs offering an affordable solution for delivering high-speed Internet services to communities that might be more expensive to serve through other technologies.”⁶ PIOs encourage the Commission to give considerable weight to these benefits as it considers increasing access to the 12 GHz band. The many public interest benefits of increased broadband competition fall within three main categories: affordability, quality of service, and increased access.

Studies on internet pricing have shown that new service providers entering a market can substantially benefit consumers by lowering costs and increasing the quality of services offered when providers respond to competitive pressure.⁷ The Benton Institute Report details a 2018 study from Harvard’s Berkman Klein Center for Internet & Society that found significant pricing

⁵ E.g., Bill Snyder & Chris Wittmean, *The Anti-Competitive Forces That Foil Speedy, Affordable Broadband*, Fast Company (March 29, 2019), <https://www.fastcompany.com/90319916/the-anti-competitive-forces-that-foil-speedy-affordable-broadband>; Jonathan Sallet, *Better Together: Broadband Deployment and Broadband Competition*, Brookings (March 15, 2017), <https://www.brookings.edu/blog/techtank/2017/03/15/better-together-broadband-deployment-and-broadband-competition/>.

⁶ NPRM ¶58.

⁷ E.g., Becky Chao & Clair Park, *Focus on the United States—The Cost of Connectivity 2020*, New America’s Open Technology Institute, at 52 (July 2020), https://d1y8sb8igg2f8e.cloudfront.net/documents/The_Cost_of_Connectivity_2020_XatkXnf.pdf (demonstrating the pro-competitive effects of municipal networks) (“New America Report”); Jonathan Sallet, *Broadband for America’s Future: A Vision for the 2020s*, the Benton Institute for Broadband & Society, 49 (Oct. 2019), https://www.benton.org/sites/default/files/BBA_full_F5_10.30.pdf (“Benton Institute Report”).

benefits from increased competition among networks offering at least 25/3 mbps broadband, “ranging from a savings of 2.9 percent, or \$19, annually in Tullahoma, Tennessee, to more than 50 percent, or \$600, annually in Lafayette, Louisiana.”⁸

The benefits of competition go beyond improving the affordability of broadband. They also include increased service quality. For example, in Kansas City, when a viable competitor entered the market, AT&T (the incumbent) tripled the speed offered to customers without increasing the price for consumers.⁹ The Benton Institute Report notes that in 2017 Molnar and Savage found that each additional competitor that is added to a market with less than four participants has a notable impact on quality by improving, for example, sustained download speeds or providing more reliable upload performance.”¹⁰

Moreover, in rural communities, increased broadband competition has the added benefit of expanding access and options for consumers who are less likely to have reliable broadband access than their urban peers.¹¹ This is particularly relevant in this proceeding since two of the dominant licensees within the 12 GHz band, DISH and SpaceX, have pitched their services as viable competitive alternatives to traditional broadband for rural communities.¹² The

⁸ The Benton Institute Report, *supra* note 7, at 49. The Report notes that the study acknowledged limitations in its data and that the 50% reduction in pricing experience in Lafayette, Louisiana is likely atypical.

⁹ Ben Popper, “AT&T announces it will match Google Fiber's price and speed in Kansas City,” *The Verge* (Feb. 17, 2015), <https://www.theverge.com/2015/2/17/8050935/att-google-fiber-kansas-city-gigapower-internet-price-match>.

¹⁰ The Benton Institute Report, *supra* note 7, at 49-50.

¹¹ See F.C.C., Fourteenth Broadband Deployment Report, ¶ 1 (rel. Jan. 19, 2021) (the Commission explains that promoting broadband competition is a successful way to close the digital divide and expand deployment); see also Mike Robuck, “Charter CFO: Bring on the Broadband Competition,” *Fierce Telecom* (Nov. 23, 2020), <https://www.fiercetelecom.com/telecom/charter-cfo-bring-broadband-competition>.

¹² Plug In to Rural Internet with Dish, Dish.com, <https://www.dish.com/availability/rural> (last accessed May 6, 2020); Order Starlink, Starlink.com, <https://www.starlink.com/> (last accessed May 6, 2020) (“Ideal for rural + remote communities”).

Commission itself has identified the opportunity to “provide much needed service in rural and other underserved areas” as its motivation for exploring expanded use within the band.¹³

B. Allowing Non-Interfering Terrestrial Use of the 12 GHz Band Will Increase Competition by Helping to Maximize the Number of Potential Broadband Providers.

Expanding flexible spectrum use rights within the 12 GHz band will promote competition in mobile broadband. It is no secret that this market has seen significant consolidation, to the detriment of consumers. As a consequence of T-Mobile’s acquisition of Sprint, American consumers are now limited to a choice of three national carriers. In an effort to address this issue, the Department of Justice consent decree and the Commission’s Order approving the merger created conditions designed to help DISH become a fourth national competitor. If the Commission truly wants to help DISH reach its potential as a viable fourth competitor, then the Commission must also ensure that DISH has access to sufficient spectrum to compete aggressively with incumbent providers. Adding 500 megahertz of mid-band spectrum will enhance DISH’s chances of success.

At the same time, the Commission must protect the entry of potential satellite broadband competitors. SpaceX has significantly invested in broadband satellite technology, demonstrating its eagerness to enter the broadband market. SpaceX and other NGSO satellite providers can play a particularly crucial role in expanding coverage and adding competition in rural, Tribal, and other less densely-populated areas. The Commission should continue to encourage SpaceX’s entry into this market, as it did by granting the recent request for waiver (subject to the outcome of this proceeding).

¹³ NPRM at ¶ 30.

Despite its significant investment, however, SpaceX is a new, unproven competitor that has yet to demonstrate that it can deliver on its promises. Elon Musk himself has acknowledged that the current deployment is a beta test, and should be used at this point primarily by those with no other alternative.¹⁴ Additionally, the current price point for Starlink—\$500 for the customer premise equipment (CPE) and \$99/month—puts the cost of Starlink out of range of many unserved Americans. SpaceX needs time to prove that its model for broadband service can work, but time is a limited resource when it comes to connecting Americans to critical broadband services. Too often the Commission has deferred action to promote competition by looking to a promising future technology, only to have that new technology fail in its promise.¹⁵

Fortunately, the Commission does not need to adopt an either/or approach to the 12 GHz band. Instead it should adopt policies that allow *both* mobile and satellite providers to access the spectrum they need to compete. By limiting expanded use of the 12 GHz band to non-interfering uses, the Commission can ensure that SpaceX has the time and opportunity to prove that it can provide the broadband service it promises at scale, while also allowing DISH to move forward with its mobile broadband services more immediately.

