

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
)	
Promoting Investment in the 3550-3700 MHz Band;)	GN Docket No. 17-258
)	
3.5 GHz SAS and ESC Applications;)	GN Docket No. 15-319
)	
Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz;)	GN Docket No. 17-183
)	
Spectrum Bands above 24 GHz)	GN Docket No. 14-177

**COMMENTS OF
THE OPEN TECHNOLOGY INSTITUTE AT NEW AMERICA,
AMERICAN LIBRARY ASSOCIATION, THE BENTON FOUNDATION,
CONSUMER FEDERATION OF AMERICA, CONSUMERS UNION,
INSTITUTE FOR LOCAL SELF-RELIANCE, NATIONAL HISPANIC MEDIA
COALITION, NEXT CENTURY CITIES, PUBLIC KNOWLEDGE,
SCHOOLS, HEALTH, & LIBRARIES BROADBAND COALITION, AND X-LAB**

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TABLE OF CONTENTS

I.	Summary and Introduction	3
II.	Progress on the Landmark Citizens Band Radio Service has been Unduly Delayed and is in Danger of Becoming a Shortsighted Industrial Policy that Serves a Single Industry rather than the Broader Public Interest	6
	<i>A. Both FCC and DoD are Unduly Delaying the Critical Economic Benefits of CBRS</i>	<i>6</i>
	<i>B. The CBRS Licensing Framework the Commission Adopted in 2015 Serves a Wide Range of Industries and the Public Interest</i>	<i>13</i>
III.	The Commission Should Continue its Progress in Opening the Entirety of the Underutilized C-bands at 3.7 GHz and 6 GHz for Shared and Opportunistic Use	20
	<i>A. Low-Power, Unlicensed Sharing of Unused Spectrum Capacity Across the 6 GHz Band Is Needed to Fuel Next Generation Wi-Fi</i>	<i>21</i>
	<i>B. Coordinated Access to Unused Spectrum Across the 3.7-4.2 GHz Band Can Immediately Promote High-Capacity and More Affordable Broadband in Rural and other Underserved Areas</i>	<i>25</i>
IV.	Conclusion	29

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BROADBAND COALITION, AND X-LAB**

The Open Technology Institute at New America, the American Library Association, the Benton Foundation, Consumer Federation of America, Consumers Union, the Institute for Local Self-Reliance, National Hispanic Media Coalition, Next Century Cities, Public Knowledge, the Schools Health & Libraries Broadband (SHLB) Coalition, and X-Lab (together, the Public Interest Spectrum Coalition, or “PISC”) hereby submit these Comments in response to the Federal Communications Commission’s request for comment as directed by Congress in the Spectrum Pipeline Act, with reference to the above captioned proceedings.¹ Together, PISC represents a wide variety of public interest and consumer advocacy organizations. PISC believes

¹ Public Notice, Wireless Telecommunications Bureau and Office of Engineering and Technology Seek Comment Pursuant to the Spectrum Pipeline Act of 2015, GN Docket Nos. 14-177, 15-319, 17-183, and 17-258, (Aug. 10, 2018), <https://docs.fcc.gov/public/attachments/DA-18-841A1.pdf>.

that the Commission should maintain its 2015 Citizens Broadband Radio Service rules, as adopted, and use similar spectrum sharing frameworks to unlock mid-band spectrum for a wide variety of use cases and improve broadband in unserved and underserved areas. PISC also believes the Commission should free up more unlicensed spectrum in the 6 GHz band to increase capacity for Wi-Fi and other unlicensed technologies.

I. Summary and Introduction

The Federal Communications Commission (“Commission”) seeks comment, as required by the Spectrum Pipeline Act of 2015, on the impact of the Citizens Broadband Radio Service (CBRS) rules, as well as on “proposals to promote and identify additional spectrum bands that can be shared between incumbent uses and new licensed and unlicensed services.” There are several major opportunities for the Commission to extend spectrum sharing and thereby empower a wide variety of use cases that improve connectivity in the 3.5 GHz, 3.7-4.2 GHz and 6 GHz bands.

First and foremost, the Commission should retain and redouble its efforts to implement the unduly delayed Citizens Broadband Radio Service (CBRS) rules governing shared use of the 3.5 GHz band that the Commission initially adopted by a bipartisan 5-0 vote in 2015. The CBRS three-tier sharing framework, including the specific rules for Priority Access Licenses, represent a landmark in forward-thinking spectrum policy not only for the 3.5 GHz band, but as a model for unlocking substantial, low-cost capacity for wireless broadband and innovation in additional occupied but underutilized bands. CBRS can be a critical part of the foundation for the nation’s 5G future and empower small and rural internet service providers, schools, hospitals, factories, office buildings, IoT and other niche connectivity providers to customize and operate their own private LTE networks that would be supplemented by Wi-Fi offload.

What Congress needs to be told is that the Commission, the U.S. Navy and NTIA are falling short of the expectations that were widely held at the time the Spectrum Pipeline Act became law on November 2, 2015 – six months *after* the adoption of the *CBRS First Report & Order* on a bipartisan 5-0 vote. At that time Congress had every reason to believe that the FCC, the U.S. Navy and NTIA would live up to high expectations for a rapid launch of CBRS as a unique innovation band vital to unlocking spectrum capacity and fueling American leadership globally. Unfortunately, however, despite rapid progress, innovation and investment around this path-breaking approach by an unprecedented collaboration of dozens of companies from a diverse range of industry segments, the sad fact is that in the waning months of 2018 there is far less to report back to Congress about the “results” of the landmark CBRS framework than there reasonably should be. The implementation of CBRS – including the assignment of Priority Access Licenses (PALs) and the approval of the coordination mechanisms for the band – have been unduly delayed. Inexplicably, progress at the Commission, at NTIA, and particularly with the U.S. Navy has slowed, creating delays that threaten to undermine the enormous public interest benefits of CBRS.

The policy purpose of CBRS and its benefits to the broader economy may also soon be cast aside. CBRS rules and licensing framework is specifically tailored, for the first time, to provide a wide variety of industries and use cases affordable and localized access to interference-protected spectrum. When adopted, CBRS was intended to benefit users ranging from rural and small wireless internet service providers, to utilities, ports and community anchor institutions, to hotels, office complexes and other venues, to utilities, factories, and critical infrastructure companies such as General Electric. The small-cell and three-tier CBRS sharing framework very purposely fashioned Priority Access Licenses (PALs) as localized and affordable (census tracts),

with competitive renewal after three years, the exception being an option for a six-year initial term. The Commission wisely adopted this alternative licensing structure to increase rural broadband deployment, to encourage intensive use of the band in both urban and less-populated areas, to create increased opportunities for competition and new market entrants, and to promote new and innovative use cases. The Commission's tentative proposal to make PALs permanent and as large as traditional cellular licenses would preclude most of the rural and innovative use cases the CBRS rules were specifically designed to catalyze. The Commission should retain licenses based on census tracts, relatively short terms and competitive renewal.

Secondly, the Commission has a ripe opportunity to authorized unlicensed sharing across the entire 6 GHz band to enable gigabit-fast Wi-Fi. The 6 GHz band, adjacent to current Wi-Fi operations, is uniquely positioned to help build capacity for Wi-Fi networks as unlicensed, and Wi-Fi in particular, increases in importance as the connectivity of choice for mobile devices and local area networks. As more data travels over unlicensed networks, it is imperative that the Commission free up this band of spectrum as a matter of preparing for the 5G future.

