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I. Summary

The record reflects strong and diverse support for the Commission's proposal to reallocate *at least* 45 megahertz of the virtually unused 5.9 GHz band for unlicensed use. This increment of additional unlicensed spectrum is critical for consumers and the economy because it creates the first unencumbered 160 megahertz channel needed to support the next generation of Wi-Fi technology, enabling Americans in all areas of the country to access gigabit-fast and more affordable 5G-capable applications and services. The Public Interest Organizations (PIOs) make several key points in these Reply Comments.

First, contrary to assertions that this 45 megahertz is of marginal importance to America's 5G wireless ecosystem, the Commission's proposal to extend today's most used Wi-Fi band in 5 GHz will create the *first and only* unencumbered, contiguous channel of 160 MHz available for use at standard power. If harmonized with U-NII-3, this 45 megahertz can almost immediately allow homes, enterprise, libraries and schools to have at least one gigabit-capable Wi-Fi 6 channel with the power to cover multiple rooms and deliver better quality connectivity at a reasonable cost. As the Commission's recent STAs for WISPs is demonstrating, this 45 megahertz addition to U-NII-3 can also immediately boost the capacity of fixed wireless broadband services in rural, tribal and other underserved areas with unencumbered outdoor use.

Second, the record reflects strong support for the Commission's proposal to adopt technical rules that fully harmonize that spectrum with the current U-NII-3 band, creating a 160 megahertz channel for Wi-Fi 6 that is not encumbered by either a Dynamic Frequency Selection (DFS) or by a geolocation database coordination requirement. Studies show ITS operations at the top of the 5.9 GHz band are unlikely to be harmed by unlicensed RLAN operations in adjacent bands and, as a result, no special mitigation techniques or stringent OOB limits are required. It is critical that the Commission get the OOB limits correct and seek to keep the limits low.

Third, the record reflects strong support for relocating ITS operations to a different, potentially better band to ensure that both Wi-Fi and other unlicensed services *and* auto safety systems have the spectrum needed to optimize consumer welfare. The 4.9 GHz band—50 megahertz of grossly underutilized spectrum already allocated exclusively for public safety—should be a prime candidate for the Commission as the new ITS band. The Commission designated 5.9 GHz as the U-NII-4 band precisely because of its immediate adjacency to both the current 5 GHz Wi-Fi band and the future 6 GHz Wi-Fi band. Together, the Commission could create a single, contiguous, extremely high-capacity band that can both accommodate 5G-capable applications and spur innovation for capabilities that have yet to be invented. In contrast, there is no specific technical reason why ITS/V2X *needs* to operate in the 5.9 GHz band.

Fourth, the Commission should reject arguments that there is sufficient unlicensed spectrum available in other bands and more than enough thanks to the agency's recent decision to open the 6 GHz band for unlicensed sharing. Not only can critical V2X safety systems successfully deploy on 30 megahertz or less, but filings in the record by two auto industry coalitions demonstrate automakers are not willing to commit to deploying even the basic V2V safety messaging to more than a tiny fraction of the U.S. vehicle fleet, rendering the radios if not utterly useless for safety, then certainly far less effective than driver assist LiDAR and other sensing technologies the Commission is facilitating on other spectrum bands.

Finally, some auto industry commenters erroneously contend that the Commission does not have the authority under Section 316 of the Communications Act to reallocate unused 5.9 GHz spectrum capacity to another service. Clear agency and judicial precedent supports the agency's authority, including two current proceedings that reduce incumbent holdings in similarly underutilized and outdated bands by the same 60 percent.

II. There is Strong Support for Making at Least 45 Megahertz Available for Unlicensed Use to Enable Next Generation Wi-Fi 6 Connectivity

The record reflects strong support for reallocating at least 45 megahertz of spectrum in the 5.9 GHz band for unlicensed use.² A wide variety of commenters agree the Commission should move expeditiously to repurpose this virtually unused spectrum to fuel next generation Wi-Fi networks and other unlicensed services. Creating the first and only unencumbered 160-megahertz channel available for Wi-Fi 6 at standard power, both outdoors and indoors, will be a huge boost not only to home and enterprise connectivity, but also for the capacity of fixed wireless services in rural and other underserved areas almost immediately. A number of parties also support our proposal that the Commission go further and achieve a bigger win-win for consumers by relocating Cellular V2X (CV2X) to a new and better band, thereby enabling both a contiguous Wi-Fi superhighway and giving CV2X innovators potentially more spectrum and security in a 5G-friendly band not sandwiched between heavily-trafficked Wi-Fi bands.

The Commission’s proposal to reallocate 45 megahertz of spectrum contiguous to the U-NII-3 band has the unique benefit of creating “a new high-capacity 80 MHz and a new high-capacity 160 MHz channel for unlicensed use.”³ Contrary to assertions by some parties that this 45 megahertz is of marginal importance to America’s 5G wireless ecosystem, the Commission’s proposal to extend today’s most used Wi-Fi band in 5 GHz to create the *first and only*

² See, e.g., Comments of Wireless Internet Service Providers Assn. at 3-4 (“Comments of WISPA”); Comments of Dynamic Spectrum Alliance (“Comments of DSA”) at 4; Comments of the Wi-Fi Alliance at 2; Comments of the Free State Foundation (“Comments of Free State”) at 3; Comments of NCTA – The Internet & Television Association (“Comments of NCTA”) at 20; Comments of the Center for Growth and Opportunity at Utah State University at 3-4 (“Center for Growth and Opportunity”); Comments of Broadcom, Inc. and Facebook, Inc. (“Comments of Broadcom and Facebook”) at 1; Comments of Comcast Corporation (“Comments of Comcast”) at 2; Comments of the R Street Institute (“Comments of R Street”) at 3; Comments of OTI and PK at 6.

³ Comments of DSA at 2.

unencumbered, contiguous channel of 160 MHz available for use at standard power would generate enormous value nationwide. If harmonized with U-NII-3, this 45 megahertz can almost immediately allow homes, enterprise, libraries, and schools to have at least one gigabit-capable Wi-Fi 6 channel with the power to cover multiple rooms and deliver better quality connectivity at a reasonable cost.

