

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

In the Matter of)
)
Use of the 5.850-5.925 GHz Band) ET Docket No. 19-138
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REPLY COMMENTS OF THE ALLIANCE FOR AUTOMOTIVE INNOVATION

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I. INTRODUCTION AND SUMMARY

The Alliance for Automotive Innovation (“Auto Innovators”), which represents 38 members including automakers, suppliers, and tech companies, hereby submits reply comments in the above-captioned proceeding.¹ Vehicle-to-everything (“V2X”) technologies, which include vehicle-to-vehicle (“V2V”) and vehicle-to-infrastructure (“V2I”) communications and the associated safety and mobility applications they support, stand to deliver enormous safety and lifestyle benefits to the American public. V2X technologies will drastically reduce automotive crashes and fatalities and produce economic, environmental, and transportation efficiencies. For these benefits to be fully realized, the Federal Communications Commission (“FCC” or “Commission”) should abandon its proposal in the *NPRM* and preserve the entire 75 MHz of the 5.9 GHz band for V2X.

The *NPRM* generated an enormous response from a broad and diverse group of commenters united in urging preservation of the entire 5.9 GHz for life-saving auto safety services. Among these many voices, the Department of Transportation (“DOT”) stands out. As

¹ *In re Use of the 5.850-5.925 GHz Band*, Notice of Proposed Rulemaking, 34 FCC Rcd 12603 (2019) (“*NPRM*”).

the agency charged by Congress in the Transportation Equity Act for the 21st Century with advancing the development and deployment of crash-avoidance technologies, DOT repeatedly and plainly has expressed the importance of preserving the entire 5.9 GHz band for auto safety. But DOT is far from alone. Every state department of transportation supports preservation of 5.9 GHz for auto safety—a bipartisan group including red states, blue states and the purple states of Florida, Wisconsin, Michigan, Ohio, Pennsylvania and Arizona. Interests of every stripe support preserving the entire 5.9 GHz band for auto safety: public safety groups, auto safety groups, wireless industry leaders (AT&T, T-Mobile and Qualcomm), standards setting bodies (IEEE and SAE International), consumer groups, and an array of cycling and walking stakeholders. The record is clear: addressing the nearly 40,000 traffic fatalities that occur each year is an urgent and widely shared national priority.

Moreover, the regulatory landscape has shifted dramatically since the FCC launched the *NPRM*. The unlicensed interests competing to use the 5.9 GHz band have won a major victory. At the April meeting, the Commission opened **1200 MHz** of 6 GHz spectrum to unlicensed use. In light of the enormity of this new unlicensed allocation, the *NPRM*'s proposal to take an additional, incremental 45 MHz from auto safety services cannot be justified.

A second major development is the auto industry's groundbreaking buildout commitment. In an April 23rd letter to Transportation Secretary Chao and FCC Chairman Pai the auto industry committed, contingent on preservation of the entire 5.9 GHz band for auto safety, to deploy **five million** V2X radios on American roadways within five years. This commitment should resolve any lingering concerns about spectrum utilization and the future of V2X technologies. With the FCC's backing, V2X auto safety services will be deployed at scale in the near-term achieving the network effects necessary to maximize roadway safety benefits.

By contrast, the *NPRM* proposal to reallocate 45 MHz of 5.9 GHz spectrum for unlicensed services is fatally flawed. The Commission’s analysis of the costs and benefits of the proposed band plan shortchanges the life-saving benefits of V2X technologies and fails to recognize the enormous economic costs of reallocating the 5.9 GHz band for unlicensed. Indeed, the Commission’s proposal, in failing to account for the Value of a Statistical Life (“VSL”) in the economic benefits analysis, departs from the record and Commission precedent without explanation and is arbitrary and capricious. The *NPRM*’s proposal to allow unlicensed use of the 5.9 GHz band also would cause a disabling level of harmful interference to V2X.