Finally, PISC appreciates the Commission's progress on unlocking unused spectrum in the 3.7-4.2 GHz. The FCC moved rapidly to approve a *Notice of Proposed Rulemaking* that requests comment on two leading proposals, including one from the Broadband Access Coalition (of which several PISC groups are original members) calling on the Commission to free up the 3700-4200 MHz band to authorize a new, licensed, point-to-multipoint (P2MP) fixed wireless service. The 3.7-4.2 GHz band presents a prime opportunity for the Commission to authorize robust band-sharing rules that achieve a win-win-win trifecta of critical public policy goals: first, to enable fixed wireless providers to bring high-speed broadband access to rural areas; second, to reallocate a substantial portion of the band available for mobile carriers to build mobile 5G

networks; and third, to protect incumbent Fixed Satellite Services (FSS) licensees from undue disruption or harmful interference. Unlocking every megahertz of the grossly underutilized C-band will serve another key element of strong 5G networks that bring both high-capacity fixed and mobile service to rural, small town and big urban areas alike. Most critically, empowering fixed wireless providers will bring high-speed broadband to rural areas rapidly in a cost-effective manner.

II. Progress on the Landmark Citizens Band Radio Service has been Unduly Delayed and is in Danger of Becoming a Shortsighted Industrial Policy that Serves a Single Industry rather than the Broader Public Interest

Rarely has a new spectrum allocation received such an outpouring of investment and innovation by a diverse range. The potential of CBRS to provide a combination of interference-protected spectrum (Priority Access Licenses) and effectively unlicensed capacity (General Authorized Access) on an affordable, local-area basis has generated interest, investment and innovation from a wide variety of industry sectors and companies. Unfortunately, however, the implementation of CBRS – including particularly the assignment of Priority Access Licenses (PALs) and the approval of the coordination mechanisms for the band – have been unduly delayed. These delays are mutually reinforcing and seem to have their locus among a number of different officials at the FCC, the U.S. Navy and the NTIA.

A. Both FCC and DoD are Unduly Delaying the Critical Economic Benefits of CBRS

When Congress adopted the Spectrum Pipeline Act in 2015, it had every reason to believe that within three years – by November 2018 – the Commission would be in a position to submit “an analysis of the results of the rules changes relating to the frequencies between 3550

megahertz and 3650 megahertz.”² At that time, Congress also had every reason to believe that the Commission would live up to high expectations for a rapid launch of CBRS as a unique innovation band vital to unlocking spectrum capacity and fueling U.S. leadership globally. The CBRS framework and rules were adopted six months prior to the Act’s passage.³ The Commission had moved this unprecedented experiment in spectrum management from a concept in a *Notice of Inquiry* (December 2012) to a final order (April 2015) in less than 30 months, and at each step with a bipartisan 5-0 vote. This was quite an accomplishment considering that the reallocation of spectrum for a new service has historically taken 13 years on average, according to a CTIA report.⁴ Petitions for Reconsideration were resolved – and final rules adopted – just 12 months later on April 28, 2016.

Upon adoption of the 2015 Order, while Congress was still deliberating the Pipeline Act, an unprecedented degree and diversity of enthusiasm around investment and innovation in the band commenced. The potential of CBRS to provide a combination of interference-protected spectrum (PALs) and effectively unlicensed capacity (GAA) on an affordable, local-area basis has generated interest and nascent innovation from a wide variety of industry sectors and companies, as we describe further in the next section.

When the Commission wisely looked to the private sector to develop a consensus around the technical details of implementation, the Wireless Innovation Forum (WinnForum) stepped up as the vehicle for an unprecedented, multi-stakeholder process to develop the technical

² See Spectrum Pipeline Act of 2015, Pub. L. No. 114-74, § 1008, 129 Stat. 621, 625 (2015), as amended by the Ray Baum’s Act of 2018, Pub. L. 115-141, § 614, 132 Stat. 1080, 1109 (2018).

³ See Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-3650 MHz Band, Report and Order and Second Further Notice of Proposed Rulemaking, 30 FCC Rcd 3959 (2015) (*CBRS First Report & Order*).

⁴ Thomas Sawanobori and Robert Roche, “From Proposal to Deployment: The History of Spectrum Allocation Timelines,” CTIA—The Wireless Assn. (July 2015), available at <https://api.ctia.org/docs/default-source/default-document-library/072015-spectrum-timelines-white-paper.pdf>.

specifications for implementation of this unique experiment in opening a band long used by the U.S. Navy for widespread sharing by the private sector. Companies from a growing variety of industry segments (rural broadband, mobile carriers, chip makers, mobile carriers, critical infrastructure and wireless equipment OEMs) donated thousands of hours to the collective effort. WinnForum, which now has 93 members, developed a CBSD Test Lab Approval Program and has already designated the first four test labs to test and certify whether CBRS devices (CBSDs) conform with Part 96 of the Commission's rules.⁵ Multiple Spectrum Access Systems (SAS) are already fully developed, and are in what promises to be the final stages of certification.

By August of 2016, this collaborative stakeholder process was reinforced by a second multi-stakeholder initiative, the CBRS Alliance, which has since grown to include more than 100 member companies and organizations dedicated to developing a robust CBRS ecosystem and early deployments on the band.⁶ The CBRS Alliance and WinnForum have each finalized *Release 1* specifications that incorporate all of the Part 96 requirements, technical standards, and supporting programs necessary for the commencement of commercial services in the band. CBRS Alliance has already developed the "OnGo" brand and certification program, an interoperable, LTE-based technology that "allows users to tailor networks to a specific set of needs, such as Private LTE, neutral host and Industrial IoT applications."⁷

And yet, despite all this outpouring of collaboration, innovation and investment around this path-breaking approach to unlocking unused prime spectrum capacity, the sad fact is that in the waning months of 2018 there is far less to report back to Congress about the "results" of the

⁵ See *Ex Parte* Letter from WinnForum CEO Lee Pucker to FCC, *3.5 GHz SAS and ESC Applications*, GN Docket No. 15-319 (June 8, 2018).

⁶ See, e.g., CBRS Alliance, "CBRS Alliance Passes 100 Member Milestone, Establishes On-Go Deployment and Operations Working Group," Press Release (Aug. 23, 2018), available at <https://www.cbrsalliance.org/news/cb-rs-alliance-passes-100-member-milestone-establishes-ongo-deployment-and-operations-working-group/>.

⁷ *Ibid.*

landmark CBRS framework than there reasonably should be. It has now been nearly as long since the Commission adopted the CBRS rules (28 months) as it was between the initial, conceptual *Notice of Inquiry* and the 5-0 vote adopting the *CBRS First Report & Order*. Inexplicably, progress at the Commission, at NTIA, and particularly with the U.S. Navy has slowed, creating delays that threaten to undermine the enormous public interest benefits of CBRS.

