



*Hearing on*  
**“Our Wireless Future: Building a  
Comprehensive Approach to Spectrum Policy”**

*Before the*  
**United States House of Representatives  
Committee on Energy and Commerce**  
**Subcommittee on Communications and Technology**

*Testimony of*  
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## **Introduction**

Good morning Chairmen Pallone and Doyle, Ranking Members Walden and Latta, and members of the Subcommittee. My name is Michael Calabrese. I direct the Wireless Future Project at New America's Open Technology Institute (OTI), a nonprofit policy institute based here in Washington, D.C. My organization develops and advocates for policies to promote universal, faster and more affordable wireless broadband connectivity, broadband competition, and more efficient spectrum use with a focus on expanding unlicensed access and dynamic spectrum sharing. OTI is also a member of the broad-based Public Interest Spectrum Coalition that includes national consumer, civil rights, education, rural broadband and social justice organizations.

There are two fundamental reasons why it's critical that substantially more mid-band spectrum is made available on a licensed, unlicensed and dynamically shared basis. First, we all three paths to access spectrum because the world's most robust and productive 5th generation wireless ecosystem will not be built out by mobile carriers alone or solely with exclusively-licensed spectrum. America's "5G" wireless ecosystem, like the current 4G wireless ecosystem, will rely on a combination of national or regional carrier networks for truly "mobile" connections (for use 'on the go') and a far larger number of complementary, high-capacity and customized networks deployed by individual business firms households to meet their particular needs at a lower cost.

Today Wi-Fi makes internet access and broadband data on smartphones and laptops faster and far more affordable. Wi-Fi already carries between 70 and 80% of all mobile device data traffic. In a 5G world, indoor and customized small cell networks using Next Generation Wi-Fi, private LTE and other technologies will enhance the ecosystem and fuel advanced applications such as home and industrial IoT, virtual reality and near-real time interactive video.

This distinction between spectrum for coverage (which fits the traditional cellular licensing model) and spectrum for capacity in localized areas (which is the rationale for unlicensed and lightly-licensed, shared spectrum) is even more relevant for 5G in light of the fact that an increasing share of mobile device data traffic (more than 80 percent) is consumed indoors, on a nomadic and not mobile basis. The benefits of 5G – high throughput, low latency, and the ability to connect hundreds of different devices and sensors in a local area (e.g., IoT) – will be most available outdoors and in high-traffic areas on cellular networks. As described

below, Next Generation Wi-Fi (Wi-Fi 6) and private LTE networks will be most relevant *indoors* where more than 80% of mobile data use actually takes place.

A second fundamental reason to make mid-band spectrum available on a licensed, unlicensed and shared basis is that a guiding goal of the Communications Act is to “encourage the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans.”<sup>1</sup> While there are heated disagreements about progress towards this goal, there is no question that we can and must do better in addressing the rural and low-income digital divides.

Rural, small town, Tribal and historically marginalized communities are most likely to find themselves on the losing side of the digital divide. The FCC’s most recent Broadband Deployment Report, which tends systematically to overstate the availability of broadband, reported that “the gap in rural and Tribal America remains notable: over 26% of Americans in rural areas and 32% of Americans in Tribal lands lack coverage from fixed terrestrial 25 Mbps/3 Mbps broadband, as compared to only 1.7% of Americans in urban areas.”<sup>2</sup> A Pew Research Center survey reported that 24% of rural adults said that a lack of high-speed internet access is a “major problem” in their community.<sup>3</sup>

Affordability and choice among competing internet providers continues to be major deterrents as well. Just 45% of U.S. adults who make less than \$30,000 a year have broadband at home, compared to 87% of adults who make more than \$75,000 annually.<sup>4</sup> A recent Department of Education survey found that 38% of households with children under 18 and no home broadband access said it was because service was too expensive.<sup>5</sup> Aggravating affordability is lack of competition. More than 50% of rural households had at most one choice for an ISP offering service at the minimum adequate service level of 25/3 mbps as of year-end

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<sup>1</sup> 47 U.S.C. § 1302(a).

<sup>2</sup> FCC, *Fixed Broadband Deployment Data from FCC Form 477* (May 2, 2019) (data as of Dec. 31, 2017), <https://www.fcc.gov/general/broadband-deployment-data-fcc-form-477>.