C. Demand for Unlicensed Spectrum Will Continue to Grow Exponentially.

The Commission has recently and repeatedly acknowledged the critical role that unlicensed spectrum plays in the communications ecosystem.¹⁶ Licensed and unlicensed uses are

¹⁴ See Michael Sheetz, “SpaceX Prices Starlink Satellite Internet Service at \$99 a Month, According to Email,” *CNBC* (October 27, 2020) (quoting Musk describing roll out as “better than nothing beta”). Available at <https://www.cnbc.com/2020/10/27/spacex-starlink-service-priced-at-99-a-month-public-beta-test-begins.html>.

¹⁵ Examples include broadband over powerlines, that the 700 MHz auction in 2008 would create a wireless “third pipe” to the home, and previous attempts at satellite broadband.

¹⁶ See Report & Order, Further Notice of Proposed Rulemaking, and Order of Proposed Modification, ET Docket No. 19-138 (Rel. Nov. 20, 2020) (“5.9 GHz Order”); Report and Order and Further Notice of Proposed Rulemaking, ET Docket No. 18-295, GN Docket No. 17-183 (Rel. April 24, 2020) (“6 GHz Order”).

synergistic and intertwined, especially in the realm of home connectivity. Our connected devices assume the presence of a robust Wi-Fi network that connects to the pipe into the home. In addition to this direct impact on the public, unlicensed spectrum is increasingly used for everything from last mile connectivity to IoT. Unlicensed access plays a critical role in expanding competitive wireless networks, such as those offered by cable operators, and plays a vital role in maintaining the health of licensed wireless networks. Licensed mobile providers look increasingly to incorporate not just Wi-Fi, but LTE over unlicensed into their devices, and LTE over unlicensed promises to further enhance the value of unlicensed overall.¹⁷

The COVID-19 pandemic underscored the importance of robust Wi-Fi capable of supporting multiple streaming devices simultaneously. Even as we slowly emerge from Covid-induced lockdown, experts expect that working from home and remote learning will remain a regular feature of the post-pandemic “new normal.” The rise of high bandwidth uses kick-started by the pandemic will further increase demand for Wi-Fi. For example, Arizona State University has announced a new “virtual reality immersive biology curriculum called Dreamscape Learn” for the fall 2021 term.¹⁸

All of these uses will require bigger, contiguous channels of quality mid-band spectrum to support. This proceeding represents a unique opportunity to open another 500 megahertz of contiguous spectrum capable of supporting the channel sizes for gigabit throughput. Wi-Fi 6 requires channel sizes of 160 MHz to support gigabit speeds. Wi-Fi 7 is projected to increase this throughput even further, and will require a channel size of 360 MHz. The need to create a

¹⁷ See AT&T, “Differences Between LTE Mobile Broadband and Wi-Fi,” available at <https://www.att.com/support/article/wireless/KM1008751/>.

¹⁸ ASU News, “How Students Will Learn Biology in 2021 (and Beyond) as Part of Dreamscape Learn” (December 22, 2020), available at <https://news.asu.edu/20201222-creativity-exploring-new-worlds-virtual-reality>.

spectrum pipeline capable of supporting these channel sizes should weigh heavily on the side of supporting an unlicensed underlay throughout the band. PIOs discuss specific ways to expand unlicensed access in greater detail in Section IV below.

III. THE COMMISSION CAN ADDRESS ITS CONCERNS ABOUT INVESTMENT AND DEPLOYMENT BY ADOPTING POLICIES THAT ENCOURAGE LICENSEES TO QUICKLY BUILD OUT THEIR NETWORKS, INCLUDING OPPORTUNISTIC SHARED ACCESS.

The Commission asks several questions that demonstrate concern over what impact allowing more terrestrial uses will have on deployment and investment in the 12 GHz band.¹⁹ To alleviate these concerns the Commission should balance expanding the spectrum rights of existing licensees in the 12 GHz band with aggressive build out requirements and by conditioning new or modified licenses on opportunistic, shared access to fallow spectrum. These policies will help incentivize build out and ensure that the 12 GHz band meets its full potential.

A. The Commission Should Condition New Terrestrial Use Rights On Aggressive, Enforceable Build Out Requirements.

By attaching aggressive build out obligations to any new terrestrial use rights it assigns to an existing licensee, the Commission can alleviate its concerns over deployment. Build-out requirements ensure that companies, like DISH, actually follow through on providing the promised services that justify their spectrum demands.

The T-Mobile/Sprint Order offers recent precedent for implementing rigorous build out requirements that will help alleviate some of the skepticism concerning the intent behind DISH's

¹⁹ See NPRM at ¶ 51.

push for increased spectrum flexibility within the 12 GHz band.²⁰ In order to ensure that New T-Mobile deploys “the sort of 5G network that justifies the significant public interest benefits we credit in our review of the proposed transaction,”²¹ the Commission required applicants to commit to rigorous and enforceable build out obligations. Specifically, New T-Mobile must provide download speeds of at least 50 Mbps to 66.7% of the rural population and 100 Mbps to at least 55% of the rural population.²² The Commission backed these requirements up with a “robust verification and enforcement mechanism,” promising that “[i]f New T-Mobile fails to meet the rural coverage and other commitments, it would be required to make significant monetary contributions to the U.S. Treasury.”²³ Similarly, the Commission tied the modification of Dish’s licenses to rigorous build out requirements.²⁴

Conditioning new terrestrial uses on a commitment to aggressive build out requirements and an enforcement mechanism will properly incentivize licensees wishing to take advantage of their expanded use right to quickly deployment within the band. Moreover, encouraging the quick deployment of new and expanded uses in the band will incentivize licensees who do not opt into the new terrestrial uses to continue investing in the band lest they fall too far behind their competing licensees. Thus, the Commission should require licensees wishing to receive expanded terrestrial use rights to agree to aggressive and enforceable build out requirements.

²⁰ See F.C.C., Memorandum Opinion and Order, Declaratory Ruling, and Order of Proposed Modification, *In the Matter of Applications of T-Mobile US and Sprint; For Consent to Transfer Control of License and Authorizations; Applications of American H Block Wireless, DBSD Corp., Gamma Acquisition, and Manifest Wireless for Extension of Time*, WT Docket No. 18-197, at ¶ 257-276 (rel. Nov. 5, 2019), <https://ecfsapi.fcc.gov/file/110561267542/FCC-19-103A1.pdf> (“T-Mobile/Sprint Order”).

²¹ *Id.* at ¶ 271.

²² *Id.* at ¶ 272.

²³ *Id.* at ¶ 273.

²⁴ *Id.* at ¶ 377.

B. The Commission Should Allow Opportunistic, Shared Access to Fallow Spectrum Within the 12 GHz Band Because it Will Incentivize Deployment.