What Congress needs to be told is that the Commission, the U.S. Navy and NTIA are falling short of the expectations that were widely held at the time the Spectrum Pipeline Act became law on November 2, 2015 some six months *after* the adoption of the *CBRS First Report & Order*. From the perspective of consumer advocates engaged actively from the inception of CBRS, these delays are mutually reinforcing and seem to have their locus in three separate offices:

First, in response to petitions for rulemaking filed in June 2017 by CTIA and T-Mobile, the Commission commenced a new rulemaking to reconsider the licensing rules for PALs, a proceeding which remains pending. The Petitions should have been dismissed because, in reality, they were late-filed and redundant petitions for reconsideration addressing precisely the same issues, and making the same arguments, that the Commission rejected in the 2016 *CBRS Order on Reconsideration*. Nevertheless, the Commission closed the existing docket, opened a new docket, and adopted a Notice of Proposed Rulemaking that closely followed CTIA's petition. When our groups filed comments last December, we expected a rapid resolution around a compromise that balanced the interests of a range of interested operators. But instead, there appeared to be little interest in either a rapid resolution or a reasonable compromise. As PISC wrote to the Commission in May: "Our groups are very concerned about reports that at least one

commissioner is encouraging industry stakeholders to accept the so-called ‘compromise’ struck between national and regional mobile carriers that would enlarge all seven PALs by using Metropolitan Statistical Areas (MSAs) in the top 306 Cellular Market Areas (CMAs) and county-based geographic area licenses in the remaining 428 CMAs.”⁸

Putting aside the merits (which are addressed in the next section), by reopening the rules for PAL licensing and by slow-rolling its resolution, the Commission has created unnecessary uncertainty and delay. The Commission’s inaction is undermining the original stated purpose of CBRS to spur investment and innovation. Even assuming, *arguendo*, that it serves the public interest to rewrite the rules to make PALs useful only to the specific business model of wide-area mobile carriers, all of the competing views and – more critically – the basis for a compromise between the mobile carriers and virtually every other industry and interest have been available and unchanged for six months. And yet, the Commission has not been able to reach a decision.

As public interest advocates, we have been appalled at the spectacle of seeing a diverse array of companies and industry segments – from rural broadband ISPs to cable companies seeking to compete in wireless, from high-tech firms to the hotel and property management sectors, from utilities to aspiring smart cities, from the American Petroleum Institute to critical infrastructure manufacturers led by G.E. – reach consensus, go into the Commission, offer compromise after compromise, and receive the implied message they should come back when they are willing to surrender to the views of a single industry, i.e., mobile carriers seeking to

⁸ *Ex Parte* Letter from Open Technology Institute at New America, Public Knowledge, National Hispanic Media Coalition, Consumers Union, Schools, Health & Libraries Broadband (SHLB) Coalition, American Library Association, Consumer Federation of America, Tribal Digital Village Network, Common Cause, Next Century Cities, Free Press, Benton Foundation, Gigabit Libraries Network, Promoting Investment in the 3550-3700 MHz Band, GN Docket No. 17-258, (May 30, 2018), (“PISC Letter”), referencing *Ex Parte* Letter from CTIA and Competitive Carriers Association, *Promoting Investment in the 3550-3700 MHz Band*, GN Docket No. 17-258 (April 20, 2018).

change the very nature of CBRS to narrowly meet their needs and exclude all others from access to useful or affordable PAL licenses.

Second, by all accounts the U.S. Navy, at least at the staff level, has over the past year moved decidedly away from the stated policy of the Department of Defense to cooperate with the FCC and industry on sharing unused capacity in federal bands rather than end up with Congressional mandates to relocate DoD operations. At a high level, DoD officials have repeatedly made public statements suggesting a preference for sharing frameworks that avoid the disruption and modification of systems that are required to comply with a statutory mandate to clear a band. For example, Colonel Fred Williams, representing the DoD CIO's office, stated at NTIA's Spectrum Policy Summit in June that "we've got to get past thinking about [spectrum] in terms of primacy, co-primacy; we've got to stop thinking about things in terms of exclusivity; and we've got to start thinking about, no kidding, getting after sharing . . ."⁹

Congress should be told that despite the marked turnabout in official DoD policy toward spectrum sharing over the past four years, the Navy appears to be backtracking on its commitment to facilitate sharing of this grossly underutilized band. Participants in CBRS Alliance and other industry-led efforts to finalize spectrum sensing requirements and to test the impact of actual deployments of CBSDs consistently report that Navy personnel continually "move the goal posts," delay progress on the testing and implementation of the Environmental Sensing Capability (ESC) required to protect naval radar, and generally obstruct industry efforts

⁹ Remarks of Colonel Fred Williams, Office of the DoD Chief Information Officer, NTIA Spectrum Policy Symposium: Advancing the Nation's Spectrum Strategy, *NTIA Transcript* (June 12, 2018), available at <https://www.ntia.doc.gov/files/ntia/publications/transcript-ntia-spectrum-policy.-symposium-06122018.pdf>. See also Frederick D. Moorefield, Director, Spectrum Policy and Programs, Office of the CIO, DoD, "Assured Dynamic Spectrum Access, Evolving Toward Revolutionary Change: A DoD Perspective" (March 18, 2015), available at https://dodcio.defense.gov/Portals/0/Documents/20150318_DOD%20UAS%20Summit%20Spectrum%20Briefv2.pdf.

to obtain experimental licenses to test CBSDs and related systems in the field. According to industry participants, the Navy has demanded the FCC not approve any experimental licenses in coastal areas, has demanded a cumbersome review of requests for deployments even a thousand miles from the coastline, and refuses to take any meetings to discuss the ban.

Perhaps most importantly, although the Navy has embraced the concept of “Dynamic Protection Zones” (based on aggregate interference in a coastal area, rather than a static and less efficient exclusion zone), the ESC shut-down levels are reportedly so low that the anticipated viability of CBSDs along at least portions of the U.S. coastlines – where a majority of the population lives – is, for the first time, in doubt.¹⁰ Furthermore, the Navy is also reportedly demanding that the ESC systems detect non-existent waveforms, seeking extreme restrictions on data retention and on geolocation accuracy (despite the fact that a \$10 spectrum sensor could achieve at the same results), and insisting on outdated and overly conservative propagation analysis models to estimate interference levels. The FCC has made no discernable effort to push back, leaving industry to negotiate these terms with the DoD, an extremely uneven negotiation.

Unfortunately, the lesson in this for the private sector will be that Congress and a statutory mandates to relocate Federal incumbents is the only reliable avenue for commercial access to DoD and other Federal spectrum bands. Similarly, although Col. Williams mentioned “bidirectional sharing” in his remarks, a policy that our groups believe would appropriately give DoD shared access to unused spectrum in licensed FCC bands under appropriate circumstances, the U.S. Navy’s posture does nothing but encourage determined opposition among private sector licensees and opposition against any federal use of FCC-assigned bands.

¹⁰ See *Ex Parte* Letter from Paige Atkins, NTIA Associate Administrator for Spectrum Management, to FCC, *Promoting Investment in the 3550-3700 MHz Band*, GN Docket 17-258 (May 29, 2018), available at <https://ecfsapi.fcc.gov/file/10530233711963/lissa.pdf>.