<sup>3</sup> Monica Anderson, “About a quarter of rural Americans say access to high-speed internet is a major problem,” The Pew Research Center (Sep. 10, 2018), <https://tinyurl.com/y6c6uqcl>.

<sup>4</sup> “Internet/Broadband Fact Sheet,” Pew Research Center (Feb. 5, 2018), <https://tinyurl.com/y3bnc92t>.

<sup>5</sup> “Student Access to Digital Learning Resources Outside of the Classroom,” U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics (Apr. 2018), <https://nces.ed.gov/pubs2017/2017098.pdf>. Another 38% said it was because they did not need it or they were uninterested in it.

2017, according to the FCC’s December 2018 Communications Marketplace Report.<sup>6</sup> Reflecting this lack of competition, even when rural consumers have access to broadband, they frequently pay higher prices for lower quality service despite the fact that, on average, they earn less than Americans living in urban areas.<sup>7</sup>

Because of the enormous costs of building out geographically extensive 5G networks, national and regional carriers will focus initially on the more densely-populated urban and affluent suburban areas with the largest returns on investment. While 5G networks may not reach rural, small town or even many exurban communities for many years, smaller and local providers of high-capacity fixed wireless broadband that rely primarily on unlicensed and coordinated sharing of unused spectrum capacity can more rapidly extend high-capacity and more affordable fixed broadband access to these underserved areas.

More mid-band unlicensed (at 5.9 and 6 GHz) and shared spectrum (unused C-band spectrum for fixed wireless broadband) can serve as the public infrastructure that enables high-capacity broadband in underserved areas. Capital costs to deploy fixed point-to-multipoint (P2MP) wireless connections using vacant C-band and unlicensed spectrum are a fraction – about one-seventh the cost – of fiber and are still able to provide high-throughput broadband service.<sup>8</sup> They are also far more cost-effective per gigabyte for this purpose than mobile systems. In addition, anywhere a high-capacity fixed service is available, Wi-Fi 6 can provide the same consumer benefits as licensed 5G and more affordably.

### **Citizens Broadband Radio Service: A Roadmap for Spectrum Sharing and Abundance**

At the outset, it’s important to recognize that within the next two months a truly revolutionary breakthrough in spectrum policy is likely to launch commercial network services. The new Citizens Broadband Radio Service (CBRS) represents a landmark in forward-thinking spectrum policy not only for the 3.5 GHz band, but as a framework and model for unlocking enormous and low-cost capacity for wireless broadband and innovation in additional occupied but underutilized bands.

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<sup>6</sup> FCC, *Communications Marketplace Report* (rel. Dec. 26, 2018), <https://www.fcc.gov/document/fcc-adopts-first-consolidated-communications-marketplace-report-0>.

<sup>7</sup> Sharon Stover, “Reaching rural America with broadband internet service,” *PhysOrg* (Jan. 17, 2018), <https://phys.org/news/2018-01-rural-america-broadband-internet.html#jCp>.

<sup>8</sup> See The Carmel Group, *Ready for Takeoff: Broadband Wireless Access Providers Prepare to Soar with Fixed Wireless*, at 12, Fig. 6 (2017).

In 2015, a unanimous FCC adopted CBRS to coordinate new licensed and opportunistic (lightly-licensed) access to unused spectrum in the 3550-3700 MHz band used by the U.S. Navy. The CBRS rules authorize the certification of multiple frequency coordination systems – called Spectrum Access Systems (SAS) – to govern a dynamic framework for spectrum sharing among a three-tier hierarchy of users: incumbent licensees (U.S. Navy radar), Priority Access Licenses (PALs), and opportunistic (effectively unlicensed) General Authorized Access (GAA) users. The SASs are responsible for ensuring incumbent services are fully protected from harmful interference and that PAL operators are protected from each other and from GAA users.

Rarely has a new spectrum access mechanism received such an outpouring of investment and innovation by such a diverse range of business enterprises. Over the past few years, an unprecedented collaboration among dozens of companies from a diverse range of industries has developed technical rules, new use cases (e.g., neutral host networks), an interoperable “OnGo” technology, a product certification program, and the design of the SASs and coastal sensing networks needed to protect the Navy and coordinate sharing. The CBRS Alliance has more than 130 member companies from a wide variety of industries. The SAS and environmental sensing systems have been tested and provisionally approved, putting this new approach to dynamic sharing of underutilized Federal spectrum on the brink of unlocking broadband capacity and innovation across a band considered fully occupied and off limits just five years ago.