The record reflects that 75 MHz is needed to support critical V2X applications, and a smaller allocation simply would not suffice. The global trend is to allocate 75 MHz for V2X. A consistent approach in the U.S. will enable us to keep pace with trading partners and maintain global leadership in this vital sector of the economy. The *NPRM*’s reallocation proposal, however, may exceed the Commission’s license modification and revocation authority and violate the Communications Act of 1934, as amended.²

In light of the widespread opposition to the *NPRM*’s proposals, the changed regulatory landscape, and the flaws in the Commission’s cost/benefit analysis, the Commission should reject the *NPRM*’s band plan and instead adopt the consensus path forward identified by the Auto Innovators. The Auto Innovators’ membership has reached consensus on a band plan in 5.9 GHz that would enable V2X to realize its full potential while “future-proofing” the band for next generation auto safety technologies. The Auto Innovators’ proposed band plan includes allocations for LTE C-V2X, DSRC, and next generation iterations of these technologies. After a set time period, the predominant technology will have full access to all 75 MHz of the band,

² 47 U.S.C. § 151 *et seq.* (“Communications Act”).

unleashing the full benefits of V2X, protecting American lives, and maintaining American leadership in the automotive and technology sectors.

Finally, the Auto Innovators and commenters urge the Commission to continue testing options for co-channel sharing with unlicensed devices, though such testing should not delay DSRC or C-V2X from accessing the spectrum. This testing may generate solutions that allow even more efficient use of the 5.9 GHz band.

II. THE RECORD OVERWHELMINGLY DEMONSTRATES THAT THE COMMISSION'S PROPOSED BAND PLAN IS FATALLY FLAWED AND SHOULD BE REJECTED.

Commenters overwhelmingly agreed that the *NPRM*'s proposal is severely flawed in several respects. First, the proposal is contrary to the public interest and well-being and fails to properly account for the immense safety, societal, and economic benefits of dedicating spectrum for a life-saving technology like V2X. Second, the Commission's proposal fails to ensure that V2X communications are adequately protected from harmful interference, and in so doing, effectively forecloses use of the band for any V2X technology. The Commission should heed commenters' calls and reformulate the proposed 5.9 GHz band plan to allow V2X to flourish and deliver life-saving benefits to the American people.

A. The *NPRM*'s Benefits Analysis is Arbitrary and Capricious and Inconsistent with Commission Precedent.

Commenters overwhelmingly agreed that V2X technologies can deliver a higher value to consumers than unlicensed Wi-Fi due to V2X's life-saving capabilities.³ The Commission's

³ See, e.g., Comments of Dr. John M. Peha, ET Docket No. 19-138, at 5 (filed Mar. 9, 2020) ("Peha Comments"); Comments of Consumer Reports, ET Docket No. 19-138, at 9 (filed Mar. 9, 2020) ("Consumer Reports Comments"); Comments of Honda Motor Company, ET Docket No. 19-138, at 10 (filed Mar. 9, 2020) ("Honda Comments"); Comments of the American Association of State Highway and Transportation Officials, ET Docket No. 19-138, at 20-22 (filed Mar. 2, 2020) ("AASHTO Comments"); Comments of the American Highway Users Alliance, ET Docket No. 19-138, at 2-3 (filed Mar. 9, 2020) ("American Highway Users

proposal in the *NPRM* is such a dramatic and unsubstantiated departure from the Commission’s prior policy and the record in this proceeding that, if adopted, it would be considered arbitrary and capricious decision-making.⁴ The Commission should reconsider its proposal in light of the many deficiencies raised by commenters. Specifically, the *NPRM*’s cost/benefit analysis was flawed because it did not take into account either the life-saving potential of V2X or the full economic magnitude of stripping spectrum from V2X.⁵ A diverse array of commenters urged the Commission to consider the costs of lost lives and injuries, as well as lost investment in V2X deployments, if the agency proceeds with reallocating over half of the band.⁶ Given the

Comments”); Comments of American Trucking Associations, ET Docket No. 19-138, at 3-4 (filed Mar. 9, 2020) (“ATA Comments”); Comments of the City of New York, ET Docket No. 19-138, at 2-3 (filed Mar. 9, 2020) (“City of New York Comments”); Comments of the DSRC Auto Safety Coalition, ET Docket No. 19-138, at 12-14 (filed Mar. 9, 2020) (“DSRC Comments”).

⁴ Under the Administrative Procedure Act, agency orders will be held unlawful and set aside if they are arbitrary and capricious, an abuse of discretion, or otherwise not in accordance with law. 5 U.S.C. § 706(2)(A).