The Commission can further encourage current licensees to continue investing in the band by allowing opportunistic and shared access to fallow spectrum. The PIOs expect that authorizing opportunistic sharing will substantially improve broadband access and capacity in rural, Tribal, and other hard-to-serve areas. As OTI and PK have previously explained, “[u]nleashing opportunistic, shared access to fallow spectrum creates a general incentive for licensees to build out services more quickly, or to make greater efforts to partition or lease... This will reduce spectrum warehousing and increase access to operators that are ready to deploy, but who lack spectrum access in a local area.”²⁵ Not only does this stimulate secondary markets it ultimately “ensure[s] that rural and other underserved areas are more likely to receive coverage and higher-capacity broadband service sooner rather than years and years later.”²⁶

The Citizens Broadband Radio Service (CBRS) framework provides important precedent for use-it-or-share-it rules. As the Commission itself has acknowledged, the CBRS framework, including its use-it-or-share it rules “set the stage to (1) promote investment in the band; (2) encourage rapid and robust network deployment; and (3) protect federal and non-federal incumbent users.”²⁷ Just as use-it-or-share it rules did in the CBRS band, opportunistic, shared access will promote investment within the 12 GHz band and encourage rapid, robust build out of

²⁵ Michael Calabrese & Amir Nasr, Comments of Open Technology Institute at New America and Public Knowledge, *In the Matter of Partitioning Disaggregation, and Leasing Spectrum*, WT Docket No. 19-38, at 9 (June 3, 2019).

²⁶ *Id.*

²⁷ F.C.C., *Report, In the Matter of Report to Congress Pursuant to Section 1008 of the Spectrum Pipeline Act of 2015, As Amended by the Ray Baum’s Act of 2018; Use of Spectrum Bands Above 24 GHz for Mobile Radio Services; 3.5 GHz SAS and ESC Applications; Expanding Flexible Use in Mid-Band Spectrum; Between 3.7 and 24 GHz; Promoting Investment in the 3550-3700 MHz Band*, GN Docket Nos. 14-177, 15-319, 17-183, 17-258, at ¶ 18 (rel. Nov. 2, 2018), <https://ecfsapi.fcc.gov/file/1102648911320/DA-18-1128A1.pdf>.

the 12 GHz band. Not only does this help alleviate the Commission’s concerns about deployment and investment within the 12 GHz band, it also benefits rural constituents by increasing their access to mobile and satellite broadband services. Thus, the Commission should allow shared access to fallow spectrum within the 12 GHz band.

IV. THE COMMISSION SHOULD AUTHORIZE UNLICENSED AND OPPORTUNISTIC ACCESS TO THE EXTENT FEASIBLE, THEREBY BOLSTERING BROADBAND ACCESS AND AFFORDABILITY.

The Commission should authorize opportunistic access to unused capacity in the 12 GHz band to the extent technically feasible and consistent with protecting the primary licensed services from harmful interference. Opportunistic use of up to 500 megahertz of spectrum in the band will add capacity to help meet the demand for next-generation Wi-Fi and other unlicensed indoor services, as well as for higher-capacity fixed outdoor wireless services to improve broadband access in rural, Tribal, and other underserved areas. As the groups signing onto the PIO’s July *ex parte* stated, “authorizing coordinated access to vacant 12 GHz spectrum on a secondary basis [can] further ensure that the band is more efficiently utilized.”²⁸ In particular, it can “provide spectrum-as-infrastructure to fixed wireless ISPs and other broadband network providers in underserved rural, tribal and less densely populated communities.”²⁹

Allowing opportunistic access will yield substantial public interest benefits, such as expanding opportunities for the numerous use cases developed by industry over the last few years, including additional Low-Power Indoor (“LPI”) connectivity for unlicensed use and Point-

²⁸ Ex Parte of Public Knowledge and New America’s Open Technology Institute on Behalf of Public Interest Organizations, *Re: Petition for Rulemaking to Permit MVDDS Use of the 12.2-12.7 GHz Band for Two-Way Mobile Broadband Service*, RM-11768 (July 9, 2020) at 3 (“PK and OTI Ex Parte”).

²⁹ *Id.* at 3.

to-Multipoint (“P2MP”) fixed wireless services. These use cases are also possible within the 12 GHz band. Finally, although PIOs believe that there are benefits to Automated Frequency Coordination (“AFC”), the PIOs do not believe it is necessary in the short-term, as manual coordination between fixed wireless P2MP (relying on directional antennas and sectorization) has a well-established track record of protecting fixed satellite earth stations.

A. Unlicensed and Opportunistic Access to Available Capacity in the 12 GHz Band Will Generate Widespread Public Interest Benefits

The PIOs urge the Commission to authorize opportunistic access for feasible terrestrial broadband use cases in the 12 GHz band due to its widespread public interest benefits. These benefits include increasing spectrum access to meet the public demand for expanded services; increasing innovation, competition, and consumer choice; deterring licensees from warehousing spectrum and boost the secondary spectrum market; and improving deployment to rural, tribal, and other underserved areas.³⁰

These potential benefits “outweigh the costs” placed on incumbents,³¹ which are minimal. The PIOs anticipate that the costs of opportunistic sharing are no greater than the costs of unlicensed sharing in the 6 GHz band (e.g., reporting the location of earth stations).³² Another very recent precedent was the Commission’s decision, at the onset of the COVID-19 pandemic,

³⁰ Michael Calabrese, “Use It or Share It: A New Default Policy for Spectrum Management,” New America Report (March 8, 2021), <https://www.newamerica.org/oti/reports/use-it-or-share-it> (“OTI Use or Share Paper”).

³¹ NPRM ¶ 54.

³² OTI Use or Share Paper at 20 (“As a report by the Dynamic Spectrum Alliance observed, coordinated sharing and “leveraging AFC systems to unlock dormant capacity, while avoiding interference to incumbents, is the closest thing there is to a spectrum ‘free lunch’ for businesses and consumers seeking connectivity at low cost.”) citing Automated Frequency Coordination: An Established Tool for Modern Spectrum Management, Dynamic Spectrum Alliance (March 2019) available at: http://dynamicspectrumalliance.org/wp-content/uploads/2019/03/DSA_DB-Report_Final_03122019.pdf (“DSA Report”).

to grant Special Temporary Authorizations to more than 100 wireless internet service providers (WISPs) to opportunistically coordinate use of unused spectrum in the lower 5.9 GHz band.