Third, NTIA has compounded these delays by operating solely as the advocate of Federal spectrum users (in this case the Navy) rather than as an arbiter for the best public policy outcome. At the operational level, band incumbents – whether television broadcasters or the U.S. Navy – will always resist a shift from exclusive to shared use of “their” spectrum. This NIMBY syndrome is not limited to the private sector. The Navy’s initial acceptance of the framework for CBRS in 2015 took concerted and coordinated leadership among the relevant officials in the White House Office of Science and Technology Policy, NTIA and the DoD’s Chief Information Officer and principal staff. That sort of leadership and coordination appears to be flagging today, at least with respect to CBRS.

Aggravating the situation further, SAS certification has been delegated to a unit within NTIA, the Institute for Telecom Science (ITS) in Boulder, and not to a neutral third party, which is the usual practice for the FCC. The SAS certifications are far behind schedule and will almost certainly take three-to-six months longer despite the fact that virtually everything else in the CBRS ecosystem is ready to launch, at least away from the coastlines, while the Navy completes its drawn-out process to approve some diluted version of the ESC originally envisioned by the Commission.

B. The CBRS Licensing Framework the Commission Adopted in 2015 Serves a Wide Range of Industries and the Public Interest

The CBRS rules and licensing framework, approved unanimously by the Commission three years ago, and reaffirmed in 2016, is specifically tailored to empower a wide variety of use cases ranging from rural and small wireless internet service providers, to ports and community anchor institutions, to hotels and other venues, to utilities, factories, and critical infrastructure companies such as General Electric. The small-cell and three-tier CBRS sharing framework very

purposely fashioned Priority Access Licenses (PALs) as localized and affordable (census tracts), with competitive renewal after three years, with the exception of an option for a six-year initial term. The Commission wisely adopted this alternative licensing structure to increase rural broadband deployment, to encourage intensive use of the band in both urban and less-populated areas, to create increased opportunities for competition and new market entrants, and to promote new and innovative use cases. The Commission's three-tier sharing framework and PAL rules is uniquely suited to encourage deployments by even the smallest rural operators, market entrants and individual firms and venues to pioneer or implement innovative new services. Further, the rules, as passed in 2015, will enable the widest possible variety of companies to access interference-protected mid-band spectrum to enrich a more diverse, robust and innovative 5G ecosystem.

The CBRS framework and PAL rules, the product of many compromises process and supported by all five Commissioners, served as a breakthrough in efficient spectrum sharing policy that promised to catalyze a competitive and thriving wireless ecosystem. The CBRS rules have already spurred a large amount of investment in the band, particularly from wireless internet service providers (WISPs), which have made significant investments in equipment that can be adapted quickly to operate across the entire 3.5 GHz CBRS band once the Spectrum Access Systems ("SAS") and Environmental Sensing Capability (ESC) are online.¹¹ Diverse industry support and investment has been demonstrated, as noted above, by broad multi-stakeholder participation in the WinnForum process and by the CBRS Alliance, which now has 100 members and a completed "OnGo" brand and interoperable technology. This diverse

¹¹ WISPA Comments at iv ("A number of WISPs, venue owners, neutral host networks, and others are operating in the 3550-3650 MHz band under experimental licenses to trial equipment, determine sound network architectures, assess consumer demand, and test a host of innovative uses."), <https://ecfsapi.fcc.gov/file/10724505007250/CBRS%20Comments.pdf>.

industry collaboration is testament to how important a wide variety of potential operators view this chance to access a combination of interference-protected PAL spectrum and GAA capacity on a very affordable and localized basis.

Rural ISPs are already deploying base stations for use at 3650 MHz that will require only a software upgrade to deliver 100 Mbps download speeds to customers once the SAS and ESC systems are authorized and the full 150 megahertz CBRS band is available for use.¹² WISPA notes: “Licensees have deployed thousands of sites serving tens of thousands of customers and made equipment design, investment, and deployment decisions in reliance on the certainty of the CBRS rules.”¹³ Rural ISPs are also planning on CBRS spectrum to enhance the quality and lower the cost of rural deployments funded by Federal subsidy programs, including especially the Connect America Fund (“CAF”). This is reflected by the large number of WISPs that won at CAF Phase II reverse auction, concluded earlier this year with the results announced in late August.¹⁴ Two of the top three winners of that CAF Phase II auction were WISPs, as were 8 of the top 13 winners.¹⁵ Although their deployment plans are not yet public, these WISPs are expected to use CBRS spectrum, including PALs if they are still small and affordable enough to be available to WISPs, as non-line-of-sight spectrum to bolster deployments to satisfy performance and build-out requirements. Similarly, Rise Broadband, the nation’s largest WISP, announced it will use a \$16.9 million rural broadband experimental grant from the Commission

¹² See Wireless Internet Service Providers Assn, Comments, *WTB and OET Seek Comment on Petitions for Rulemaking Regarding the Citizens Broadband Radio Service*, (July 24, 2017), at iv, available at <https://ecfsapi.fcc.gov/file/10724505007250/CBRS%20Comments.pdf> (“A number of WISPs, venue owners, neutral host networks, and others are operating in the 3550-3650 MHz band under experimental licenses to trial equipment, determine sound network architectures, assess consumer demand, and test a host of innovative uses.”).

¹³ *Ex Parte* Letter of WISPA Counsel Stephen Coran, *Amendment of the Commission’s rules with Regard to Commercial Operations in the 3550-3700 MHz Band*, GN Docket 12-354 (April 7, 2017), at 11.

¹⁴ See Public Notice, “Connect America Fund Phase II Auction (Auction 903) Closes,” AU Docket No. 17-182 and WC Docket No. 10-90, DA 18-887 (rel. Aug. 28, 2018), at Attachment A.

¹⁵ *Ibid.*

to deploy base stations that would be capable, once operations below 3650 MHz are authorized, of operating across the entire 3.5 GHz band.¹⁶ WISPA has reported that many other rural WISPs are poised to replicate this approach to build out fixed wireless networks capable of extending broadband into unserved and underserved rural, small town and exurban areas, all under the CBRS rules.¹⁷

Other wireless internet service providers, including tier-two carriers (e.g., CenturyLink, Windstream Holdings, Frontier Communications) seeking a cost-effective way to reach rural customers using subsidies from the Connect America Fund, have invested to enter the CBRS space.¹⁸ Other companies, including equipment manufacturers, have devoted capital and resources, dependent on the CBRS rules, for deployments specifically tailored for private LTE and “neutral host” mobile service indoors, as well as in hard-to-serve locations.¹⁹

Municipalities, critical public infrastructure facilities (e.g., the Port of Los Angeles), and community anchor institutions (schools, libraries) are also reviewing how they can use CBRS to create localized networks to improve connectivity. In addition to outdoor uses, CBRS-based “neutral host” networks promise affordable in-building LTE access points for high-traffic areas and individual venues and businesses. This will enable individual schools, hospitals, factories, office buildings, and niche connectivity providers to deploy and operate their own private LTE

¹⁶ Joan Engebretson, *Rise Broadband Exec: Broadband Wireless Economics Are Better Than Ever*, Telecompetitor (April 14, 2016), available at <http://www.telecompetitor.com/rise-broadband-exec-broadband-wireless-economics-are-better-than-ever/> (crediting Rise Broadband Co-founder Jeff Kohler as asserting the CBRS band “could be a game changer . . . [t]hat type of spectrum [supports] faster speeds and can operate at slightly higher power”).