⁵ See Comments of the Alliance for Automotive Innovation, ET Docket No. 19-138, at 20, 36-37 (filed Mar. 9, 2020) (“Auto Innovators Comments”) (“Although the full potential of the 5.9 GHz band is yet to be fully realized, removing over half of the band now would strand both private and public sector investments in life-saving V2X capabilities. [T]he Commission omits any discussion of the Value of a Statistical Life (“VSL”), a departure from the agency’s consistent, standard practice across multiple proceedings involving safety-of-life services.”).

⁶ See, e.g., Comments of the Association for Unmanned Vehicle Systems International, ET Docket No. 19-138, at 2 (filed Mar. 9, 2020) (“AUVSI Comments”) (“At this time there are approximately 123 planned or operational deployments across the United States using the 5.9GHz band. Hundreds of millions of dollars to date have made these projects a reality based on the necessary spectrum allocation.”); City of New York Comments at 4-6; Comments of DENSO International, ET Docket No. 19-138, at 2-3, 5-6 (Mar. 9, 2020) (“DENSO Comments”); Comments of the U.S. Department of Transportation, ET Docket No. 19-138, at 35-37 (filed Mar. 13, 2020) (“DOT Comments”); Comments of General Motors, LLC, ET Docket No. 19-138, at 22-23 (filed Mar. 9, 2020) (“GM Comments”); Comments of IEEE 802, ET Docket No. 19-138, at 4, 8-9 (filed Mar. 9, 2020) (“IEEE 802 Comments”), Comments of OmniAir Consortium, ET Docket No. 19-138, at 7, 11-12 (filed Mar. 9, 2020) (“OmniAir Comments”).

importance of these factors to the Commission’s cost/benefit analysis, it should preserve the entire 5.9 GHz band for V2X to reflect the proper value of this life-saving technology.

1. The Life-Saving Potential of V2X Technologies is an Enormous Benefit to the American Public.

There is no higher benefit to the American public than saving a life. Congress and the Commission have long recognized this fact, and commenters to this proceeding explained the incalculable value of saving lives through use of V2X technologies. The Commission should take heed of this reality and preserve the 5.9 GHz band for life-saving V2X technologies.

Congress prioritized the development and adoption of crash-avoidance technologies in the Transportation Equity Act for the 21st Century.⁷ DOT and the FCC jointly responded to Congress’s directive by making the 5.9 GHz band available for V2X and enabling the research and development of connected life-saving applications.⁸ Both then and now, commenters overwhelmingly favor prioritizing roadway safety innovations over other spectrum uses.

The record shows that the life-saving benefits of V2X technologies are worth more to the American public than yet more spectrum for unlicensed. Dr. John Peha, former Chief Technologist at the Commission and former Associate Director at the White House Office of Science and Technology Policy, stated that roadway safety V2X applications represent a higher-

⁷ See Transportation Equity Act for the 21st Century, Pub. L. No. 105-178, at § 5207 (1998) (“Transportation Equity Act for the 21st Century”). An identified national “priority area” under the statute was focusing on “crash-avoidance and integration of in-vehicle crash protection technologies with other on-board safety systems.”

⁸ “The record in this proceeding overwhelmingly supports the allocation of spectrum for DSRC-based ITS applications to increase traveler safety, reduce fuel consumption and pollution, and continue to advance the nation’s economy.” *In re Amendment of Parts 2 and 90 of the Commission’s Rules to Allocate the 5.850-5.925 GHz Band to Mobile Service for Dedicated Short-Range Communications of Intelligent Transportation Services*, Report and Order, at ¶ 1.5 (1999).

valued use for the 5.9 GHz band than unlicensed devices.⁹ Dr. Peha argued that the FCC should prioritize identifying the spectrum necessary for “core safety-related applications” and that the Commission risks taking “irreversible action” without further information on the impacts of reallocating V2X crash avoidance spectrum in the 5.9 GHz band.¹⁰ Consumer Reports also weighed these competing interests and concluded that supporting auto safety and reducing traffic fatalities was paramount.¹¹

Stakeholders in both the private and public transportation sector likewise prioritized the value of saving lives on the road over expanded Wi-Fi connectivity. For example, in reviewing the 37,133 lives lost annually and \$800 billion in automobile crashes per year, Honda Motor Company stated that “[t]he data clearly indicates that the benefit to public safety-of-life and transportation efficiency far outweigh the benefits for consumer Wi-Fi.”¹² Moreover, the American Association of State Highway and Transportation Officials (“AASHTO”)—an association that represents the interests of all 50 state departments of transportation and the state departments of transportation of the District of Columbia and Puerto Rico—noted that the *NPRM*’s proposal “puts potential benefits of over \$1 trillion annually in safety and an additional \$140 billion in congestion costs at risk.”¹³ Indeed, a number of commenters stated that V2X

⁹ Peha Comments at 5.