Facebook and Broadcom explain that “[w]hen combined with the existing, adjacent spectrum available in U-NII-3, the U-NII4 band will allow next generation Wi-Fi standards, such as Wi-Fi 6, to be deployed in the band. Wi-Fi 6 is intended to be deployed over wider channels to support gigabit connectivity, lower latency, improved coverage and power efficiency.”⁴ Comments filed by the Center for Growth and Opportunity highlight the importance for the economy: “A contiguous block of unlicensed frequencies would allow for wide channels and greater throughput which would result in greater efficiency compared to many isolated bands even if they total the same bandwidth when aggregated.”⁵

NCTA likewise agrees that authorizing unlicensed use of the nearly contiguous U-NII-3, 5.9 GHz, and the 6 GHz bands “would ‘optimize the efficient and effective use’ of spectrum.”⁶ The Public Interest Organizations agree with NCTA that opening the entire 5.9 GHz band would eliminate “the need for OOB limits to protect an island of ITS spectrum in an area zoned for unlicensed use. U-NII-3, U-NII-4, and U-NII-5 could all operate at efficient power levels that maximize throughput for consumers. Access points and client devices would be more effective and less expensive, as there would be less need for expensive filters and other techniques to comply with OOB limits to protect ITS operations.”⁷

⁴ Comments of Broadcom and Facebook at 2.

⁵ Comments of the Center for Growth and Opportunity at 4.

⁶ See 5.9 GHz NPRM ¶ 63.

⁷ Comments of NCTA at 16.

As OTI and PK detailed in their initial comments,⁸ the R Street Institute points to the numerous consumer and industry benefits that would come with an added 45 megahertz of unlicensed spectrum in the 5.9 GHz band for next-generation Wi-Fi services. The R Street Institute states that the Commission’s proposed reallocation “will translate into vastly improved speeds for consumers (gigabits per second), as well as a platform for innovators and entrepreneurs to develop new technologies that take advantage of those improved capabilities, like wireless AR/VR headsets.”⁹

Our organizations also urge the Commission to consider the opportunities the 5.9 GHz band brings for fixed wireless services and improving broadband access in rural and other underserved areas through outdoor use. The Wireless Internet Service Providers Association (WISPA) concurs with the Commission’s observation that equipment manufacturers will be able to manufacture devices to expand the capacity of point-to-multipoint fixed wireless broadband offerings that rely today on adjacent 5 GHz spectrum quickly and cost-effectively.¹⁰ WISPA states: “These advantages apply not just to Wi-Fi equipment designed for short-range transmission, but also to existing equipment authorized in the U-NII bands and available in the marketplace for longer-range point-to-multipoint transmission for providing fixed wireless broadband service.”¹¹ The Covid-19 crisis has highlighted just how important it is for the Commission to do everything possible to facilitate cost-effective and higher-capacity fixed wireless service to unserved and underserved homes in rural, tribal and small town America, which is exactly what a 45 megahertz extension of the U-NII-3 band relied on today by WISPs would facilitate.

⁸ Comments of OTI and PK at 9-17.

⁹ Comments of R Street at 8.

¹⁰ 5.9 GHz NPRM at 12610, ¶16.

¹¹ Comments of WISPA at 5-6.

III. The Record Strongly Supports Technical Rules that Align with the Current U-NII-3 Band, Facilitating an Unencumbered 160 Megahertz Channel for Wi-Fi 6

The record reflects strong support for the Commission’s proposal to reallocate U-NII-4 spectrum while adopting technical rules that fully harmonize that spectrum with the current U-NII-3 band, thereby creating a 160 megahertz channel for Wi-Fi 6 that is not encumbered by either a Dynamic Frequency Selection (DFS) or by a geolocation database coordination requirement.¹² The Wi-Fi Alliance correctly emphasizes the importance of harmonizing the technical rules, arguing that the rules governing the band “must be aligned with the rules covering the U-NII-3 band.”¹³ Our groups agree with the Wi-Fi Alliance that “the Commission’s proposal to permit U-NII-4 devices to operate at the same power levels, and with the same operating parameters, as U-NII-3 devices will maximize the utility of both U-NII bands. If different power levels or other technical rules for the two bands are adopted, U-NII devices will not be able to operate across both the U-NII-3 and U-NII-4 bands, eliminating the potential use of wider channels, equipment commonality, reduced cost and complexity, superior performance and other benefits that may be realized by the Commission’s proposal.”¹⁴ We likewise agree with the Dynamic Spectrum Alliance (DSA), which argues that ensuring the same EIRP and power spectral density limits would “simplify the design of Wi-Fi devices operating on the new 20, 40, 80, and 160 MHz channels that span the U-NII-3 and U-NII-4 bands to operate under a single set of technical rules.”¹⁵

¹² *See, e.g.*, Comments of Microsoft at 3; Comments of NCTA at 9-10; Comments of DSA at 2-3; Comments of Free State at 9.

¹³ Comments of the Wi-Fi Alliance at 6.

¹⁴ *Ibid.*

¹⁵ Comments of DSA at 4.

Cable industry commenters similarly emphasize the importance of harmonized technical rules between the U-NII-3 and U-NII-4 bands. As NCTA points out, “in cable Wi-Fi networks U-NII-3 has long been the workhorse U-NII band. Applying the U-NII-3 power limits, including the 1 W maximum conducted power limit, to U-NII-4 will enable network operators and device manufacturers to build on the success of U-NII-3.”¹⁶

Comcast elaborates on this point, stating: “Much of the Wi-Fi equipment deployed today and operating in the widely used U-NII-3 band at 5.8 GHz could bring consumers access to the 5.9 GHz spectrum with only software or firmware updates, a benefit that would not be possible in any other band.”¹⁷ Comcast states: “Within a year, the system could be updated on site, to operate in the 5.9 GHz (U-NII-4) band, supporting a 160-megahertz channel spanning both U-NII-3 and U-NII-4. The combination of U-NII-3 and U-NII-4 to create a 160-megahertz channel means that the 5.9 GHz band will deliver benefits beyond the 45 megahertz of spectrum for unlicensed use.”¹⁸

Broadcom and Facebook explain why ITS operations at the top of the 5.9 GHz band are unlikely to be harmed by unlicensed RLAN operations in adjacent bands, and that as a result, “no special mitigation techniques or stringent OOB limits are required.”¹⁹ The companies point to a study by CableLabs that found that RLAN operation up to the ITS band edge in UNII-4 would result in only a “0.002% probability that Wi-Fi operations would cause adjacent channel DSRC

¹⁶ Comments of NCTA at 45-46.