1. Opportunistic sharing will efficiently address the boom in demand spectrum access.

As the NPRM acknowledges, a key reason for this proceeding is the surge in demand for spectrum capacity and wireless broadband services generally. The President’s Council of Advisors on Science and Technology (“PCAST”) report noted this phenomenon and how relocating incumbents (whether in federal or underutilized commercial bands) is an increasingly difficult, lengthy and costly undertaking.³³ As a result, the Commission has increasingly turned to variations of opportunistic sharing in relatively underutilized bands (licensed, unlicensed and licensed by rule) to address the growing spectrum demands of a diverse set of users.

As the nation transitions to a ubiquitous 5G wireless ecosystem, this demand will continue to multiply. Mobile carriers deploying both mobile and fixed 5G services are not the only providers driving the surge in demand, as other high-capacity fixed wireless providers and an increasing number of individual enterprises, venues, critical infrastructure providers, campuses, and community anchor institutions number among the increasing number of entities deploying or considering the deployment of next generation Wi-Fi and customized IoT networks (including private LTE) to meet their connectivity needs.³⁴

The current obstacle to meeting the growing demand for spectrum is not a scarcity of spectrum capacity, but access to the many occupied but underutilized frequency bands allocated

³³ *Id.* at 20; See Executive Office of the President, President’s Council of Advisors on Science and Technology, *Realizing the Full Potential of Government-Held Spectrum to Spur Economic Growth, Report to the President* (July 2012) (“PCAST Report”); Thomas K. Sawanobori & Dr. Robert Roche, “From Proposal to Deployment: The History of Spectrum Allocation Timelines” (July 20, 2015), <http://www.ctia.org/docs/default-source/default-document-library/072015-spectrum-timelines-white-paper.pdf>; Federal Communications Commission, *Connecting America: The National Broadband Plan* (2010).

³⁴ OTI Use or Share Paper at 20.

for varying uses today. Studies have long demonstrated that only a fraction of the overall data-carrying capacity of most bands is employed on a frequency, geographic, directional, or temporal basis.³⁵ Opening up unused bandwidth for capacity-hungry entities through opportunistic sharing of spectrum makes wireless connectivity more available to more people and decreases deployment costs, which directly improves both consumer welfare and the productivity of businesses that are dependent on wireless data.³⁶ This comes at little to no discernable burden to incumbents. As a Dynamic Spectrum Alliance report recently highlighted, coordinated sharing and “leveraging AFC systems to unlock dormant capacity, while avoiding interference to incumbents, is the closest thing there is to a spectrum ‘free lunch’ for businesses and consumers seeking connectivity at low cost.”³⁷

2. *By promoting diverse spectrum access, opportunistic sharing catalyzes innovation, competition, and consumer choice.*

Although the 12 GHz band is currently shared among three co-primary licensed services, the potential capacity for terrestrial broadband connectivity is barely used. Finding ways to make more intensive terrestrial use of this contiguous 500 megahertz could promote competition and innovation by empowering small and rural providers, individual enterprises (especially for IoT and other low-power, indoor networks), large entertainment venues, community and municipal networks, and individual consumers to tap into the spectrum themselves instead of relying on a provider.³⁸

As OTI recently explained in its *Use it or Share it* report, opportunistic sharing offers a solution to these problems: “Providing more direct spectrum access with low coordination costs,

³⁵ *Id.*

³⁶ *Ib.*

³⁷ *Ib.*; DSA Report at 29.

³⁸ *Id.* at 21.

which is what AFCs are designed to do, also lowers barriers to entry to new providers and types of services.”³⁹ This in turn “[r]educ[es] barriers to entry” and “facilitates more competition, innovation, and consumer choice.”⁴⁰ Moreover, increasing “opportunistic access to spectrum (both GAA and unlicensed) would have the dual effect of encouraging these innovative local networks and increasing their benefits and chances of success.”⁴¹

The Commission has structured the vast majority of recent spectrum auctions in deference to mobile carrier business models that are premised on very wide-area coverage (justifying geographically enormous and expensive license areas) and on a quality of service that requires exclusive control of a band. Unfortunately, this mindset has forced small wireless ISPs and other enterprises that wish to deploy a network on a more localized basis (such as servicing a neighborhood, campus, factory, farm, or warehouse) to rely entirely on purchasing a carrier-offered service, or to limit their deployment to only unlicensed spectrum.⁴²

While the three-tier sharing framework of CBRS is a historic achievement for more intensive use and inclusive spectrum access, the relative dearth of direct access to spectrum remains a serious obstacle to innovation and competition. Direct and opportunistic access to spectrum, both unlicensed and licensed by rule, is more relevant and needed than ever as an increasingly large share of individual businesses, community anchor institutions, offices, and even residential and housing centers can benefit from an IoT network customized to their needs in the boom for connectivity driven by the modern economy. The COVID-19 pandemic further accelerated this trend. The capability to mobilize by quickly and cost-effectively accessing (and

³⁹ OTI Use or Share Paper at 21.

⁴⁰ *Ibid.*

⁴¹ *Id.* at 22.

⁴² *Ibid.*

aggregating) wide channels of spectrum on a local basis through opportunistic sharing is increasingly important to productivity and competition “in a 5G/IoT economy where wireless data connectivity will be associated with virtually every system, venue and device—and where many thousands of firms and service providers will have needs and demands for customized local networks.”⁴³

The CBRS rules in the 3.5 GHz band provide the perfect blueprint for the benefits of opportunistic sharing. The Commission itself found that “permitting opportunistic access to unused Priority Access channels would maximize the flexibility and utility of the 3.5 GHz Band for the widest range of potential users” and “ensure that the band will be in consistent and productive use.”⁴⁴ The three-tier framework of CBRS offers an idea of how allowing opportunistic access in the 12 GHz band could facilitate similar benefits to providers, consumers, and other entities seeking connectivity alike. As OTI opined in its *Use it or Share it* report:

Providing more direct spectrum access with low coordination costs, which is what AFCs are designed to do, also lowers barriers to entry to new providers and types of services. Reducing barriers to entry thereby facilitates more competition, innovation, and consumer choice. Small and rural broadband providers, utilities, and other critical infrastructure, school districts, campuses, large venues, factories, and other individual enterprises are already taking advantage of GAA spectrum access, but will also require more capacity as use expands. More opportunistic access to spectrum (both GAA and unlicensed) would have the dual effect of encouraging these innovative local networks and increasing their benefits and chances of success.⁴⁵

⁴³ *Ibid.*; DSA Report at 32.

⁴⁴ Report & Order and Second Further Notice of Proposed Rulemaking, GN Docket No. 12-354 (Rel. April 21, 2015) ¶ 72 (“3.5 GHz Report & Order”).

⁴⁵ OTI Use or Share Paper at 22.