¹⁷ See Letter from Stephen E. Coran, WISPA Counsel, to Marlene H. Dortch, FCC Secretary, GN Docket No. 12-354 (filed Apr. 7, 2017).

¹⁸ See WISPA, “WISPA and Diverse Coalition of Allies Unite on CBRS Spectrum Proposal,” Press Release (May 9, 2108), available at <http://www.wispa.org/Wispa-News/ArtMID/13028/ArticleID/401/WISPA-and-Diverse-Coalition-of-Allies-Unite-on-CBRS-Spectrum-Proposal>.

¹⁹ See Comments of New America’s Open Technology Institute and Public Knowledge, GN Docket No. 17-258, (Dec. 28, 2017), at 13-17.

networks that would be supplemented by Wi-Fi offload.²⁰ Of course, hotels, convention centers, office building complexes and other private sector venues have expressed their interest in the tremendous potential of neutral host networks as well.

Unfortunately, subsequent to the Commission's 2016 *Memorandum and Order* dismissing mobile industry petitions for reconsideration, which sought to revisit the licensing framework for PALs, and in the midst of this remarkable industry collaboration and investment, the FCC decided to yet again take up the request of CTIA to re-open the CBRS rules and change the PAL framework to better suit the big wide-area mobile providers. The proposed changes, pending for nearly a year, are expected before the end of 2018.²¹

While the original CTIA proposal to increase the size of PALs to Partial Economic Areas could have denied even the few remaining regional mobile carriers from acquiring PALs, a so-called "compromise" struck between national and regional mobile carriers would similarly undermine the purpose and utility of the CBRS framework to facilitate a competitive and thriving wireless landscape. The "compromise" would enlarge all seven PALs by using Metropolitan Statistical Areas (MSAs) in the top 306 Cellular Market Areas (CMAs) and county-based geographic area licenses in the remaining 428 CMAs.²² Concerningly, this compromise would reportedly either retain no census tract PALs or, even worse, make two small-area PALs available in a second auction by decreasing the amount of General Authorized Access (GAA) spectrum available to the public and all band stakeholders.

²⁰ See Testimony of David A. Wright before the U.S. House Subcommittee on Communications and Technology (April 5, 2017), available at <https://goo.gl/CUyX1G>; "Ruckus Wireless Shares Vision for the Future on In-Building Cellular," Ruckus Wireless (Feb. 18, 2016), available at <https://goo.gl/2KgMqF>.

²¹ Kim Hart, "How to get from our 4G reality to the 5G future," Axios (Sept. 2, 2018), <https://www.axios.com/bridging-4g-reality-with-5g-future-cbbs-fcc-6c02ad30-6027-410d-8437-936deb19cae1.html>.

²² See CTIA and Competitive Carriers Association, *Ex Parte* Letter, *Promoting Investment in the 3550-3700 MHz Band*, GN Docket No. 17-258 (April 20, 2018).

If the Commission were to choose to adopt PALs as large as CMAs, rather than census tract license areas, it would mean that only large mobile carriers (and possibly regional cable ISPs) would have a realistic chance to actually get PALs through auctions. This choice, if pursued, would distort the market, lower auction revenues, and ultimately undermine the more robust and innovative 5G ecosystem that could arise from a proliferation of local networks customized to meet the diverse needs of very different and specific variations of end users.²³

The possibility of changes to the CBRS rules has already been disruptive to the investment detailed above, both prior and ongoing. However, if the changes sought by the mobile carriers are eventually adopted, they will also gut the CBRS rules and undermine its utility to various use cases. Representatives from every other interested industry -- including rural broadband providers, utilities and port operators, the oil industry and other industrial IoT users, hotel and property management companies, schools and libraries, cities and public venues -- have all called on the Commission to reject the mobile industry's attempt to change the CBRS rules.²⁴

PALs with coverage areas substantially larger than census tracts, and particularly as large as CMAs or counties, would undermine the goal of this small-cell innovation band. The current PAL rules allow rural and small ISPs, individual business facilities and venues, and public-purpose networks such as schools, libraries, college campuses and municipal services access to *both* interference-protected *and* unlicensed (GAA) mid-band spectrum. Increasing the size of PALs will result in a loss of that synergized strategy, as smaller and local users would be unable to acquire PALs. It would be particularly devastating for smaller and local users in the case of indoor use, where the opportunity loss and spectrum inefficiency coupled with auctioning very

²³ See PISC Letter, *supra* note 8; WISPA, "WISPA and Diverse Coalition of Allies Unite on CBRS Spectrum Proposal," Press Release (May 9, 2108), *supra* note 18.

²⁴ *Ibid.*

large geographic area licenses for a small-cell band would dramatically harm the connectivity needs of a wide variety of enterprise, school, library and other applications that may not be well suited to commercial mobile network offerings, a complication that the Commission noted in its initial Spectrum Frontiers *NPRM*.²⁵

Very large-area and expensive licenses are not a good fit with small-cell, high-capacity use cases. CMA- or even county-sized licenses for low-power CBRS spectrum is a recipe for incredibly productive spectrum lying fallow for many years (if not indefinitely) in low-density environments outside of central urban areas and well-trafficked venues.²⁶ For rural areas, where WISPs and other entities were keen on using the CBRS model to bring broadband to Americans unserved or underserved, access to the band would be greatly restricted, perpetuating the digital divide and rendering taxpayer subsidies for rural broadband less effective. Open access by operators *and* end users to low-power and unlicensed spectrum, as is currently seen through Wi-Fi, is the best way to catalyze the highest rates of spectrum reuse.²⁷ Much of the public interest value of the current PAL rules is that virtually any enterprise, rural ISP or public-purpose network provider can reasonably hope to acquire PALs at their location – to achieve a baseline of protected access – and then also leverage the 80 megahertz of GAA spectrum for capacity.

Finally, despite newly-conjured claims that PAL auctions for census tract licenses would be too difficult to administer, the Commission has plenty of time and expertise to develop new software needed to accommodate census tract PAL auctions, as leading auction economists have

²⁵ The Commission said it would be “highly efficient” to allocate some spectrum to “enable flexibility to facilitate a third type of network deployment: privately deployed networks that can provide 5G communications for advanced enterprise and industrial applications not suited to unlicensed spectrum or public network services.” *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services*, GN Docket No. 14-177, Notice of Proposed Rulemaking (rel. October 23, 2015), at ¶ 100.

²⁶ Comments of New America’s Open Technology Institute and Public Knowledge, GN Docket No. 17-258, (Dec. 28, 2017), at 27.

²⁷ PISC Letter at 5.

agreed.²⁸ The Commission has historically allowed its policies to govern how it runs its auctions, not the other way around, and the CBRS rules and licenses should be no different.²⁹

III. The Commission Should Continue its Progress in Opening the Entirety of the Underutilized C-bands at 3.7 GHz and 6 GHz for Shared and Opportunistic Use

As Congress recognized in the Spectrum Pipeline Act, there is a salient need to free up more mid-band spectrum for fixed, mobile and unlicensed use. On this issue, the Commission can report good and rapid progress -- and even more so if, as expected, a NPRM is adopted this fall proposing an unlicensed underlay covering all or most of the frequencies between 5925 and 7125 MHz. Our groups applaud the Commission for approving a *Notice of Proposed Rulemaking* at its July Open Meeting that includes a strong proposal to bring high-speed broadband to rural and other unserved and underserved areas by empowering fixed wireless providers to coordinate into vacant portions of the 3.7-4.2 GHz band.³⁰ Similarly, Chairman Pai has indicated the Commission will vote on a NPRM by the end of the year to authorize unlicensed sharing across the 6 GHz band, from 5925 to 7125 MHz.³¹ While the Commission will not be able to report a final outcome in its November reports to Congress, it will hopefully report an intention to complete both proceedings in a way that ensures the most intensive possible new or shared use of *every megahertz* in the 3700-4200 MHz and 5925-7125 MHz bands.