¹⁰ *Id.*

¹¹ Consumer Reports Comments at 9 (“[N]otwithstanding the tangible benefits of expanded Wi-Fi, and in light of more than 100 Americans dying in traffic crashes each day and the availability of other spectrum options, CR supports efforts . . . to ensure that adequate spectrum remains allocated to [V2X] applications that will improve auto safety and reduce traffic fatalities.”). Consumer Reports also noted that spectrum for Wi-Fi is available in other bands, including all 1200 MHz of the 6 GHz band. *Id.*

¹² Honda Comments at 10.

¹³ AASHTO Comments at 20-22.

technologies have the ability to save countless lives and reduce automobile accident costs.¹⁴

V2X spectrum preserved for automation can also improve traffic safety by allowing both commercial truck and light vehicle platooning.¹⁵

Strikingly, the Commission's analysis fails to consider the VSL in measuring the benefits of V2X safety-of-life services, a departure from the FCC's regular practice in other proceedings. As the Auto Innovators stated in their initial comments, the Commission has consistently used this metric to evaluate the costs and benefits of a proposed action that involves lives saved or lost.¹⁶ For example, in its latest wireless 911 location accuracy for emergency calling proceeding, the Commission estimated that more detailed location information could save 10,020 lives annually, leading to combined estimated benefits of \$97 billion.¹⁷ In that proceeding, the FCC used a metric of \$9.6 million per person.¹⁸ Other agencies too, including the Environmental Protection Agency, the United States Department of Agriculture, the Food and Drug Administration, the Mine Safety and Health Administration, and the Occupational Health and Safety Administration, have used numerical valuations to measure the value of a human life in conducting a cost/benefit analysis.¹⁹

¹⁴ See, e.g., American Highway Users Comments at 2-3; ATA Comments at 3-4; City of New York Comments at 2-3; DSRC Comments at 12-14.

¹⁵ DOT Comments at App'x E.

¹⁶ See Auto Innovators Comments at 37-38 (listing instances in which the FCC has utilized the VSL measurement).

¹⁷ See *Wireless E911 Location Accuracy Requirements*, Fifth Report & Order and Fifth Further Notice of Proposed Rulemaking, PS Docket No. 07-114, FCC 19-124 ¶ 57 (Nov. 25, 2019).

¹⁸ *Id.*

¹⁹ Auto Innovators Comments at 38.

Incorporating the statistical value of lives saved with V2X vastly changes the cost/benefit calculus. The National Highway Traffic Safety Administration (“NHTSA”) estimates that 89% of unimpaired light vehicle crashes could be avoided with full deployment of V2X capabilities.²⁰ Using the \$9.6 million valuation that the Commission has embraced in the past, the U.S. could save over \$192 billion annually if V2X services saved even half of the 40,000 vehicle deaths that occur in the U.S. each year. Indeed, Panasonic also noted that “omitting this calculation means the FCC fails to consider \$9 billion per year in lifesaving costs” from deployment of V2V applications alone.²¹ The Auto Innovators agree with Panasonic that “the Commission fails to quantify the relevant loss of life—despite it assigning the value of a statistical life in other proceedings.”²² The FCC should revise its cost/benefit analysis to correct this critical oversight and consider the overwhelming support in the record for prioritizing roadway safety over the marginal economic benefits of allotting an additional 45 MHz of spectrum for unlicensed devices.

2. In Light of the Commission’s Recent Allocation of 1200 MHz to Unlicensed, Taking an Additional 45 MHz from Auto-Safety Services Cannot be Justified.