3. *Allowing opportunistic access will deter warehousing and incentivize secondary market transactions.*

As mentioned previously, the vast majority of the Commission’s spectrum policies throughout the agency’s history have sought to promote nationwide coverage, which has resulted in auctions for license areas that are extremely large and encompass regions with varying characteristics (urban, suburban, exurban, and rural). These diverse geographies are far too large for small ISPs or enterprise and institutional users to manage, effectively creating a barrier that limits their ability to actually acquire spectrum when it is made available. Instead, they must rely on secondary spectrum market transactions and subleases to acquire the spectrum they need.

Historically, large carriers that acquire widespread spectrum licenses at auction are reluctant to sublease their fallow spectrum. The Wireless Internet Service Providers Association (WISPA) surveyed its members and found that 90 percent that had pursued the leasing of carriers’ unused spectrum were ultimately unsuccessful. According to the WISPAs members, carriers were either unwilling to negotiate or demanded unreasonable conditions. As WISPA explained to the Commission, “large carriers acquire licenses for large areas, build out in the urban core where the population is more dense, and warehouse spectrum in rural areas that could be used for broadband deployment.”⁴⁶

As PIOs have argued previously, opportunistic sharing :“creates a general incentive for licensees to pursue secondary market transactions since it identifies operators who see value in using the band in a particular local area. This “demand discovery” puts market-based pressure on licensees to partition and/or lease. With use-it-or-share-it rules in place, licensees will more

⁴⁶ Comments of the Wireless Internet Service Providers Assn, GN Docket No. 12-354, at 25 (July 24, 2017); *See also* Comments of the Wireless Internet Service Providers Assn, GN Docket No. 17-258 at 43-44 (Dec. 28, 2017).

readily identify small carriers as prospects for longer-term and more secure partitioning or leasing arrangements.⁴⁷

This problem is not new. Mobile carriers purchase licenses for areas as large as Partial Economic Areas and focus primarily on building out the most profitable areas, which are often also the most populated. Mobile Future reported that over a 10-year period (2003-2013) leases from a nationwide carrier to a non-nationwide carrier account for only 8.6 percent of the MHz/POPs leased among carriers.⁴⁸ The largest providers have long hoarded spectrum and left it unused rather than reallocating it—even for a profit—to competitors that could extend broadband deployment or other services.

Allowing opportunistic access to spectrum in a wide variety of bands, including the 12 GHz band, would incentivize nationwide carriers to either lease their fallow spectrum or actually build out its network. As OTI has explained, “there are no obvious incentives [for licensees] to lease or partition vacant spectrum. Transaction costs are high and prime spectrum has proven to have an option value that deters the sort of long-term commitments that another ISP typically wants.”⁴⁹ Opportunistic, shared access flips this and “creates a general incentive for licensees to build out services more quickly, or to engage in secondary market transactions such as leasing unused spectrum or partitioning a license.”⁵⁰ Moreover, with opportunistic access “other

⁴⁷ Comments of New America’s Open Technology Institute, WT Docket No. 19-38 (June 3, 2019) at 13-14 (“OTI and PK Secondary Markets Comments”).

⁴⁸ Mobile Future, “FCC Spectrum Auctions and Secondary Market Policies: An Assessment of the Distribution of Spectrum Resources Under the Spectrum Screen,” at 18-19 (Nov. 2013), available at <https://ecfsapi.fcc.gov/file/7520957584.pdf>.

⁴⁹ OTI Use or Share Paper at 23-24.

⁵⁰ *Ibid.*

(typically smaller) operators are finding value in the unused portions of their license area. This “demand discovery” puts market-based pressure on licensees to partition and/or lease.”⁵¹

The positive effect opportunistic access has on secondary markets, also provides far-ranging benefits to rural, Tribal, and other hard-to-serve areas. These areas have a notable need for high-speed broadband that promoting shared use of vacant spectrum in rural parts of the country can help meet. The areas that have more fallow spectrum also tend to have the highest costs relative to ARPU and subsequently small and rural providers cannot buy exclusive, large-area licenses.⁵² Allowing opportunistic use in the 12 GHz band has the potential to promote aggregation with other bands to expand capacity and strengthen quality of service in rural, Tribal, and other hard-to-serve areas even if the service is only available temporarily. As PIOs have previously stated, “On the buy side, opportunistic access creates a market for interference protection, serving as an intermediate step between non-use and paying the licensee for partitioning and leasing spectrum.”⁵³ Opportunistic access also allows small operators to run “initial and test deployments to see if paying for interference protection would actually be worth the cost.”⁵⁴ Regardless of “[w]hether or not they ultimately come to an agreement to pay for exclusive use – through partitioning or leasing – the public benefits when unused spectrum, a resource that is infinitely renewable, is used to improve connectivity.”⁵⁵

4. *Opportunistic sharing can facilitate high-capacity deployments in rural, tribal, and other underserved areas.*

Deploying rural broadband is expensive. Fiber and other wireline technologies are five-to-seven times more expensive and far more time-intensive to deploy in less densely-populated

⁵¹ *Ibid.*

⁵² OTI and PK Secondary Markets Comments at 13.

⁵³ *Id.* at 14.

⁵⁴ *Ibid.*

⁵⁵ *Ibid.*

or otherwise topographically-challenging regions.⁵⁶ High costs are a major hurdle to both access and affordability in these communities.⁵⁷ As a point of policy, fixed wireless providers (through point-to-multipoint, or P2MP, service) offer a more cost-effective method of extending high-speed broadband service to tailored regions that are hard-to-serve parts of the country, which would likely drive down the prices of broadband for consumers. As one report highlighted, “Fixed wireless has a much lower upfront cost to build than fiber. This lower cost makes reaching certain locations more economically feasible.”⁵⁸

These underserved communities are precisely where the Commission should seek to catalyze deployment by incentivizing efficient access to wide channels of unused spectrum such as the 12 GHz band. If spectrum is unused in a certain region and a provider or other local entity is willing and able to employ the spectrum to offer access to local residents, then the Commission should empower them to make use of the spectrum and promote widespread use of the band. Doing so will not affect areas where the band is already occupied. But, in parts of the country where the band is unused, opportunistic sharing will facilitate P2MP services that can help localities bridge their own digital divides.

B. An Indoor-Only Underlay and Point-to-Multipoint Fixed Service Outdoors Could Facilitate a Variety of Additional Uses that Promote the Public Interest.

Recent Commission decisions that authorize opportunistic sharing of occupied-but-underutilized spectrum to support low-power indoor unlicensed use in 6 GHz and outdoor point-to-multipoint (P2MP) services in 5.9 GHz demonstrate how the 12 GHz band can accommodate

⁵⁶ OTI Use or Share Paper at 25.

⁵⁷ See Edward Carlson and Justin Goss, “The State of the Urban/Rural Digital Divide,” National Telecommunications and Information Administration Blog (Aug. 10, 2016).