The FCC’s original 2015 *CBRS Order* intended to make a combination of very small-area licenses (PALs) and unlicensed spectrum (GAA) available on a targeted basis to thousands of potential network operators, including rural ISPs, private “neutral host” LTE networks, office complexes, factories, utilities, ports and other critical infrastructure operators, shopping malls, sporting arenas, and college and other campuses. The agency aimed to accomplish this in part by making the PALs small (the size of census tracts), temporary and therefore far more affordable than very large-area and permanent mobile licenses.

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 new opportunities for market entrants, and to promote new and innovative use cases. With direct and affordable access to spectrum, local enterprises and others users can deploy localized broadband and IoT networks, including connectivity solutions customized and deployed by end users themselves, much as Wi-Fi is used today, but with an option to pay for a

license with interference protection. Other nations, including the UK and Germany, are now attempting to replicate this innovation by authorizing coordinated shared use of 3 GHz spectrum in small areas by local enterprises.

Unfortunately, last October the Commission reversed a key pillar of the agency's original vision for CBRS, enlarging the PALs to the size of counties and making licenses permanent rather than available for periodic re-auction. Public interest groups, rural broadband ISPs, technology and critical infrastructure companies, big hotel and office management companies, municipal users and virtually every party other than mobile carriers and their equipment suppliers argued that making PALs permanent and as large as traditional cellular licenses would preclude most of the innovative and localized use cases that the CBRS rules were specifically designed to catalyze.

Despite the FCC's unwise decision to effectively exclude most small ISPs and other U.S. businesses from acquiring PALs at auction, we believe the CBRS three-tier sharing framework still can and will soon prove to be a critical part of the foundation for the nation's 5G future. Going forward, in additional underutilized bands, coordinated access to unused spectrum on a local basis – ideally using either dynamic sharing without pre-set license area, or very small area licenses – can empower rural broadband service providers, individual enterprise, schools, hospitals, factories, office complexes, and other niche connectivity providers to customize and operate their own private LTE networks.

### **C-band: A Public Auction with Revenue and Spectrum to Close the Broadband Divide**

OTI and multiple public interest coalitions strongly support the overarching goal of the Commission's rulemaking on C-band. A reallocation of C-band has the potential to ensure that *all 500 megahertz* of today's grossly underutilized C-band is put to work to fuel America's 5G future and to close the rural broadband divide. The FCC's pending proposals to reallocate at least the lower portion of the band to add 5G *capacity*, and to authorize sharing of unused spectrum in at least the upper portion for high-speed fixed broadband *coverage* in rural areas, each represent an essential component of a potential win-win-win solution that achieves three vital public interest outcomes: First, to reallocate and auction a substantial portion of the band to promote mobile 5G networks; second, to enable high-speed fixed wireless service in rural, small

town, Tribal and other underserved areas at a fraction of the cost of trenching fiber; and third, to protect existing earth stations from undue disruption or harmful interference.

### ***Congress Can Avoid Unjust Enrichment and Earmark Proceeds for Broadband Infrastructure***

Public interest groups, rural wireless ISPs, the cable industry and other stakeholders remain concerned, however, that the agency continues to consider proposals for a ‘private auction’ that would violate the Communications Act and needlessly transfer many billions of dollars in public assets to four foreign satellite companies that never paid for the public airwaves they use. A private sale controlled by four foreign-based companies, with no return of the anticipated proceeds of \$10 to \$30 billion or more to the Treasury, amounts to a massive and needless giveaway of public revenue we could be investing to close the digital divide.