²⁸ Wireless Internet Service Providers Association, Notice of Oral Ex Parte Presentation, GN Docket No. 17-258, (Sep. 5, 2018), <https://ecfsapi.fcc.gov/file/10905606412794/CBRS%20Ex%20Parte%20Letter.pdf>.

²⁹ *Ibid.*

³⁰ See Order and Notice of Proposed Rulemaking, GN Docket No. 18-122, (July 12, 2018), <https://docs.fcc.gov/public/attachments/FCC-18-91A1.pdf>.

³¹ Notice of Inquiry, GN Docket No. 17-183, (Aug. 3, 2017), ¶¶ 26-31.

A. Low-Power, Unlicensed Sharing of Unused Spectrum Capacity Across the 6 GHz Band Is Needed to Fuel Next Generation Wi-Fi

The Commission initiated its progress on the 6 GHz band by issuing a mid-band *Notice of Inquiry* earlier this year that specifically requested comment on opening up the 5925 to 7125 MHz band for unlicensed use to supplement current Wi-Fi operations.³² The Commission should quickly issue a NPRM to develop service and technical rules that authorize unlicensed broadband operations across the entire 6 GHz band. Wi-Fi is a vital aspect of the nation's wireless ecosystem due to the fact that it enables faster broadband connectivity that is also more affordable. However, Wi-Fi users will require access to wider channels and more spectrum to keep pace with surging demand and high-bandwidth applications, to ensure that this complement to mobile networks continues to be a pillar of the emerging 5G wireless ecosystem.³³

The 6 GHz band presents the most promising frequency bands to bolster Wi-Fi. The 1200 MHz of contiguous spectrum between 5925 and 6425 MHz is uniquely tailored to unlicensed use, particularly the next generation, gigabit-fast Wi-Fi characterized by the new IEEE 802.11ax standard. This spectrum could support up to seven 160 MHz gigabit Wi-Fi channels, which would drastically increase the total number of available wide-bandwidth channels.³⁴ The well-suited capability of the 6 GHz band to help bulk up Wi-Fi explains why opening up the 6 GHz band for unlicensed use indoors and outdoors enjoys such wide support from a variety of industry actors.³⁵ These industry entities, which include representatives from the consumer

³² Notice of Inquiry, GN Docket No. 17-183, (Aug. 3, 2017), ¶¶ 26-31.

³³ Reply Comments of The Open Technology Institute at New America and Public Knowledge, GN Docket No. 17-183, (Nov. 15, 2017), at 23, https://ecfsapi.fcc.gov/file/11162291701183/Mid-Band%20NOI_ReplyComments_OTI-PK_FINAL_111517.pdf.

³⁴ Comments of National Cable & Telecommunications Association, GN Docket No. 17-183, (Oct. 2, 2017), at 5-10.

³⁵ Comments of All Points Broadband, Amplex Internet, Apple, Blaze Broadband, Broadcom, Cambium Networks, Cisco Systems, Cypress Semiconductor, Dell, Extreme Networks, Facebook, Fire2Wire,

equipment, semiconductor, internet media, rural broadband, enterprise wireless, software, and cloud services industries, reflects how more wide, contiguous channels of unlicensed spectrum is a foundation to improve connectivity and innovation.

The importance of harnessing the 6 GHz band to amplify the enormous benefits of Wi-Fi in the future 5G ecosystem is reflected by the key role Wi-Fi plays today. A recent report found that: “The current economic surplus of unlicensed spectrum in the U.S. from a selected set of applications amounts to, at least, \$496.13 billion today, while also contributing \$29.06 billion to the nation’s GDP.”³⁶ That same report, by Dr. Raul Katz, Director of Business Strategy Research at Columbia University’s Center for Tele-Information, found that Wi-Fi cellular offloading generated \$25.22 billion in value to the U.S. economy in 2017 *alone*.³⁷ The report sheds light on how essential Wi-Fi is for mobile carriers as well, which rely on fixed networks and Wi-Fi in particular for the majority of bandwidth consumed by mobile devices, especially indoors..

The mobile device data traffic transported over Wi-Fi networks - rather than over mobile carrier networks -- is increasing and vastly exceeds all other wireless technologies, making more spectrum capacity for Wi-Fi critical. The 6 GHz high-tech coalition raises the important point that 540 MHz of unlicensed spectrum currently available in the 2.4 GHz and 5 GHz unlicensed bands “carry more internet data than any other wireless technology or service, with usage

Google, Hewlett-Packard Enterprise, HP, Intel, Joink, MediaTek, Metalink Technologies, Microsoft, New Wave Net, Pixius Communications, Qualcomm, Rise Broadband, Ruckus, A Unit of Brocade, Snappy Internet, Sony Electronics, Western Broadband, Wireless Internet Service Provider Association, Wisper ISP (“6 GHz Coalition Comments”), GN Docket No. 17-183, at 5; Comments of Dynamic Spectrum Alliance, GN Docket No. 17-183, at 10-19; Comments Hewlett Packard, GN Docket No. 17-183, at 8; Comments of Vivint, GN Docket No. 17-183, at 4; Comments of Broadcom, GN Docket No. 17-183, at 9; Comments of Qualcomm, GN Docket No. 17-183, at 6; Comments of Microsoft, GN Docket No. 17-183, at 9; Comments of Wi-Fi Alliance, GN Docket No. 17-183, at 3; Comments of Google, GN Docket No. 17-183, at 12-13.

³⁶ “NEW REPORT: Economic Value of Unlicensed Spectrum in the U.S. Tops \$525 Billion,” Wi-Fi Forward, (May 17, 2018), <http://wififorward.org/2018/05/17/new-report-economic-value-of-unlicensed-spectrum-in-the-u-s-tops-525-billion/>.

³⁷ *Ibid.*

expected to continue increasing at a rapid pace.”³⁸ Cisco’s ongoing Visual Networking Index report found that as of 2016 at least 60 percent of total mobile data traffic is offloaded onto fixed networks using Wi-Fi or femtocell.³⁹ The reliance of smartphone, tablet and even laptop users on Wi-Fi to ensure fast, affordable and ubiquitous mobile connectivity has been found in other reports as well.⁴⁰ As high-definition video and other high-bandwidth applications proliferate, the ability of Wi-Fi to offload traffic from mobile networks to nearby fixed networks via unlicensed spectrum will become increasingly important.