⁵⁸ See “OVUM White Paper Reveals Growth in Fixed Wireless as an Alternative to Fiber for Enterprise-Class Services,” *Business Wire* (March 15, 2018), available at <https://www.businesswire.com/news/home/20180315005732/en/OVUM-White-Paper-Reveals-Growth-Fixed-Wireless>.

more widespread and productive shared spectrum access for a more diverse set of users and use cases. The Commission should build on the precedents established last year in the 6 GHz band and in approving Special Temporary Access for over 100 WISPs to coordinate use of vacant spectrum capacity in the lower 5.9 GHz band. This will increase the coverage and capacity of fixed wireless broadband networks, making the most effective use of the 12 GHz band.

1. An unlicensed, low-power and indoor-only underlay could be authorized, particularly if the coexistence of flexible use mobile 5G is not feasible.

The Commission seeks comment on three alternative approaches to assigning expanded terrestrial rights.⁵⁹ The first two (modifying licenses under section 316 and an overlay auction) generally presuppose a grant or auction of flexible use rights that could be used to deploy mobile 5G operations. The third approach outlined by the Commission would allow “new terrestrial operations . . . in the form of an underlay” that “likely would need to be authorized at low power and would need to operate on an opportunistic basis, not causing harmful interference to—nor seeking protection from harmful interference by—the incumbent primary services in the band.”⁶⁰ The PIOs reiterate our call for the Commission to authorize an unlicensed, low-power underlay in the 12 GHz band.⁶¹ If the Commission decides it is not able to assign flexible terrestrial use rights in all or some portion of the 12 GHz band, then this approach is particularly relevant. The PIOs urge the Commission to authorize an unlicensed underlay with Part 15 technical rules as similar as possible to the low-power, indoor-only (LPI) authorization the Commission adopted last year in the 5925-7125 MHz band. We expect this is both feasible without undue risk of interference to the current co-primary satellite services and it would provide additional capacity for a wide variety of industrial, home, school and business Internet of Things (IoT) networks.

⁵⁹ NPRM at ¶ 33 *et seq.*

⁶⁰ *Id.* at ¶ 33.

⁶¹ NPRM ¶ 39; PK and OTI Ex Parte at 6.

A contiguous 500 megahertz of spectrum would give tens of millions of users—in homes, businesses, schools, and venues—access to additional high-capacity channels with the ability to support next-generation Wi-Fi 6 and future Wi-Fi 7 services, as well as other unlicensed technologies and future innovation. In its recent 6 GHz and 5.9 GHz Orders, the Commission has emphasized the wide-ranging and widely-available benefits of expanding capacity for 5G-quality Wi-Fi 6 connectivity, thereby facilitating consumer access to innovative new applications such as augmented reality and virtual reality.⁶² Authorizing low-power underlay on an unlicensed basis would not require the overhead of an automated frequency coordination, a benefit of LPI that the PIOs emphasized in the context of the 6 GHz proceeding.⁶³

The importance of gigabit-fast Wi-Fi and other unlicensed innovation to the economy, businesses, education, and other purposes is well-documented and provided a strong basis for the Commission’s decision to overrule the objections of incumbents in the 5.9 GHz and 6 GHz proceedings. As the Commission acknowledges, the 5G/IoT/O-RAN working group of the Commission’s Technological Advisory Council has recommended that the agency consider opening more private spectrum for enterprise Internet-of-Things (“IoT”) devices in locations such as confined geographic areas, buildings, and campuses and posits whether 12 GHz band spectrum is suitable for this purpose.⁶⁴

⁶² PK and OTI Ex Parte at 6; In re: Unlicensed Use of 6 GHz band, Expanding Flexible Use in Mid-Band Spectrum Between 3.7 GHz and 24 GHz, ET Docket 18-295, GN Docket 17-183 (rel. April 24, 2020).

⁶³ Comments of Public Interest Organizations, ET Docket No. 18-295, GN Docket No. 17-183 (Feb. 15, 2019), at 17, available at <https://ecfsapi.fcc.gov/file/10216231854762/Public%20Interest%20Orgs%206%20GHz%20Comments%20Final%20AsFiled%20021519.pdf>.

⁶⁴ See NPRM ¶ 32.

Wi-Fi plays a pivotal role as the “workhorse” of the internet largely due to the fact that low-cost, off-the-shelf routers allow consumers to access unlicensed spectrum that supports high-capacity connectivity throughout offices, schools, libraries, dining locations, retailers, and virtually all public places in the modern era. The vast majority of the uses derive from do-it-yourself installations as opposed to costly professionally-installed enterprise networks. This proceeding offers the Commission an opportunity to add much-needed capacity—500 megahertz of spectrum—to next generation Wi-Fi services.

Last year the Commission concluded that low-power and indoor-only unlicensed use across the entire 6 GHz band—and without an AFC requirement—does not create undue risk of harmful interference to fixed microwave links and other incumbents, many of which serve critical utility and public safety missions.⁶⁵ Although the co-primary satellite services sharing the 12 GHz band are technically very different, the propagation characteristics of the 12 GHz band are far more amenable to robust indoor use without undue risk of harmful interference to incumbent satellite services or other potential outdoor operations.⁶⁶ At a minimum the PIOs believe that the opportunity to authorize an indoor-only underlay at some relatively low power level deserves further study, since it could be compatible with various outcomes, including the possibility that the Commission maintains allocations similar to the status quo. At present, the two co-primary satellite services (DBS and NGSO MSS) use only a tiny fraction of the band’s useful capacity.

⁶⁵ 6 GHz Order ¶ 98. “Based on the record before us, we open the entire 6 GHz band for unlicensed indoor operations without the need for AFC-controlled access. By doing so, we create new unlicensed use opportunities in these bands—including optimizing the potential for deployment of next generation Wi-Fi that makes use of 160 MHz channels—while protecting the various incumbent licensed services in the band, . . .”

⁶⁶ PK and OTI Ex Parte at 6.

While interference risks are quite likely low, the public interest benefits of allowing low-power indoor use in the 12 GHz band are substantial. The Commission acknowledged this by authorizing an unlicensed LPI underlay across the entirety of the 6 GHz band: “[W]e expect that 6 GHz unlicensed devices will become a part of most peoples’ everyday lives. The rules we are adopting will also play a role in the growth of the IoT; connecting appliances, machines, meters, wearables, and other consumer electronics as well as industrial sensors for manufacturing.”⁶⁷ Similarly, the 12 GHz band could play a significant role in supporting the same 5G-quality services. As Cisco explains there is a need for more spectrum to support unlicensed sharing across the 6 GHz band: “Unless the Commission opens new frequencies for unlicensed operations now, rising demand will increasingly result in congestion and adversely impact the user experience.”⁶⁸ Indeed, it’s quite possible that a major beneficiary would be the NGSO satellite operators in the band, whose data streams will be useful to the steadily growing number of consumer Wi-Fi devices in the home only by being re-broadcast by the home or business Wi-Fi router.