While Wi-Fi is important, the Commission has already allocated vast amounts of spectrum for unlicensed and is poised to allocate still more in the near term. The Commission’s cost/benefit analysis fails to recognize the availability of alternative spectrum for unlicensed

²⁰ These capabilities include Forward Collision Warning, Intersection Movement Assist, Left Turn Assist, and Lane Change Warning. *Ex Parte* Letter of the Association of Global Automakers, ET Docket No. 13-49, Attachment Responding to Staff Questions, at 1 (filed June 28, 2017) (citing Federal Motor Vehicle Safety Standards; V2V Communications, Notice of Proposed Rulemaking, 82 Fed. Reg. 3854, 3863 (proposed Jan. 12, 2017)).

²¹ Comments of Panasonic Corporation of North America, ET Docket No. 19-138, at 10-11 (filed Mar. 9, 2020) (“Panasonic Comments”).

²² *Id.* at 10-11.

beyond the 5.9 GHz band. In contrast, V2X does not have other spectrum opportunities and cannot readily be transitioned to spectrum outside of the 5.9 GHz band.²³

Commenters point out that unlicensed applications and Wi-Fi have plenty of spectrum opportunities in other bands. Indeed, the Commission dramatically has expanded the amount of spectrum available for unlicensed services very recently. At its April meeting, the Commission adopted an order that expanded unlicensed use in the 6 GHz band, adding an eye popping **1,200 MHz** of prime mid-band spectrum for unlicensed use.²⁴ As Consumer Reports stated, this additional 1,200 MHz makes the 45 MHz that the Commission is proposing to take from V2X seem “but a drop in the bucket compared to what might be available in the adjacent band.”²⁵ Indeed, “[t]he 6 GHz band offers more than 25 times the amount of unlicensed spectrum identified in the 5.9 GHz band proceeding for potential unlicensed use.”²⁶ Commenters agreed that preserving the life-saving capabilities of V2X deserves higher priority than giving unlicensed another 45 MHz on top of the 1,200 MHz it is poised to receive.²⁷

²³ See Auto Innovators Comments at 29-31 (discussing unique suitability of the 5.9 GHz band for V2X); Comments of Qualcomm, ET Docket No. 19-138, at 17 (filed Mar. 9, 2020) (“Qualcomm Comments”) (“In contrast to the enormous amount of unlicensed spectrum to be opened just above the 5.9 GHz band, there is no other spectrum band allocated for V2V and V2I direct communications in the FCC’s rules.”).

²⁴ FCC, April 2020 Open Commission Meeting Agenda, <https://www.fcc.gov/news-events/events/2020/04/april-2020-open-commission-meeting> (last visited Apr. 27, 2020); *Unlicensed Use of the 6 GHz Band; Expanding Flexible Use in the Mid-Band Spectrum Between 3.7 and 24 GHz*, ET Docket No. 18-295, GN Docket No. 17-183, Report and Order and Further Notice of Proposed Rulemaking (rel. Apr. 24, 2020).

²⁵ Consumer Reports Comments at 9.

²⁶ Qualcomm Comments at 17.

²⁷ See DENSO Comments at 5; DSRC Comments at 21-22; Panasonic Comments at 12-13; Comments of SAE V2X Core Technical Committee and Infrastructure Applications Technical Committee, ET Docket No. 19-138 at 5 (filed Mar. 9, 2020) (“SAE Comments”); Comments of Toyota Motor Corp, ET Docket No. 19-138 at 20-21 (filed Mar. 9, 2020) (“Toyota Comments”).

Use of the 6 GHz band for unlicensed also offers far greater economic value than use of the 5.9 GHz band. An April 2020 report estimated that the Commission’s 6 GHz band proposal would provide \$153.75 billion in economic value by 2025, while the *NPRM*’s 5.9 GHz proposal would provide just \$28.14 billion during that time.²⁸ Further, the economic value of use of the 5.9 GHz band by unlicensed is dwarfed by the value of V2X—whether measured by the collective \$800 billion that automobile crashes cost each year²⁹ or the \$192 billion that could be saved per year if just half of the annual U.S. crash deaths were prevented.³⁰

Moreover, maintaining the 5.9 GHz band for V2X applications will not negatively impact unlicensed innovation. In addition to the massive amount of spectrum recently allocated for unlicensed in the 6 GHz band, there may be options for unlicensed interests to aggregate non-contiguous bands of spectrum to support 160 MHz channels for Wi-Fi or gigabit Wi-Fi.³¹ Through opportunities in the 6 GHz band and leveraging of technologies, unlicensed has multiple viable options besides the 5.9 GHz band.