¹⁷ Comments of Comcast at 8.

¹⁸ *Id.* at 9.

¹⁹ Comments of Broadcom and Facebook at 2.

packet error rates (PER) to reach 10%.”²⁰ Another option for the Commission would be to move the band edge up.²¹

The PIOs agree with commenters, including Microsoft, that it is critical that the Commission gets the out-of-band-emissions (OOBE) limits correct and that the Commission seeks to keep the limits low.²² Comcast urges the Commission to provide “reasonable protection to [ITS] communications operating between 5895 MHz and 5925 MHz without impairing the implementation or utility of wide-channel bandwidths in U-NII-4.”²³ Comcast correctly notes that the OOBE limits in the 5.9 GHz band should be set in line with the reality that most wide-channel Wi-Fi use is indoors, while auto safety will inherently be outdoors: “A balanced approach to U-NII-4 OOBE limits should also account for the natural separation and propagation losses between vehicular communication systems and the devices mostly likely to operate under U-NII-4 rules, such as residential, commercial, and enterprise Wi-Fi systems. This is especially true for devices that are installed inside buildings, as their transmissions would be subject to substantial building entry loss and they would likely be further separated from moving vehicles by tens of meters.”²⁴

²⁰ *Id.* at 4-5; Letter from Paul Margie, Counsel for NCTA—The Internet & Television Association, to Marlene H. Dortch, FCC, Secretary, ET Docket 13-49 (June 28, 2017).

²¹ Comments of WISPA at 6 (“WISPA recommends that the Commission adopt the existing U-NII-3 slope that has governed out-of-band emissions into the 5.850-5.925 GHz band, but should truncate the slope at 5.895 GHz, now that it will be the upper edge of the U-NII-4 band.”).

²² Comments of Microsoft at 4; Comments of DSA at 4-5; Comments of Wi-Fi Alliance at 6-8 (“Therefore, Wi-Fi Alliance proposes the following OOBE limits for U-NII transmitters operating solely in the U-NII-4 band or operating across the U-NII-3 and U-NII-4 bands: For an indoor device, all emissions at or above 5.925 GHz shall not exceed an EIRP of –7 dBm/MHz increasing linearly to 15 dBm/MHz at 5.895 GHz. For an outdoor device, all emissions at or above 5.925 GHz shall not exceed an EIRP of –27 dBm/MHz increasing linearly to -5 dBm/MHz at 5.895 GHz.”); Comments of Comcast at 10-11; Comments of Broadcom and Facebook at 2; Comments of WISPA at 6.

²³ Comments of Comcast at 10.

²⁴ *Id.* at 11.

IV. There is Strong Support for Reallocating All 75 MHz for Unlicensed Use and Relocating CV2X to a New and Potentially Better Band, Such as 4.9 GHz

In the *NPRM*, the Commission asked commenters to “consider whether there are other spectrum bands that might be better suited for supporting ITS applications.”²⁵ The record reflects strong support for the Commission to consider relocating ITS operations to a different, potentially better band to ensure that both unlicensed services *and* auto safety systems have the spectrum needed to optimize consumer welfare.²⁶ The PIOs agree with the R Street Institute that “if vehicle safety were moved out of the 5.9 GHz band, that would allow the full 75 MHz to be allocated to unlicensed use, potentially bridging the 5.8 GHz band, the 5.9 GHz band and the 6 GHz band to form a Wi-Fi superhighway.”²⁷ R Street further notes that several other countries use other bands for similar auto safety services, and that the Commission itself has previously allocated the 76–81 GHz band for “vehicular radar systems, which can be used to support automatic emergency braking systems and adaptive cruise control systems.”²⁸

The 4.9 GHz band, as OTI and PK highlighted in initial comments, should be a prime candidate for the Commission as the new ITS band. This grossly underutilized band is already allocated exclusively for public safety. As the Dynamic Spectrum Alliance suggests: “If C-V2X systems can operate successfully in 20 MHz within the 4.9 GHz band, there would be a clear path to reach a total 50 MHz of spectrum, allowing it to evolve toward 5G. While seemingly a more radical approach, it is one that could improve spectrum utilization and overall spectrum

²⁵ *5.9 GHz NPRM* at ¶ 61.

²⁶ *See, e.g.*, Comments of DSA at 6 (“within the 4.9 GHz band, there would be a clear path to reach a total 50 MHz of spectrum, allowing it to evolve toward 5G”); Comments of NCTA at 19-20; Comments of Center for Growth and Opportunity at 3-4 (“Other bands would provide the same, if not better, connectivity for ITS services”); Comments of R Street at 10-11.

²⁷ Comments of R St. Institute at 11.

²⁸ *Id.* at 10.

efficiency and bring the greatest economic benefits to the U.S. economy.”²⁹ NCTA agrees that the Commission should consider the 4.9 GHz band as an option for ITS operations.³⁰

Some commenters argue that moving V2X operations to another band would be cumbersome or cause even more delay in deploying critical safety communication. General Motors asserts that moving V2X out of the 5.9 GHz band is not “workable” and that “the agency could not undo the harm to V2X by allocating a bandwidth outside the 5.9 GHz band.”³¹ General Motors states that V2X requires “the ability to communicate beyond the line-of-sight and around fixed objects, and few (if any) other available bandwidths share the characteristics that make 5.9 GHz ideally suited for such critical safety applications,” as well as the “international adoption” of 5.9 GHz for V2X.³² General Motors and AT&T, among others, assert that the 5.9 GHz band is essential because NHTSA has identified crash avoidance scenarios (e.g., blind intersection crossings and left turn assist) in which a ubiquitously-deployed CV2X signaling capability could potentially be more effective than LiDAR or other sensing technologies operating on high-frequency bands, such as 76-81 GHz.³³

On both points, General Motors, AT&T, et al. miss the mark. First, General Motors appears to presume that any alternative spectrum would be in propagation-limited millimeter wave spectrum above 24 GHz. GM provides no evidence that other mid- or low-band spectrum (such as the 4.9 GHz public safety band, or the lower 3 GHz band) could not work equally well—or better—for critical V2X safety applications that require the ability to communicate beyond line-of-sight.