A private auction or sale would violate Section 309(j) of the Communications Act and willfully ignore Congressional intent and precedent. Congress has twice passed legislation ensuring that when the TV bands at 700 MHz and 600 MHz were consolidated for auction to mobile carriers, local broadcast stations would either receive no windfall (the 2002 Auction Reform Act<sup>9</sup>) or receive at most incentive payments limited by a competitive reverse auction (the 2012 incentive auction bill<sup>10</sup>). Indeed, most broadcasters received only compensation for expenses incurred to switch frequencies, an approach that would work well in the C-band if only the lower 200 megahertz are cleared, because incumbents have acknowledged that all current FSS video and radio distribution can be accommodated above 3900 MHz. General provisions such as Sections 303(c), 303(r) and 4(i) cannot possibly provide the authority for a public or private auction that is not consistent with the explicit provisions of Section 309(j).

Just as Congress in 2012 designated \$7 billion from the auctions of AWS-3 and 600 MHz spectrum to fund FirstNet, under your leadership Congress can set aside \$10 billion or more of C-band auction revenue to pay for broadband infrastructure in underserved areas. According to FCC data, broadband is unavailable to roughly 25 million Americans, more than 19 million of whom live in rural communities. With a pay-for at hand, Congress should not miss this rare

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<sup>9</sup> *Spectrum Reform Act of 2002*, Pub. L. No. 107-195, 47 U.S.C. §309(j)(15)(C)(iv), available at <https://www.congress.gov/bill/107th-congress/house-bill/4560/text?overview=closed>.

<sup>10</sup> *Middle Class Tax Relief and Job Creation Act of 2012*, Pub.L. 112-96, Subtitle D—Spectrum Auction Authority, § 6402, (enacted Feb. 22, 2012), codified at 47 U.S.C. § 309(j)(8)(G) (“Spectrum Act”), available at <https://www.congress.gov/112/plaws/publ96/PLAW-112publ96.pdf>.

opportunity to narrow the rural/urban digital divide by directing both dollars and unused C-band spectrum for fixed wireless broadband and backhaul in rural areas.

A private auction is also likely to distort competition in the mobile market, excluding smaller and rural ISPs. Incumbents have a strong incentive to maximize their windfall rather than the broader public interest. Moreover, a private sale would set a dangerous precedent, suggesting that incumbent licensees should always wage maximum resistance against giving up or sharing unused spectrum unless the Commission agrees to give them *all* the public revenue that until now has always, with few exceptions, flowed back to the public.

The speediest, most straightforward option consistent with the Commission's statutory authority is a traditional forward auction that consolidates FSS incumbents into the upper portion of the band and requires auction winners to reimburse incumbents for any eligible and reasonable costs. Unlike a private auction, the courts have consistently upheld the Commission's authority to reorganize bands, to modify licenses, and to authorize mechanisms that reimburse incumbents' costs. There is strong precedent from multiple prior proceedings to support license conditions that require winning bidders to shoulder the costs of relocating FSS incumbents and to voluntarily negotiate reasonable premium payments, as needed, to incumbents in exchange for expedited clearance. The FCC can appoint an *independent* Transition Facilitator. Bipartisan leadership in Congress should either legislate or at least urge this outcome.

### ***Shared Access to Unused C-band Spectrum Can Spur Fixed Wireless Broadband***

Like the TV band prior to its consolidation, the C-band's overall capacity is grossly underutilized. We believe any Congressional action on C-band should require the FCC to authorize coordinated, shared access to unused spectrum across the entire band to the extent it does not cause harmful interference to registered earth stations or to future licensed mobile services. Spectrum itself is public infrastructure that can be used to help close the digital divide. Unlocking every megahertz of the grossly underutilized C-band will promote a more inclusive, robust and affordable 5G wireless ecosystem for all Americans.

By requiring rural ISPs and other operators to rely on an automated coordination system, the FCC can fully protect existing earth stations (and thereby TV and radio consumers) in the same way that the Spectrum Access System (SAS) will begin in just a couple months to coordinate shared use of the adjacent 3.5 GHz band between the U.S. Navy and terrestrial

broadband providers. As described above, the SAS will both safeguard Navy operations and manage opportunistic use of unused licensed spectrum until licensees actually build out and commence service. Similarly, the FCC should be required to authorize shared use of unused spectrum across the entire C-band, but retain the discretion to determine the technical rules that ensure there is no harmful interference to licensed and operating services. An engineering study filed yesterday by wireless ISPs, Google and Microsoft showed that even on a co-channel basis, unused spectrum can be easily coordinated with earth stations and shared locally for rural broadband, enterprise networks and other uses in 78% of the country where at least 80 million Americans live.