⁶⁷ 6 GHz Order ¶ 3.

⁶⁸ Comments of Cisco, ET Docket No. 18-295, GN Docket No. 17-183 (filed Feb. 15, 2019) at 4 “The VNI reflects that Wi-Fi is ‘the crucial link’ to the Internet for numerous applications, and that the United States’ reliance on Wi-Fi to carry enormous amounts of data will grow markedly over the coming years. . . . the VNI shows that Wi-Fi will grow from 50.4% of total [Internet] traffic in 2017 to 56.6% of traffic in 2022. Those percentage increases are significant in isolation, but they represent staggering increases in the total data carried by Wi-Fi when taking into consideration that... Internet traffic in the United States will likewise grow from 337.2 exabytes in 2017 to 1.03 zettabytes (or roughly 1,030 exabytes) in 2022. . . . [I]n 2022 Wi-Fi will carry more than triple the amount of data than it did two years ago. Unless the Commission opens new frequencies for unlicensed operations now, rising demand will increasingly result in congestion and adversely impact the user experience.”).

2. ***Coordinated sharing by point-to-multipoint services is feasible and facilitates high-capacity fixed broadband services in rural, tribal and underserved areas.***

As discussed previously, the Commission can further enhance access to high-capacity fixed wireless services—particularly in rural, Tribal and other low-density areas—by allowing coordinated, opportunistic access to unused portions of this 500 megahertz band on a secondary basis. The PIOs agree that the 12 GHz band could “support opportunistic use of unused spectrum on a localized basis, such as for high-capacity fixed wireless in rural and less densely populated areas.”⁶⁹ Adding opportunistic access for fixed, point-to-multipoint (“P2MP”) terrestrial broadband can ensure the most efficient use of this band of spectrum. This is particularly relevant if the Commission reallocates all or a portion of the band to flexible use licensing. Mobile carriers incorporating 12 GHz spectrum in their 5G networks are very likely to focus on urban, inner suburban and other high-traffic areas for the foreseeable future, since their spectrum holdings below 4 GHz are far more economic for low-density deployments. In the meantime, opening access to unused capacity in the 12 GHz band would provide rural ISPs and other entities with the spectrum-for-infrastructure they need to expand broadband services and help to bridge the digital divide.⁷⁰

Even if the Commission opts to authorize flexible use rights for MVDDS licensees, the need to protect satellite services could require terrestrial much lower power limits than those deployed in other bands employed to support wide-area 5G coverage such as C-band. The first deployments in the 12 GHz band are likely to focus on urban, suburban, and other higher-density areas where the investment in greater capacity justifies the cost. The Commission should not

⁶⁹ NPRM ¶ 54.

⁷⁰ See, e.g., Linda Hardesty, “WISPA Wants 200 MHz Allocated to Close Digital Divide,” *Fierce Wireless* (March 24, 2021), <https://www.fiercewireless.com/wireless/wispa-wants-200-mhz-allocated-to-close-digital-divide>.

leave upwards of 500 megahertz on the table in underserved rural, Tribal, and other less-densely-populated areas. This use-it-or-share approach to the band permits sharing on a secondary, coordinated basis and has the power to streamline high-capacity fixed broadband such as P2MP services.⁷¹

Opportunistic sharing in the 12 GHz band to deploy fixed P2MP services is particularly valuable for rural, Tribal, and other hard-to-serve areas.⁷² As OTI, PK, and other rural and Tribal advocates explained in the C-Band proceeding:

It is extremely expensive to trench or hang fiber and other wireline broadband technologies in rural and hard-to-reach areas, and often the business case is nonexistent, particularly for larger companies, . . . However, fixed wireless offers a more cost-effective method of bringing high-speed broadband to targeted, hard-to-serve rural areas, which should in turn make the actual service more affordable, as prohibitive costs are a major obstacle to high-speed broadband adoption for rural Americans, even when and where it is available.⁷³

A study from OVUM supports the view that fixed wireless services, such as P2MP, are more economically feasible for providers in hard-to-serve areas: “Fixed wireless has a much

⁷¹ OTI Use or Share Paper at 32.

⁷² PK and OTI Ex Parte at 5 (“A use-it-or-share-it opportunity at 12 GHz will help expand affordable broadband services in rural, tribal and other communities where there is a limited economic incentive for a national or regional carrier to offer service, but still a real economic need for the community. A recent study by BroadbandNow Research found that 42 million Americans lack access to wireline or fixed wireless broadband, nearly 13 percent of the population, with a disproportionate share in rural and small town communities. Surveys by the Pew Research Center found that only 63 percent of rural Americans said they having broadband at home, compared to 79 percent of suburban Americans and 75 percent of Americans living in urban areas.”); John Busby et al., “FCC Reports Broadband Unavailable to 21.3 Million Americans, BroadbandNow Study Indicates 42 Million Do Not Have Access,” BroadbandNow Research (Feb. 3, 2020), <https://broadbandnow.com/research/fcc-underestimates-unserved-by-50-percent>; Andrew Perrin, “Digital gap between rural and nonrural America persists,” Pew Research Center (May 31, 2019), <https://www.pewresearch.org/fact-tank/2019/05/31/digital-gap-between-rural-and-nonruralamerica-persists/>.

⁷³ Comments of Broadband Connects America Coalition, GN Docket No. 18-122, at 23 (Oct. 29, 2018), available at https://ecfsapi.fcc.gov/file/1030290296636/BCA%20Rural%20Comments_C-Band_FINAL_AsFiled_102918.pdf.

lower upfront cost to build than fiber. This lower cost makes reaching certain locations more economically feasible.”⁷⁴ The widespread benefits of open spectrum for fixed wireless applications is not limited to higher-capacity and more affordable rural broadband. For example, parties including Deere & Company have told the Commission that fixed wireless, along with mobile services, are likely the “superior technology choice to achieve cost-effective coverage for many rural areas including farm-intensive areas with significant tracts of cropland.”⁷⁵

Like the ongoing FSS portion of C-band, local users of unused channels in the 12 GHz band for fixed P2MP can coordinate with each other, even on a co-channel basis, while avoiding harmful interference with incumbent earth stations. An engineering study by Virginia Tech Professor Jeff Reed concluded that exclusion zones of up to 10 kilometers are adequate in the upper C-band (4000-4200 MHz) to protect fixed satellite service (FSS) earth stations from harmful interference in the presence of co-channel P2MP services.⁷⁶ OTI, PK, and other rural and Tribal advocates in the Broadband Connects America coalition highlighted the Reed study as demonstrating why there is tremendous potential in less densely populated areas for fixed

⁷⁴ “OVUM White Paper Reveals Growth in Fixed Wireless as an Alternative to Fiber for Enterprise-Class Services,” *Business Wire* (March 15, 2018), <https://www.businesswire.com/news/home/20180315005732/en/OVUM-White-Paper-Reveals-GrowthFixed-Wireless>. See also Sarah Barry James, “Fixed wireless to shine in 2018 thanks to 5G, cost savings,” *S&P Market Intelligence* (April 6, 2018), available at <https://platform.mi.spglobal.com/web/client?auth=inherit#news/articleabstract?id=44144018>.