²⁹ Comments of DSA at 6.

³⁰ Comments of NCTA at 19-20.

³¹ Comments of General Motors at 14.

³² *Ibid.*

³³ Comments of General Motors at 19-20; Comments of AT&T at 7.

GM also downplays the fact that with few exceptions, automated vehicle companies have developed autonomous driving and driver-assist technologies that address the most common and most deadly crash avoidance scenarios *without* using 5.9 GHz spectrum and *without* relying on ubiquitous adoption by nearly all other vehicles. LiDAR and other technologies are improving steadily and being deployed widely, with each new vehicle improving safety for everyone. In contrast, V2V depends on virtually all other vehicles being similarly equipped. As a result, the National Highway Traffic Safety Administration (NHTSA) has acknowledged that V2V will not be reliable as an automated safety signaling network in the absence of a regulatory mandate, a proposal the Department of Transportation (DOT) has abandoned.³⁴ And even if there was a government mandate, NHTSA concluded that it cannot even determine if V2V safety communications will be effective until the radios are installed in nearly all new vehicles and “it will still take 37 years before we would expect the technology to fully penetrate the fleet.”³⁵

Second, as noted in our comments, as well as by the R Street Institute, the 5.9 GHz band is not entirely harmonized internationally. Although the 5.9 GHz band likely offers some “economy of scale for manufacturers,” as General Motors argues, the fact that there has been no government mandates or voluntary scale deployments of V2V or V2X relying on 5.9 GHz spectrum anywhere in the world suggests that this is at best a hypothetical concern.³⁶

Further, the Commission should reject arguments by 5GAA and a number of other V2X proponents that there is sufficient unlicensed spectrum available in other bands and more than

³⁴ Department of Transportation, National Highway Traffic Safety Administration, 79 Fed. Reg. 49,270 (proposed Aug. 20, 2014) (to be codified at 49 C. F. R. pt. 9701), at p. 6 (“... if V2V were not mandated by the government, it would fail to develop or would develop slowly.”).

³⁵ Harding, J. et al., *Vehicle-to-vehicle communications: Readiness of V2V Technology for Application*, National Highway Traffic Safety Administration, Report No. DOT HS 812 014, at 24 (Aug. 2014) (“V2V Readiness Report”).

³⁶ *Ibid.*

enough thanks to the agency's recent decision to open the 6 GHz band for unlicensed sharing.³⁷

We address this in the next section. However, when considering the benefits of relocating ITS operations entirely to an alternative band, what's most important is not the overall quantity of unlicensed spectrum, but rather its location and unique capabilities to offer an unencumbered 160 megahertz to power next generation Wi-Fi. The 5.9 GHz band is currently a roadblock to a potentially faster and more productive Wi-Fi superhighway. Reallocating all 75 megahertz creates a contiguous unlicensed band with more robust technical characteristics better able to meet the evolution of demand by both consumers and enterprises for very high-bandwidth, low-latency and better-quality wireless connectivity able to connect anything and everything at an affordable cost.

The Commission designated the 5.9 GHz band as the U-NII-4 band precisely because of its immediate adjacency to both the current 5 GHz Wi-Fi band and the future 6 GHz Wi-Fi band. Together, the Commission could create a single, contiguous, extremely high-capacity band that can both accommodate 5G-capable applications and spur innovation for capabilities that have yet to be invented. In contrast, there is no specific technical reason why ITS *needs* to have 75 megahertz in the 5.9 GHz band. The automotive and mobile industries are obviously in the process of converging around Cellular V2X—and ultimate integration with mobile 5G networks—as the future standard for safety communication and data collection (e.g., via roadside unites). But since that development is ongoing and not yet deployed commercially, there is time for a course correction that benefits the overall public interest.

³⁷ Comments of 5GAA at 39 (“In sum, whether considered on its own or in tandem with the other unlicensed spectrum discussed above, there very well may be more than sufficient spectrum available for new Wi-Fi and unlicensed uses without infringing upon the 5.9 GHz band.”).

V. Auto Industry Claims that Vehicle Safety Communications Requires 75 Megahertz and has No Alternatives to 5.9 GHz Lack Merit

The auto industry and some mobile industry interests assert that auto safety operations require all 75 megahertz of the 5.9 GHz band, but without offering tangible evidence or specifics about what these high-bandwidth applications are and what they will do to promote public safety. These claims ignore the global consensus that 30 megahertz is sufficient for critical public safety communications. They also ignore realities of the auto market that resulted in 20 years of inaction over the 5.9 GHz band regarding DSRC: Even if automakers were in agreement to install interoperable V2X radios in every new vehicle (and they clearly are not), it costs too much and takes too long for the sort of ubiquitous deployment that is needed.

Not only can critical V2X safety communications successfully deploy on 30 megahertz or less, but filings in the record by two auto industry coalitions demonstrate automakers are not willing to commit to deploying even the basic V2V safety messaging to more than a tiny fraction of the U.S. vehicle fleet, rendering the radios if not utterly useless for safety, then certainly far less effective than driver assist LiDAR and other sensing technologies the Commission is facilitating on other spectrum bands. Finally, some auto industry commenters erroneously contend that the Commission does not have the authority under Section 316 of the Communications Act to reallocate unused 5.9 GHz spectrum capacity to another service.

A. Nothing in the Record Suggests that Automakers Require More than 30 Megahertz for Critical Auto Safety Communications

Auto and mobile industry commenters generally assert that all 75 megahertz of 5.9 GHz spectrum are necessary for vehicle safety applications without providing much specificity of what that means beyond a voluntary and very limited deployment of V2X signaling that NHTSA

and other governments have concluded will require at most 20 or 30 megahertz.³⁸ While both critical auto safety communications and commercial connected car applications should be facilitated by federal policy, auto and mobile industry commenters simply assert that 75 megahertz at 5.9 GHz is necessary for “potential” and “future” safety applications without providing a technical or other practical basis to support that conclusion. In doing so, even putting aside their 20-year failure to make use of the band, auto interests neglect to acknowledge several key points.