In sum, C-band gives Congress an opportunity to mandate *both* a public auction and coordinated shared access to unused spectrum in the C-band, which together can provide billions in funding for infrastructure *and* the spectrum that rural broadband providers, schools, and other enterprises need to close the connectivity gap in underserved areas.

### **Next Generation Wi-Fi: Accelerating Affordable 5G Services for All Americans**

Unlicensed spectrum is what ultimately makes both mobile and fixed broadband service more available, more productive and more affordable for an overwhelming majority of Americans at home, at work, at school, and in public places. Most mobile devices rely entirely on unlicensed spectrum for connectivity. Wi-Fi generates hundreds of billions of dollars in economic activity and consumer surplus each year, in substantial part as a critical complement to mobile carrier networks that would otherwise be overwhelmed by consumer demand. Wi-Fi also plays an increasingly important role in connecting education, manufacturing, agriculture, and healthcare technologies. IoT and other high-capacity, local-area networks – most of which will be indoors and connect everything – are likely to make unlicensed spectrum an even more critical part of a truly robust 5G ecosystem.

Wi-Fi is the reason warnings of a “spectrum crisis” years ago were greatly overstated. Most consumers don’t even realize that between 70 and 80% of the total mobile data traffic flowing over smartphones and tablets never touch their mobile carrier network. The vast majority of mobile data travels a very short distance over shared, unlicensed spectrum and into the fixed broadband connection that most homes and businesses buy from a cable company, a wireline telco or a wireless ISP.

And just as Wi-Fi is central to today’s 4G wireless ecosystem, Next Gen Wi-Fi will be a complement to 5G mobile networks that makes 5G services more rapidly available – and far more affordable – to every home and business nationwide. Cisco, which measures and projects internet traffic globally, projects consumers will need Wi-Fi to carry far more traffic in the 5G era as IoT and advanced, media-centric applications demand more data, but cellular connectivity is more limited indoors or more expensive due to data caps.<sup>11</sup>

The good news is that Next Gen Wi-Fi – known more formally as Wi-Fi 6 – is ready to go now and can accelerate 5G-quality services for *all* Americans. Because mobile 5G networks are massively expensive to deploy, they won’t be available outside dense urban, high-traffic, and affluent suburban areas for many years. Wi-Fi 6, by contrast, can upgrade connectivity in any home or business that has a gigabit-capable fixed broadband service, as more than 80 million cable subscribers (among others) already do today.

In other words, Next Gen Wi-Fi can bring 5G capabilities more quickly to urban, suburban and rural areas alike. But, there’s a *big if* . . . Accelerating affordable 5G capabilities for all depends on whether the FCC gives America’s homes and businesses access to a sufficient amount of contiguous, wide-channel unlicensed spectrum. The FCC’s efforts to open more unlicensed spectrum at 5.9 GHz and across the entire 6 GHz band – more than 1200 megahertz of new unlicensed spectrum capacity – is key to unlocking the potential for the U.S. to truly have the world’s most robust and equitable 5G wireless networks.



<sup>11</sup> Usha Andra, “Connecting the Unconnected: 5G and Wi-Fi 6 Will Play a Pivotal Role in Bridging the Digital Divide,” Cisco Blog (March 19, 2019), <https://tinyurl.com/y488kqda>.

## ***Extending Gigabit-Fast Wi-Fi Across the Entire 6 GHz Band is Feasible and Essential***

Authorizing unlicensed use of 1200 contiguous megahertz of spectrum across the entire 6 GHz band – from 5925 to 7125 MHz – is the fuel necessary to power gigabit-fast and affordable Wi-Fi 6 and other unlicensed innovations of greatest benefit to consumers and the overall economy. OTI and PISC strongly support the FCC’s pending proposal to allow at least indoor use of unlicensed devices and networks across all four band segments (a total of 1200 megahertz). We likewise support the FCC’s proposal to allow outdoor unlicensed operations – as well as indoor operations at standard power (1 watt) – in two band segments that total 850 megahertz subject to registration and recurring authorization by a geolocation database. As I’ve noted, these Automated Frequency Coordination (AFC) systems will be similar to, but simpler than, the Spectrum Access System that facilitates sharing and protects Navy operations in the new CBRS band in the immediately adjacent 3.5 GHz CBRS band.