An expedited proceeding to extend unlicensed use into the 6 GHz band (above 5925 MHz) is particularly key because of the shortage of contiguous unlicensed spectrum to support the current IEEE 802.11ac and pending 802.11ax Wi-Fi standards that are capable of providing gigabit connectivity and lower latency in an extremely cost-effective way. Independent studies and the Commission itself has acknowledged that there is a shortage of unlicensed spectrum expected to be as much as 500 megahertz by 2025.⁴¹ Large amounts of unlicensed spectrum will

³⁸ 6 GHz Coalition Comments at 5, citing Cisco, Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2016–2021, 21–22 & fig. 23 (2017), <https://www.cisco.com/c/en/us/solutions/collateral/serviceprovider/visual-networking-index-vni/mobilewhite-paper-c11-520862.pdf>.

³⁹ Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2016–2021 White Paper, Cisco (March 28, 2017), <https://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networkingindex-vni/mobile-white-paper-c11-520862.html> (“Of all IP traffic (fixed and mobile) in 2021, 50% will be WiFi, 30% will be wired, and 20% will be mobile.”).

⁴⁰ *Global State of Mobile Networks*, Open Signal (February 2017), available at <https://opensignal.com/reports/2017/02/global-state-of-the-mobile-network>. “In general though, we see a high proportion of time spent on Wifi in the majority of the 96 countries we analyzed. Specifically, 38 of those countries had time on Wifi scores of 50% or greater, meaning in a large part of the world our users are spending as much time connected to Wifi networks as they are cellular networks. Rather than acting as a mere supplement to 4G networks, Wifi remains as important a technology as any cellular system in mobile communications.” *Ibid.*

⁴¹ See Steve Methley & William Webb, Quotient Assocs. Ltd., Wi-Fi Spectrum Needs Study 29 (Feb. 2017) (—[B]etween 500 MHz and 1 GHz of new spectrum will be needed in 2025 to satisfy the anticipated busy hour.); Rolf de Vegt et al., Qualcomm Techs., Inc., A Quantification of 5 GHz Unlicensed Band Spectrum Needs 5 (2017). See also Commissioner Michael O’Rielly, A Mid-Band Spectrum Win in the Making, FCC Blog (July 10, 2017, 2:30 PM), available at <https://www.fcc.gov/news-events/blog/2017/07/10/midband-spectrum-win-making> (“Study after study

be required for more than just Wi-Fi—tens of billions of devices are linked through a web of IoT applications and networks. Wi-Fi and other unlicensed technologies are already dominant in several industries that are rapidly incorporating wireless connectivity. These unlicensed technologies make up 70 percent of smart grid communications, 80 percent of wireless healthcare solutions, over 90 percent of wireless tablet connectivity, nearly all RFID inventory and asset tracking, *and* a growing share of the emerging Internet of Things.⁴²

Notably, even the cable industry, which relies heavily on the uplink C-Band for program distribution to cable head ends, has told the Commission: “Not only did the Commission choose the right time to explore new unlicensed bands, it correctly identified 6 GHz as a promising candidate, provided that studies demonstrate that unlicensed users can protect incumbent operations.”⁴³ Similarly, Charter argued that the 6 GHz band would be “particularly well suited for unlicensed use in order to further expand the success of Wi-Fi.”⁴⁴ Although the Commission may need to monitor the possibility that a general rise in the noise floor could impact FSS earth stations, the agency has the ability to handle this. The Commission has previously handled a similar concern that arose in relation to authorizing outdoor unlicensed operations under Part 15 in the U-NII-1 band.⁴⁵

has shown that the U.S. is going to need multiple gigahertz of licensed and unlicensed spectrum just to keep up with current growth patterns”); Commissioner Jessica Rosenworcel, Bringing the Connected Future to All Americans, May 11, 2012– January 3, 2017, FCC Blog (Dec. 30, 2016, 5:30 PM), <https://www.fcc.gov/newsevents/blog/2016/12/30/bringing-connectedfuture-all-americans-may-11-2012-%E2%80%93-january-3-2017> (“Moreover, as any wireless user can attest to, the airwaves used for Wi-Fi today are getting crowded—putting a premium on identifying additional spectrum for unlicensed growth.”).

⁴² Yochai Benkler, *Open Wireless vs. Licensed Spectrum: Evidence from Market Adoption*, 26 HARV. J. L. & TECH. 1 (Fall 2012), at p. 72; Reply Comments of The Open Technology Institute at New America and Public Knowledge, GN Docket No. 17-183, (Nov. 15, 2017), at 26.

⁴³ Comments of NCTA, GN Docket No. 17-183, at 5-10.

⁴⁴ Charter Comments, GN Docket No. 17-183, at 3.

⁴⁵ Reply Comments of The Open Technology Institute at New America and Public Knowledge, GN Docket No. 17-183, (Nov. 15, 2017), at 27.

Our groups urge the Commission to release a NPRM and go on to authorize shared, unlicensed use of 5925-7125 MHz spectrum as quickly as any needed testing can adequately show that interference mitigation techniques are sufficient to avoid harmful interference to fixed point-to-point links, FSS or any other incumbent services.⁴⁶

B. Coordinated Access to Unused Spectrum Across the 3.7-4.2 GHz Band Can Immediately Promote High-Capacity and More Affordable Broadband in Rural and other Underserved Areas

The 3.7-4.2 GHz band presents a prime opportunity for the Commission to authorize robust band-sharing rules that achieve a win-win-win trifecta of critical public policy goals: first, to enable fixed wireless providers to bring high-speed broadband access to rural areas; second, to reallocate a substantial portion of the band available for mobile carriers to build mobile 5G networks; and third, to protect incumbent Fixed Satellite Services (FSS) licensees from undue disruption or harmful interference. Unlocking every megahertz of the grossly underutilized C-band will serve as part of the foundation for strong 5G networks that bring both high-capacity fixed and mobile service to rural, small town and big urban areas alike.

The Commission made encouraging progress on freeing up unused spectrum in the 3.7-4.2 GHz by approving a *Notice of Proposed Rulemaking* that requests comment on a variety of proposals, including one from the Broadband Access Coalition (BAC) calling on the Commission to free up the 3700-4200 MHz band to authorize a new, licensed, point-to-multipoint (P2MP) fixed wireless service.⁴⁷ (OTI, the American Library Association, Consumer Federation of America, Public Knowledge, and the Schools, Health & Libraries Broadband

⁴⁶ Reply Comments of The Open Technology Institute at New America and Public Knowledge, GN Docket No. 17-183, (Nov. 15, 2017), at 24.

⁴⁷ See Order and Notice of Proposed Rulemaking, GN Docket No. 18-122, (July 12, 2018), <https://docs.fcc.gov/public/attachments/FCC-18-91A1.pdf>.

Coalition are original members of this coalition). Enabling fixed wireless providers to use this mid-band spectrum will bring affordable high-speed broadband access to hard-to-reach tribal, rural, and suburban areas where consumer choice is either lacking or nonexistent. Freeing up these bands could bring immediate relief to unserved areas and bring necessary high-speed internet access to Americans who do not currently have such an option.

Congress should be told that the Commission can almost immediately offer this spectrum as infrastructure for fixed wireless providers to address the rural broadband divide at no cost to the Treasury. Enabling wide-channel P2MP fixed service on spectrum with mid-band propagation characteristics will empower fixed wireless providers to deploy very high-capacity broadband to rural and other less densely populated areas much sooner and at far lower costs.⁴⁸ Shared access to wide channels of mid-band spectrum available for P2MP deployment will catalyze private sector investment in rural and other underserved communities. Commission action in this regard will significantly lower the cost of high-capacity broadband deployment, which not only benefits rural and small town communities directly, but also serves to increase the impact of public subsidies paid from the Connect America Fund and other programs.⁴⁹ With mid-band spectrum as infrastructure, operators receiving universal service funds will be empowered to accomplish the mission of the Commission sooner in a cost-effective way.