First, and most relevant for this proceeding, NHTSA’s proposals for real-time safety signaling among vehicles were premised on a single Basic Safety Messaging channel of 10 megahertz, both because the signals are extremely narrowband and because other connected car applications (such as in-vehicle advertising) might congest the safety channel.³⁹ A second 10 megahertz channel was contemplated for first responders and certainly a third could be used for data transfers with roadside infrastructure (e.g., traffic signals). General Motors, 5GAA and other proponents of CV2X maintain they prefer a 20 megahertz basic safety channel—yet they do not provide an adequate explanation why, contrary to NHTSA findings vis-à-vis DSRC, more than 30 megahertz is needed to address crash avoidance and other critical safety scenarios.

As Cisco notes: “30 MHz would minimally address some of the US DoT’s ITS safety goals. For example, it appears that V2V crash avoidance can be supported, and possibly other applications.”⁴⁰ The PIOs further agree with Cisco that commenters need to sufficiently answer

³⁸ See, e.g., Comments of 5G Automotive Association at 28 (claiming the *NPRM* proposal “fails to future-proof America’s spectrum regulations”); Comments of AT&T at 24 (expressing the need to “account for the potential evolution of technology”); Comments of United Parcel Service, Inc. at 4-5 (“both DSRC and V2X technologies have great potential”).

³⁹ *V2V Readiness Report* at 56 (“one radio will be used exclusively for sending and receiving BSMS, while the other will be used to communicate with infrastructure and the security system”).

⁴⁰ Comments of Cisco at 9-10.

the following questions, and that at this point they have not: “Will parties point to applications that require more spectrum than what is proposed? To what extent do the applications require low latency and therefore suggest the need for dedicated spectrum? Can some of the functions be serviced with general purpose spectrum?”⁴¹

Second, as noted above and in our initial comments, DOT has abandoned the proposal to mandate V2V communications, making it highly unlikely that even critical safety signaling will be voluntarily deployed ubiquitously enough—even two decades from now—to require more spectrum for add-on safety applications on additional channels. As Consumer Reports concedes in its comments, “individual car companies do not have strong incentives to equip their vehicles with needed systems unless other companies are doing the same.... The current leadership at DOT has yet to act upon the proposal, and absent a mandate, automakers have retreated from their plans to install DSRC in their vehicle fleets.”⁴² The record shows how unlikely it is for the free market to incorporate the needed systems in every vehicle absent a mandate, as NHTSA itself predicted high costs for automakers to do so (more than \$100 billion) —a clear deterrent to the likelihood of universal, voluntary deployment.⁴³

In fact, the auto industry essentially concedes in this proceeding that it will not commit to the sort of ubiquitous deployment of Cellular V2X that NHTSA has previously found would be

⁴¹ *Id.* at 10.

⁴² Comments of Consumer Reports at 7.

⁴³ Comments of OTI and PK at 23-24; National Highway Traffic Safety Administration (NHTSA), Department of Transportation (DOT) NPRM, Docket No. NHTSA-2016-0126 (Jan. 12, 2017), at 4000, <https://www.federalregister.gov/documents/2017/01/12/2016-31059/federal-motorvehiclesafetystandards-v2v-communications>. See also The Brattle Group, “The Economic Costs and Benefits of a Federal Mandate that All Light Vehicles Employ 5.9 GHz DSRC Technology,” (May 2, 2016), http://files.brattle.com/system/publications/pdfs/000/005/284/original/brattle_costs_benefits_of_v2v_mandate_may_2_2016.pdf; Letter of Competitive Enterprise Institute, American Commitment, Niskanen Center, Reason Foundation, and R St. Institute to Transportation Secretary Elaine Chao (April 3, 2017), <https://cei.org/sites/default/files/Letter%20to%20USDOT%20on%20V2V%20April032017.pdf>.

necessary to even determine if the technology will be effective. For example, the Alliance for Automotive Innovation, in an April 23 letter, committed to deploy at least 5 million radios on “vehicles and roadway infrastructure” within 5 years *if* the FCC preserves all 75 megahertz of the 5.9 GHz band for safety.⁴⁴ WifiForward observed that if the industry met this goal, “less than 2% of all cars on the road would be equipped with one of two competing V2X technologies, which means a motorist’s chance of encountering another car equipped with a compatible V2X device in a crash-imminent situation is less than one in a hundred.”⁴⁵ That is exactly why NHTSA concluded that without a mandate, not even the single 10 megahertz channel it proposed to dedicate to basic V2V signaling would be put to effective use. Moreover, even if 5 million vehicles are equipped over 5 years, that represents less than 30 percent of the average 17 million new vehicles currently sold in a single year.⁴⁶ Unfortunately, the auto industry is not even going that far, since the 5 million radios “within 5 years” will include those deployed on “roadway infrastructure . . . including any previous V2X deployments,” which are mostly DSRC pilots funded by federal and state grants.

The U.S. auto industry is relatively optimistic compared to the automakers globally. The Center for Growth and Opportunity points out that last year the Association of Global Automakers, in a letter to the FCC, proposed an interim buildout requirement of “2 million V2X radios within five years.”⁴⁷ The Center notes that this commitment would amount to 0.7 percent

⁴⁴ Letter from John Bozella, Alliance for Automotive Innovation, to FCC Chairman Ajit Pai and DOT Secretary Elaine Chao, ET Docket 19-138 (April 23, 2020).

⁴⁵ Howard Buskirk, “Auto Alliance Promising 5M V2X Radios if FCC Drops 5.9 GHz Plan Meets Skepticism,” *Communications Daily* (April 24, 2020).