The FCC’s proposed rulemaking has one critical shortcoming, however, that threatens to diminish the value of Wi-Fi 6 to the vast majority of Americans at home and at work. In addition to authorizing Wi-Fi at standard power subject to coordination by an automated database (AFC), the Commission also proposes to allow indoor-only operations at a much lower power (250 milliwatts rather than 1 watt), but *only* in the U-NII-6 and U-NII-8 band segments. These two band segments are not contiguous, total only 350 megahertz and, most critically, would make available only a single gigabit-fast channel for Wi-Fi 6.

Consumer advocates, as well as rural broadband providers and a coalition of the nation’s largest high-tech companies, have all urged the Commission to likewise authorize lower-power, indoor-only unlicensed use across the much larger U-NII-5 and U-NII-7 band segments without the cost and complexity of geolocation database coordination. These two band segments total 850 megahertz and would unleash *four* new 160-megahertz wide channels. This is especially critical for small business and families. The overwhelming majority of consumer welfare and economic value generated by unlicensed spectrum – and particularly by Wi-Fi – is indoors, in homes and businesses literally walled off from incumbent receivers in the U-NII-5 and U-NII-7 band segments.

Although expensive, professionally-installed, higher-power and AFC-controlled unlicensed access will be important for enterprise networks and outdoor deployments, the failure to set a power level at which Wi-Fi can operate indoors across the entire 6 GHz band will

sacrifice what is likely to be the greatest benefit of this rulemaking. Wi-Fi is the workhorse of the Internet because low-cost, off-the-shelf routers and devices can easily and affordably offer access to unlicensed spectrum that provides high-capacity connectivity in homes, at work, at school, in libraries, at restaurants, retailers and virtually every public place. Without affordable, do-it-yourself access to the 850 megahertz in U-NII-5 and U-NII-7, a majority of homes and small businesses in particular could be limited *to a single 160 megahertz channel* between 6875 and 7125 MHz.

We remain hopeful that engineering facts will prevail over incumbent fears – and the by-now-predictable NIMBY syndrome that seems to afflict every incumbent user of an underutilized band of spectrum. The Commission can adopt a rebuttable presumption that lower-power, indoor-only (LPI) unlicensed access does not create an undue risk of harmful interference to incumbents.

First, harmful interference to incumbent point-to-point (FS) links at this power level from LPI inside a building would be extremely rare. The two operate in entirely different locations and with transmit characteristics that are complementary.

Second, fixed point-to-point links are high power and use high-quality, highly-directional antenna, whereas Wi-Fi on a LPI basis would operate indoors at very low duty cycles and at extraordinarily low power.

Third, moving Wi-Fi and other unlicensed traffic onto networks required to be low power and indoors could reduce the overall risk of interference to FS incumbents. And by making 1200 contiguous megahertz available inside every building, unlicensed routers and other devices will spread their transmissions over multiple and much wider channels, further reducing the risk.

Our coalition has also urged the FCC to harmonize the rules for outdoor, AFC-controlled fixed wireless deployments with existing unlicensed rules (Part 15) for the 5 GHz bands that permit higher gain antennas and therefore enable rural broadband providers to cover larger areas more affordably. Equipment already widely deployed in the 5 GHz band is easily adaptable to operate in the 6 GHz band.

Finally, while we agree that AFC systems will be necessary to avoid interference outdoors and for standard power deployments, AFCs in this band can be relatively simple databases that are easy to implement. Geolocation database coordination is well-established and reliable in bands, such as in U-NII-5 (5925 to 6425 MHz) and U-NII-7 (6525 to 6875 MHz),

where incumbent operations are geographically fixed and change location or operating parameters infrequently. The FCC has a long history of ensuring that coordination technologies and procedures work to give primary licensees in shared band a high degree of protection from harmful interference. Fears about theoretical and corner-case scenarios that could result in fleeting interference should not preempt the truly enormous economic and social benefits of authorizing unlicensed sharing across the entire 6 GHz band.