These benefits explain why the Commission received more than 100 comments strongly supporting the Broadband Access Coalition's proposal. Smaller rural operators (such as hundreds of internet service providers represented by BAC members WISPA, NTCA—The Rural Wireless Association and Rural Wireless Association) and large incumbent rural carriers including Frontier, Windstream and Consolidated, all noted specific support for moving forward to a

⁴⁸ BAC Petition.

⁴⁹ *Ibid.*

rulemaking proceeding based on the Broadband Access Coalition proposal to free up vacant mid-band spectrum to fuel rural broadband.⁵⁰

The band is currently occupied by FSS space and earth stations, and those stations are permitted to coordinate and reserve full band, full arc operations, an outdated ITU policy that has never been expressly adopted by the Commission. FSS earth stations are typically authorized to use all 500 megahertz in the 3700 – 4200 MHz band, despite the fact that any given earth station typically uses only a small portion of the band. More than 90 percent of the band’s spectral capacity is lies fallow. For example, while 975 receive-only C-Band earth stations licensed to the Associated Press holds the entire 3700-4200 MHz range of spectrum, AP’s website notes that it uses only a single, 23-megahertz satellite transponder for each of these earth stations.⁵¹ Similarly, National Public Radio has noted to the Commission that its “system depends . . . [on] 475 total public radio earth stations that use four FSS transponders that transmit between 3702 – 3858 MHz.”⁵² By NPR’s own account, it is using a maximum of 160 MHz (including guard bands) in each and every one of the 475 communities where an NPR FSS earth station has been registered. Therefore, as much as 340 contiguous megahertz of fallow spectrum is potentially available in

⁵⁰ See, e.g., Comments of Frontier Communications Corporation, Windstream Services, LLC, and Consolidated Communications; Comments of Rise Broadband, RM11791 (filed Aug. 3, 2017); Comments of Cal.net, Inc., RM-11791 (filed Aug. 7, 2017) ; Comments of All Points Broadband, RM-11791 (filed Aug. 7, 2017); Comments of Hudson Valley Wireless, RM-11791 (filed Aug. 7, 2017); Comments of Highspeedlink, RM-11791 (filed Aug. 3, 2017); Comments of Southern Ohio Communication Services, Inc., RM-11791 (filed Aug. 2, 2017); Comments of Slopeside Internet, RM-11791 (filed Aug. 7, 2017); Comments of NGL Connection, RM-11791 (filed Aug. 7, 2017), at 2 (“the larger companies will continue to offer their services to the urban and suburban areas, continuing to ignore the much needed access to wireless services in rural areas”). See also Comments of the National Spectrum Managers Association, RM-11791 (filed Aug. 7, 2017), at 5; Comments of the Fixed Wireless Communications Coalition, RM-11791 (filed Aug. 7, 2017) (FWCC Comments), at 2; Comments of the Utilities Telecom Council, RM-11791 (filed Aug. 7, 2017), at 2, 5.

⁵¹ Broadband Access Coalition Petition at 23 & n. 42. The NOI notes that geostationary orbit FSS satellites —typically have 24 transponders, each with a bandwidth of 36 megahertz received by one or more earth stations. NOI at ¶ 14.

⁵² National Public Radio, Ex Parte Letter to Marlene H. Dortch, FCC, *Expanding Flexible Use in MidBand Spectrum Between 3.7 and 24 GHz*, Notice of Inquiry, GN Docket No. 17-183 (Nov. 8, 2017).

areas surrounding each NPR earth station, unless some other earth station nearby is using the upper two-thirds of the band.

The current operations in the 3.7-4.2 GHz band does not preclude the band's ability to serve as a resource for fixed wireless and 5G networks. As OTI and other groups have recently presented to the Commission, the Broadband Access Coalition proposal to free up the 3.7-4.2 GHz band can protect incumbent FSS providers from harmful interference, give mobile carriers building 5G networks access to the 3700 – 3800 MHz band to serve densely populated urban areas, *and* provide access to frequency-coordinated spectrum across the 3800 – 4200 MHz band, and to the 3700 – 3800 MHz band outside densely populated urban areas, to enable point-to-multipoint broadband wireless providers.⁵³ This compromise is founded on the fact that in many areas of the U.S, fixed wireless P2MP systems are able to operate in the 3700-4200 MHz band without causing interference to co-channel FSS systems. In fact, FSS and P2MP are able to coexist sharing the same channel of spectrum when the aggregate interference from planned P2MP deployments is kept below the interference limit of any FSS earth station in the region. This co-channel sharing is enabled by P2MP operating in areas that have relatively small number of earth stations, and using directional antennas that do not point toward earth stations in that specific area. P2MP is even able to make use of the vacant, adjacent channels that are not being used by the earth stations in a local area.⁵⁴

⁵³ Ex Parte of the Broadband Access Coalition, GN Docket No. 17-183, RM-11791, (March 19, 2018), <https://ecfsapi.fcc.gov/file/10319938413689/BAC%20Response%20to%20Intel%20Ex%20Parte%20--%20FINAL%20--%2003.19.18.pdf>.

⁵⁴ “WiFu, Coalition Present a ‘Win-Win-Win’ Proposal to Open Mid-Band Spectrum for High-Speed Rural Broadband,” New America’s Open Technology Institute Blog, (the technical presentation made to the Commission is available here: https://newamericadotorg.s3.amazonaws.com/documents/BAC_Google_FCC_Technical_Preso_P2MP-FSS_Coex_FINAL_032718_1.pdf).

IV. Conclusion

The Commission has a variety of policies it can enact and implement quickly to unleash mid-band spectrum to improve broadband connectivity. The Commission should retain and move with far greater haste to implement the 2015 CBRS rules governing shared use of the 3.5 GHz band, including the licensing framework for PALs. The agency should adopt its proposed multi-tiered spectrum sharing framework in the 3.7-4.2 GHz band, authorizing high-capacity fixed wireless operators to coordinate sharing into vacant spectrum on a localized basis across the entire band that remains allocated to FSS or guard band. Finally, the Commission should proceed apace to adopt and complete a 6 GHz NPRM that authorizes robust unlicensed use to bolster Wi-Fi across the 6 GHz band up to 7125 MHz. We applaud the Commission's progress overall and urge the agency to act swiftly and clearly to enact these pro-consumer and pro-innovation policies.

Respectfully submitted,

**THE OPEN TECHNOLOGY INSTITUTE AT NEW AMERICA,
AMERICAN LIBRARY ASSOCIATION, THE BENTON FOUNDATION,
CONSUMER FEDERATION OF AMERICA, CONSUMERS UNION,
INSTITUTE FOR LOCAL SELF-RELIANCE, NATIONAL HISPANIC MEDIA
COALITION, NEXT CENTURY CITIES, PUBLIC KNOWLEDGE,
SCHOOLS, HEALTH, & LIBRARIES BROADBAND COALITION, AND X-LAB**

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