⁴⁶ *Ibid.*

⁴⁷ Comments of Center for Growth and Opportunity at 2, quoting Letter from Scott Delacourt, counsel to Association of Global Automakers, ET Docket No. 13-49, GN Docket No. 18-357, at 7 (May 17, 2019), https://www.globalautomakers.org/As-Filed%20Global%20Automakers%20Ex%20Parte_1.pdf.

penetration of the U.S. vehicle fleet in 2017 (approximately 272.5 million vehicles were registered in the U.S. as of 2017).⁴⁸ Within 10 years, automakers proposed a requirement to equip 75 percent of new vehicles. This failure to even aspire to ubiquitous penetration of the U.S. vehicle fleet (which turns over roughly every 15 years) suggests that on a voluntary basis, NHTSA’s original projection of 37 years before automated V2V could prove reliable may have been far more optimistic than it appeared at the time.⁴⁹

Third, auto and mobile industry proponents of retaining all 75 megahertz consistently conflate critical *public safety* communications with their desire to have exclusive free spectrum for commercial connected car applications. Some commenters argue that the 45 megahertz is needed is for new categories of “advanced” CV2X applications, such as “trajectory and intent sharing,” “extended sensor sharing,” and “protecting pedestrians, bicyclists, and road workers.”⁵⁰ As a result, they claim, more spectrum is needed to “send and receive this torrent of V2X information to and from hundreds of vehicles, roadside infrastructure, and other road users in the immediate vicinity.”⁵¹

However, like the V2V Basic Safety Message specified by NHTSA, it is not clear why these narrowband transmissions (such as vehicle trajectory and intent data, AV sensor data, or a pedestrian smartphone alert) cannot not be accommodated on two or three channels and 30 megahertz of spectrum. This would seem particularly true if a single interface—like CV2X—had access to all 30 megahertz, as Qualcomm proposes.⁵² Indeed, many of these “advanced” safety functions—such as sharing trajectory, intent, and sharing environmental data with nearby

⁴⁸ *Ibid.*

⁴⁹ See NHTSA, *V2V Readiness Report*, at 24.

⁵⁰ Comments of 5GAA at 29-31.

⁵¹ Comments of Qualcomm at 4.

⁵² *Id.* at 9.

vehicles—actually appear to describe the essential functions of the basic safety messaging channel that NHTSA originally sought to mandate using a single 10 megahertz channel.

Additionally, these arguments seem to ignore the high likelihood that connected car and auto safety operations will connect to general purpose mobile carrier 5G networks and services. AT&T predicts that “automotive manufacturers will incorporate 5G enabled V2N connectivity into their vehicles on a pace similar to, and perhaps more quickly than, how they adopted 4G LTE V2N connectivity,” and adds that “this is the primary path to 5G for vehicle connectivity and will occur regardless of which V2V/V2I technology is ultimately adopted for use in the 5.9 GHz band, just as it did with 4G LTE adoption.”⁵³ As AT&T notes, vehicle connectivity will likely be another “slice” of 5G mobile networks tailored to deliver specialized commercial applications and services for a fee. The mobile carrier business model anticipates that car connectivity will be one of several revenue-generating verticals using a “slice” of the general purpose network, similar to the services that mobile carriers will customize for factory automation, port or airport operations, hotel chains and many other use cases. There appears to be no reason why the auto industry should receive dedicated, free spectrum for its “slice” of the general purpose 5G networks that will power a host of connected car services.

T-Mobile argues that the full 5.9 GHz band is necessary because “C-V2X applications would offer two modes of vehicular communications: peer-to-peer mode and network mode.”⁵⁴ However, it is not apparent why the service the mobile carriers call Vehicle-to-Network (V2N) connectivity would be, or needs to be, transmitted on the lower portion of the 5.9 GHz band and cannot be integrated into the carriers’ individual networks. In all cases the mobile carriers will be delivering this connectivity over their own exclusively-licensed (“flexible use”) spectrum

⁵³ Comments of AT&T at 12-13.

⁵⁴ Comments of T-Mobile at 3.

holdings, as the AT&T quote above illustrates. If what AT&T and T-Mobile are proposing for the lower 5.9 GHz band is a sort of shared band for 5G mobile operators to deliver car connectivity, they should describe how sharing that spectrum will uniquely advance the *public safety* purpose—not commercial prospects—of the band.

Furthermore, these arguments that all 75 megahertz are needed for public safety is inconsistent with the insistence from the auto and mobile industries that the private sector is moving forward on continuing plans to deploy commercial applications. In 2004, the Commission amended the rules to note that the 75 megahertz allocation was designed to accommodate commercial applications as well as safety operations.⁵⁵ The amount the Commission is reserving for V2X safety in the current NPRM—30 megahertz—is consistent with what’s needed for non-commercial safety use and, therefore, consistent with the principles of spectrum management the Commission has adopted and reiterated in more recent years,⁵⁶ as OTI and PK detailed in their initial comments.⁵⁷ The Commission’s proposal promotes public safety and the public interest, even if it does not subsidize commercial or safety-related applications that can operate (and far sooner) on general purpose mobile 5G networks.

⁵⁵ Federal Communications Commission, Amendment of the Commission’s Rules Regarding DSRC Services in the 5.850-5.925 GHz Band, Report and Order, WT Docket No. 01-90 (rel. Feb. 10, 2004) at p. 16-17 ¶ 25. Under the band plan adopted by the Commission, there is one control channel and six service channels, two of which are designated for public safety applications. Channel 172 is dedicated to V2V signaling. Channel 184 is designated for higher-power public safety communications, but also for shared use by “non-public safety DSRC operations.”

⁵⁶ See *Report of the Spectrum Policy Task Force*, ET Docket No. 02-135, at 41 (Nov. 2002), http://sites.nationalacademies.org/cs/groups/bpasite/documents/webpage/bpa_048826.pdf (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.*”); accord FCC, *National Broadband Plan: Connecting America*, “Chapter 5: Spectrum,” at 75 (2010), <http://download.broadband.gov/plan/nationalbroadband-plan.pdf>.

⁵⁷ See Comments of OTI and PK at 28-19; Michael Calabrese, “*Spectrum Silos to Gigabit Wi-Fi: Sharing the 5.9 GHz ‘Car Band’*,” at 30-34 (Jan. 2016), available <https://www.newamerica.org/oti/policy-papers/spectrum-silos-to-gigabit-wi-fi/>.