### ***The Vacant 5.9 GHz Band is a Roadblock to a Potential Wi-Fi Superhighway***

The 5.9 GHz band lies directly between the upper portion of the 5 GHz band, which is currently used for unlicensed Wi-Fi and rural broadband, and the 6 GHz band that the FCC has proposed to open for shared unlicensed use. As Commissioner Mike O’Rielly so aptly put it, the 5.9 GHz band is “the missing link between the 5 GHz and 6 GHz bands.” Reallocating the 5.9 GHz band for unlicensed use would create a very high-capacity Wi-Fi “superband” that would enable multiple contiguous channels of gigabit-fast connectivity in every home and business. As noted above, contiguous and wide unlicensed spectrum with mid-band propagation is absolutely essential for accelerating the next-generation 5G-capable Wi-Fi services.

The 5.9 GHz band is currently allocated for auto safety signaling using a specific technology called Dedicated Short-Range Communications (“DSRC”). Way back in 1999 the FCC allocated this 75 megahertz (5850 to 5925 MHz) for shared use by DSRC technology on a licensed basis. For two decades the band has gone almost completely unused. The 5 GHz band has become a telling experiment in market forces and innovation. Wi-Fi also emerged in 1999 and consumers today are celebrating its 20<sup>th</sup> anniversary. Over that time, while the auto industry left the 5.9 GHz band fallow, unlicensed innovation and Wi-Fi use has surged, saturating both the 2.4 GHz band and two segments of the 5 GHz band with intensive spectrum re-use that generates hundreds of billions of dollars annually in consumer surplus. Wi-Fi bands are congested because they carry the vast majority of wireless internet traffic and are an input for virtually every other industry. The ‘car band,’ meanwhile, sits idling and empty.

DSRC has also been eclipsed by newer technologies that render the requirement to use DSRC in the 5.9 GHz band a relic of an abandoned policy that would have mandated DSRC radios in every new vehicle and would have taken at least another two decades, at a high cost to

consumers, to be effective.<sup>12</sup> Unfortunately, the Department of Transportation (DOT) has not yet formally withdrawn its proposed DSRC mandate; nor has it acknowledged, as the European Union has, that real-time safety signaling for V2X applications requires far less than the 75 megahertz currently set aside for this purpose. Since Cellular V2X is in its infancy and is likely to thrive, if at all, as an application on general purpose mobile 5G networks, it could be a “win-win” for consumers to relocate V2X safety signaling.

To its credit, a majority of FCC commissioners seem eager to resolve this issue. Chairman Pai had planned to put a very objective Further Notice of Proposed Rulemaking on the FCC’s June 2019 meeting agenda, seeking comment on several possible outcomes. However, that attempt to update the record continues to be delayed by DOT, which appears unwilling to let the FCC explore all options that serve the public interest overall. We believe Congress should urge the FCC and DOT to work together to solicit public input and explore all alternatives, including whether an alternative band, such as the nearly vacant 4.9 GHz public safety band, could be equally or *more* useful for vehicle safety applications that are integrated with 5G mobile networks. Consumers will benefit most if allocations for both safety and Wi-Fi are optimized.

Cellular V2X should certainly be given the opportunity to prevail in the market as an application on general purpose mobile 5G networks. But even if the FCC decides that a spectrum set-aside at 5.9 GHz is necessary for time-critical safety signaling, the band segmentation approach that has been before the agency for more than three years at least minimizes the cost of another DSRC-type failure. As the Commission has stated multiple times in policy statements since the 2002 Spectrum Policy Task Force Report, exceptions made for public safety or other public interest allocations should be narrowly defined “and the amount of spectrum . . . limited to that which ensures that those [compelling public interest] objectives are achieved.”<sup>13</sup>

Thank you for this opportunity to share our views with the Committee on these critical spectrum proceedings.

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<sup>12</sup> Harding, J. *et al.*, “Vehicle-to-Vehicle Communications: Readiness of V2V Technology for Application,” National Highway Traffic Safety Administration, Report No. DOT HS 812014 (Aug. 2014), at 24 (“Even if the market drives faster uptake by consumers of aftermarket devices . . . it will still take 37 years before we would expect the technology to fully penetrate the fleet.”).

<sup>13</sup> FCC, *Report of the Spectrum Policy Task Force*, ET Docket No. 02-135, at 41 (Nov. 2002), available at <https://tinyurl.com/yypqy8uu>.