⁷⁵ Comments of Deere & Company, GN Docket No. 17-199 (Sep. 21, 2017).

⁷⁶ Letter from Wireless Internet Service Providers Association, Google LLC, and Microsoft Corp. to Marlene H. Dortch, Secretary, GN Docket No. 18-122 (filed July 15, 2019), Attachment, available at [https://ecfsapi.fcc.gov/file/10715379201594/Joint%20Ex%20Parte%20Letter%20\(WISPA%20Microsoft%20Google\).pdf](https://ecfsapi.fcc.gov/file/10715379201594/Joint%20Ex%20Parte%20Letter%20(WISPA%20Microsoft%20Google).pdf); Public Notice, Wireless Telecommunications Bureau, International Bureau, Office of Engineering and Technology, and Office of Economics and Analytics Seek Focused Additional Comment in 3.7-4.2 GHz Band Proceeding, GN Docket No. 18-122, RM-11791, RM-11778, DA 19-678 (rel. July 19, 2019); See also Monica Allevan, “Google, WISPA tout results of study on sharing in C-band,” *Fierce Wireless* (July 2, 2019), <https://www.fiercewireless.com/wireless/google-wispa-tout-results-study-sharing-c-band>.

wireless P2MP operations, using directional antennas and sectorization, to coordinate and coexist with satellite earth stations, thereby facilitating high-capacity fixed wireless services in rural and other hard-to-serve areas:

[T]he Reed Study concludes that a combination of geographic protection zones and directional antennas allow the Commission to authorize high-speed P2MP fixed wireless broadband service in areas covering nearly 80 percent of the U.S. landmass – mostly rural and less densely populated areas – where 80 million Americans live. . . . the Reed Study demonstrates there should be no concern about harmful interference to FSS incumbents in these areas provided that a modernized version of Part 101 frequency coordination is required, as it has been for decades in bands shared between the Fixed Service (FS) and FSS. . . . P2MP fixed wireless operators can effectively use directional antennas to coordinate sectors of coverage with no risk of harmful interference to FSS earth stations.⁷⁷

As the current COVID-19 crisis has made painfully clear, adequate and affordable broadband access is critical for accessing education, healthcare, government services and the modern workplace.⁷⁸ For example, a Hudson Institute study found that rural broadband facilitated over \$100 billion in e-commerce in 2015 and that \$8.2 billion of the earnings generated through the economic activity catalyzed by the rural broadband industry was funneled back to rural areas.⁷⁹ Authorizing opportunistic sharing of vacant spectrum in parts of the country where providers are unlikely to deploy service will provide the public infrastructure for local ISPs, community anchor institutions, and other entities to expand deployment and boost local economies, as the cases of municipal broadband network deployments in places such as Chattanooga, Tennessee, and Lafayette, Louisiana, have demonstrated.⁸⁰

⁷⁷ Comments of the Broadband Connects America Coalition, GN Docket No. 18-122 (Aug. 7, 2019), at 11-12.

⁷⁸ PK and OTI Ex Parte at 5.

⁷⁹ Hanns Kuttner, “The Economic Impact of Rural Broadband,” The Hudson Institute, at 4 (April 2016), available <https://www.frs.org/sites/default/files/documents/2017-12/Hudson%202016%20The%20Economic%20Impact%20of%20Rural%20Broadband.pdf>.

⁸⁰ Comments of the Broadband Connects America Coalition, GN Docket No. 18-122 (Aug. 7, 2019), at 9-10 (“For example, the municipal power company in Chattanooga, Tennessee, spent

Finally, although one or more AFCs could promote the efficiency of opportunistic access in the 12 GHz band longer term, a geolocation database would not be necessary to coordinate opportunistic sharing, as precedents in several other bands have demonstrated.⁸¹ Although there are clear benefits to Automated Frequency Coordination (AFC), the PIOs do not believe it is necessary in the short-term, as manual coordination between fixed wireless P2MP (relying on directional antennas and sectorization) has a well-established track record of protecting fixed satellite earth stations. Manual coordination is adequate until stakeholders there is a better sense of the scale of opportunistic use. Further, the recent 5.9 GHz STAs detailed above provide further evidence of not only the viability of opportunistic access as a policy priority, but also as an approach to opportunistic access that can be implemented almost immediately by relying initially on manual coordination and accurate reporting by incumbent licensees.

V. CONCLUSION

This proceeding provides an excellent opportunity for the Commission to further fuel the nation's wireless future. The Commission should expand non-interfering access to wide channels of underutilized spectrum for terrestrial broadband use to promote the deployment of 5G services, promote competition, enhance the benefits of next generation Wi-Fi, spur innovation, and narrow the digital divide in underserved communities. The rules should promote competition

roughly \$220 million building its municipal fiber-optic system, which later brought in over \$865 million in economic growth for the city. . . . [including] the creation of between 2,800 and 5,200 new jobs, and roughly \$1 billion of the economic benefits for the city from the years of 2011-2015 were the result of the network. Chattanooga then experienced the third highest wage growth of all American mid-sized cities in 2014. Chattanooga's unemployment rate has fallen to around 3% in 2019 after being at over 10% following the 2008 economic crash. The city of Lafayette, Louisiana, experienced a similar improvement to its economy with the introduction of a high-speed municipal broadband network . . . creat[ing] around 2,000 jobs with average salaries of \$60,000 in about one year and a half.).

⁸¹ NPRM at ¶ 47.

and deployment in underserved areas, including through strict build out requirements and a use-it-or-share-it condition on licenses. Commission decisions last year that authorize opportunistic sharing of occupied-but-underutilized spectrum to support low-power indoor unlicensed use in 6 GHz and outdoor point-to-multipoint services in 5.9 GHz demonstrate how the 12 GHz band can accommodate more widespread and productive shared spectrum access for a more diverse set of users and use cases. The Commission should take this opportunity to adopt another creative and progressive leap forward to a future of spectrum sharing.

Respectfully Submitted,

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