Finally, AT&T argues that additional spectrum is needed for ITS operations, specifically to facilitate peer-to-peer communications and the “evolution to 5G.”⁵⁸ However, this actually presents a somewhat backwards solution: mobile 5G will be widely deployed long before V2X penetrates the vehicle fleet, as the meager commitments offered by two automaker associations (described above) indicate. It seems more likely, more cost-effective, and far more consistent with the Commission’s principles of spectrum management, if these additional applications operate on the other bands of spectrum actually dedicated to 5G general purpose networks.

B. Creating the Only Unencumbered, High-Capacity Wi-Fi Channel Available for Outdoor and Indoor Use at Standard Power Generates Unique Benefits for Consumers and Rural Areas in Particular

The Commission’s actions to open up 45 megahertz of 5.9 GHz spectrum will benefit consumers in rural areas, in particular the Commission’s proposal that U-NII-4 devices operating on an unlicensed basis in the 5.850-5.895 GHz band are subject to technical and operational rules harmonized with those that currently apply to the adjacent U-NII-3 band.⁵⁹ The Public Interest Organizations agree with WISPA that this recommendation is “a sensible and efficient approach” as it would “permit higher-EIRP fixed wireless operations that will enable use of the 5.9 GHz band for rural broadband deployment, including both outdoor point-to-point operations and point-to-multipoint operations.”⁶⁰

The current Covid-19 crisis—and the FCC’s response—reinforces how important it will be for rural, tribal and other less-densely-populated areas to have unfettered access to the lower 45 megahertz of U-NII-4 in combination with U-NII-3. The Commission recently granted STAs

⁵⁸ Comments of AT&T at 13-14.

⁵⁹ See NPRM at 12622-23, ¶53.

⁶⁰ Comments of WISPA at 6.

that allow WISPs serving 330 counties across 29 states to make use of the 5850-5895 MHz band “to help them serve rural communities facing an increase in broadband needs during the COVID-19 pandemic.”⁶¹ The stay-at-home orders in most states increased bandwidth demand by WISP customers as much as 40 percent.⁶² By granting the STAs, the Commission essentially recognized that the lower 45 megahertz of the band is unused in all but a handful of locations. As a result, an STA that amounts to a “use it or share it” rule for the band that immediately gives WISPs up to 160 megahertz (combined with the adjacent U-NII-3 band), conditioned on manual but streamlined coordination (WISP operators must be more than 2 km from DSRC units and give notice in case any interference results). The STAs should prove to be a “proof of concept” showing that in this proceeding the Commission can immediately permit at least coordinated use of fallow 5850-5895 MHz spectrum.

Despite this opportunity, some commenters attempt to discount the value of this 45 megahertz increment for consumers and rural areas in particular by claiming that the Commission has already authorized a sufficient amount of spectrum in other bands for unlicensed operations.⁶³ T-Mobile takes this argument even further, stating that the U.S. “is an outlier in making substantially more spectrum available on an unlicensed and shared basis than other countries.”⁶⁴ T-Mobile seems to imply that this is a negative aspect of the Commission’s spectrum policy, rather than the benefit it truly is. This wide-channel spectrum band for Wi-Fi

⁶¹ FCC News Release, “FCC Grants Wireless ISPs Temporary Access to Spectrum in 5.9 GHz Band to Meet Increase in Rural Broadband Demand During Pandemic; Authority Granted to Dozens of Fixed Wireless Broadband Providers to Support Rural Telework, Remote Learning, and Telehealth” (rel. March 27, 2020)(“WISP STA”).

⁶² See Letter from Stephen E. Coran, Counsel to 33 WISPs, to Donald Stockdale, Chief, Wireless Telecommunications Bureau, FCC, “Request for Emergency Special Temporary Authority” (filed March 20, 2020), at 1.

⁶³ Comments of AT&T at 15-16; Comments of 5GAA at 37-39; Comments of Qualcomm at 17; Comments of Consumer Reports at 9.

⁶⁴ Comments of T-Mobile at 5.

will power next-generation wireless services not just for Wi-Fi users, but for the benefit of the mobile industry as well as the offloading of mobile device data traffic continues to grow.⁶⁵

Arguments that the 6 GHz band will be enough spectrum for unlicensed services are misplaced. Even after two sub-segments of the 6 GHz band are authorized for outdoor and indoor use at standard Part 15 power, there will be no gigabit-fast 160 megahertz channel that is not encumbered by either automated frequency coordination (6 GHz) or a detect-and-avoid sensing requirement (U-NII-2). As noted previously, 5.9 GHz spectrum plays a unique role in the unlicensed broadband ecosystem not because of its quantity, but because of its location and unencumbered capability. Additionally, as WISPA and NCTA highlight, this spectrum can immediately and inexpensively extend the adjacent U-NII-3 band using existing equipment.⁶⁶

C. A Reorganization of the Completely Unused 5.9 GHz Band Would Clearly Not Violate Sections 312 or 316 of the Act

The Intelligent Transportation Society of America (ITS America) and General Motors argue that reducing the ITS allocation at 5.9 GHz by 60 percent is tantamount to a “fundamental change” in their licenses in violation of Section 316 of the Communications Act.⁶⁷ There is no basis in fact or in precedent for an interpretation of Section 316 that would preclude the Commission from reorganizing a band that has remained fallow for 20 years to promote the broader public interest and particularly not where incumbent licensees retain sufficient spectrum to deploy the safety-critical V2X communication technology the band is intended to support.

Changing or reducing the frequencies used by a licensed service is a type of modification the Commission has ordered multiple times in the past, including this year by adopting a 60

⁶⁵ See, e.g., Comments of OTI and PK at 10-11.

⁶⁶ Comments of NCTA at 16; Comments of WISPA at 5-6.

⁶⁷ Comments of the Intelligent Transportation Society of America at 14; Comments of General Motors at 13-14.

percent reduction in C-band spectrum allocated to the Fixed Satellite Service and reallocating the 3700-4000 MHz band to terrestrial flexible use. The Commission is also scheduled to vote in May on a draft Report and Order that reduces the allocation for narrowband services in the 900 MHz band by 60 percent, thereby realigning the 900 MHz band to create a new flexible use broadband segment and reserving the remainder for continued narrowband operations.⁶⁸ The Commission’s proposed 60 percent reduction in the share of the 5.9 GHz band allocated to ITS amounts to less of a “fundamental change” than these two most recent precedents.

The Commission’s recent findings that the public interest justified a 60 percent reduction in the allocation of a grossly underutilized band is also nothing new. For example, in its *2002 MSS Order*, the Commission relied on Section 316 to both relocate and reduce the amount of L-Band spectrum authorized for use by Motient from 28 to 20 megahertz.⁶⁹ Likewise, in its *2004 800 MHz Order*, the Commission rejected Sprint’s claim that it had to be compensated on a “megahertz-by-megahertz” basis for rebanding to avoid interference with public safety.⁷⁰

Federal courts have repeatedly upheld the Commission’s broad authority under Section 316 to modify licenses at any time provided the agency makes a public interest finding and does not fundamentally change the license.⁷¹ Reducing the range of frequencies in which ITS

⁶⁸ See Draft Report and Order, *Review of the Commission’s Rules Governing the 896-901/935-940 MHz Band*, WT Docket No. 17-200 (April 22, 2020); Notice of Proposed Rulemaking, WT Docket No. 17-200 (rel. March 14, 2019).

⁶⁹ *Establishing Rules and Policies for the use of Spectrum for Mobile Satellite Services in the Upper and Lower L-band, Report and Order*, 17 FCC Rcd 2704, ¶¶ 1, 21 (2002) (“2002 MSS Order”) (relocating the Motient spectrum assignment and reducing it from 28 to 20 megahertz).

⁷⁰ *Improving Public Safety Communications in the 800 MHz Band et al.*, Report and Order, Fifth Report and Order, Fourth Memorandum Opinion and Order, and Order, 19 FCC Rcd 14969, ¶ 68 (2004) (“2004 800 MHz Order”) (rejecting argument Sprint must be compensated for frequency relocation on a “megahertz-for-megahertz” basis).

⁷¹ See *California Metro Mobile Communications Inc. v. FCC*, 365 F.3d 38, 45 (D.C. Cir. 2004) (“Section 316 grants the Commission broad power to modify licenses; the Commission need only find that the proposed modification serves the public interest, convenience and necessity.”); *Cellco Partnership v. FCC*, 700 F.3d 534, 543-544 (D.C. Cir. 2012); *MCI Telecommunications Corp. v. AT&T*, 512 U.S. 218,

licensees are guaranteed interference protection for V2X public safety communications does not represent a “fundamental change” in their rights, provided that licensees are able to continue operating essentially the same service, as the D.C. Circuit has consistently held.⁷²

As ITS America concedes, the ultimate test for whether the Commission can change licenses is whether licensees can “provide essentially the same services” on a reduced amount of spectrum.⁷³ That is axiomatic in this case because to the extent V2X services exist at all, they are designed to operate on less than 30 megahertz. Moreover, it’s difficult to maintain that the Commission is imposing a fundamental change on a service that barely exists. Neither DSRC nor CV2X services have been commercially deployed on the band. DSRC today amounts to a scattering of pilot deployments at test centers and in cities paid for primarily by the government. For its part, Cellular V2X is still on the drawing board and has only just begun to test its viability with pilot deployments. The Commission’s proposal is aligned with regulators worldwide that have thus far concluded that 30 megahertz is enough spectrum to safely support auto safety operations. The Commission has wide discretion to reallocate this spectrum based on a reasoned and articulated balance between the public’s need for safety-critical auto communications and uniquely capable and affordable Wi-Fi connectivity.

Moreover, it is important to note that GM, Toyota and other automakers do not hold exclusive commercial licenses. These licenses are for a shared, license-by-rule band that was intended to serve a public safety purpose from the very beginning. Automakers can hardly claim their commercial expectations have been stymied when they let 20 years go by without

228 (1994) (Section 316 authority to modify licenses does not contemplate ‘fundamental changes’); *Community Television, Inc. v. FCC*, 216 F.3d 1133, 1140-41 (D.C. Cir. 2000).

⁷² See, e.g., *Teledesic LLC v. FCC*, 275 F.3d 75, 85-86 (D.C. Cir. 2000) (the Commission only needs to ensure that incumbents will be able to continue to operate); *Cellco Partnership v. FCC*, 700 F.3d at 543-544.

⁷³ Comments of ITS America at 14.

deploying auto safety technology at scale—and now, as detailed in the section above, offer commitments to deploy V2X at levels that ensure the systems will be completely unreliable for the two or three crash avoidance scenarios that they claim justify the technology as a necessary complement to driver-assist sensing technologies, such as LiDAR, that are rapidly making America’s roads safer with each new vehicle sold.

Finally, General Motors claims that the Commission justifies its decision to reduce the amount of spectrum allocated for ITS operations on “the abilities of sensor technology operating in the 76-81 GHz bands” to do the same work that CV2X does.⁷⁴ This is a misinterpretation of the Commission’s reasoning. While it’s inarguable, as the *NPRM* states, that LiDAR and sensing technologies relying on high-frequency spectrum are serving most of the same safety functions that DSRC was intended to do, the Commission’s decision to reduce the spectrum allocation for CV2X to 30 megahertz is based on the fact that 30 megahertz is all that is required for critical auto safety signaling in the 5.9 GHz band. This is reflected, as noted above, in the framework for a mandate proposed by NHTSA and by allocations by telecommunications regulators around the world. Further, the operations conducted in the 76-81 GHz bands actually do account for most of the auto safety services required, but for two or three use cases, and LiDAR is constantly being developed and improved to fill those gaps.

⁷⁴ Comments of General Motors at 14.

VI. Conclusion

The Public Interest Organizations urge the Commission to expeditiously move to open up the 5.9 GHz band for unlicensed use, while continuing to protect public safety by either allocating 30 megahertz of spectrum in the band for ITS/CV2X operations, or moving auto services to an entirely different band. The country and the economy rely heavily on Wi-Fi, which needs this added capacity to handle the increasing demand for both fixed and mobile uses.

Respectfully Submitted,

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