In contrast, the record shows that it is not practical for V2X to relocate outside of the 5.9 GHz band. As Qualcomm noted, “there is no other spectrum band allocated for V2V and V2I

²⁸ Raul Katz, *Assessing the Economic Value of Unlicensed Use in the 5.9 GHz & 6GHz Bands*, WifiForward, at 56, 58 (Apr. 2020), <http://wififorward.org/wp-content/uploads/2020/04/5.9-6.0-FINAL-for-distribution.pdf>.

²⁹ Honda Comments at 10.

³⁰ Using the \$9.6 million statistical value of life that the Commission has embraced in the past, the U.S. could save over \$192 billion annually if V2X services saved even half of the 40,000 vehicle deaths that occur in the U.S. each year.

³¹ Auto Innovators Comments at 32-33; DSRC Comments at 21-22; Comments of the Hyundai America Technical Center, Inc., ET Docket No. 19-138, at 8 (filed Mar. 9, 2020) (“HATCI Comments”); Comments of the Intelligent Transportation Society of America, ET Docket No. 19-138, at 24 (filed Mar. 9, 2020) (“ITS America Comments”); Panasonic Comments at 12-13; Toyota Comments at 21.

direct communications in the FCC’s rules.”³² Proposals to relocate auto safety services to 4.9 GHz are made only by opponents of V2X and without serious consideration.³³ Re-purposing that spectrum for V2X cannot happen on any reasonable timeframe and raises questions that have not begun to be explored regarding relocation or sharing with public safety incumbents; the amount of spectrum actually available; the technical suitability of the band for V2X services and equipment; and international harmonization. V2X is being deployed now and the offer of hypothetical spectrum that may or may not be available at some point in the distant future is not an acceptable substitute. Moreover, the 5.9 GHz band is ideally suited for V2X as the spectrum’s unique propagation characteristics allow for non-line-of-sight communications between vehicles and infrastructure and enable low-latency communications to facilitate vehicle automation and safety applications.³⁴ Further, there are hundreds of existing and planned deployments of V2X in the 5.9 GHz band and it would be a waste of investment and resources to move these deployments to a new band. The Commission should accordingly retain the full 75 MHz of spectrum in the 5.9 GHz band for V2X applications.

3. The Commission’s Proposal Would Generate Substantial Economic Costs.

³² Qualcomm Comments at 17.

³³ *See, e.g.*, Comments of Dynamic Spectrum Alliance, ET Docket No. 19-138, at 6 (filed Mar. 9, 2020); Comments of NCTA – The Internet & Television Association, ET Docket No. 19-138, at 19 (filed Mar. 9, 2020) (“NCTA Comments”); Comments of New America’s Open Technology Institute and Public Knowledge, ET Docket No. 19-138, at 26-28 (filed Mar. 9, 2020) (“OTI and Public Knowledge Comments”).

³⁴ Comments of the Ford Motor Company, ET Docket No. 19-138, at 7 (filed Mar. 9, 2020) (“Ford Comments”) (“The 5.9 GHz spectrum is uniquely positioned to provide the optimal technical characteristics for effective V2X communications. For low-latency, device-to-device communication, the RF propagation characteristics in the 5.9 GHz band are ideal for non-line-of-sight (NLOS) driver challenges . . . Other 5G bands are not suitable for this.”).

The *NPRM*'s cost/benefit analysis is flawed as it fails to recognize the lost investments in existing and planned V2X deployments by both state departments of transportation and original equipment manufacturers ("OEMs"). The record is replete with evidence of the magnitude of these costs, as numerous commenters discussed the immense financial toll of lost public and private investment should the Commission elect to repurpose over half of the 5.9 GHz band.³⁵ For example, DOT estimates that the total cost of lost investments from existing deployments nationwide would total over \$2.7 billion.³⁶ Further, state and local departments of transportation would likely be required to spend more than \$645 million just to transition connected roadway infrastructure.³⁷

Additionally, the FCC's regulatory actions have already caused delay and chilled the auto industry's ability to put V2X spectrum to use. For example, Toyota has stated that the lack of regulatory clarity regarding whether V2X applications would continue to have interference-free access to the 5.9 GHz band was a significant factor in Toyota's decision to pause DSRC deployment in its 2021 models.³⁸ Further, numerous commenters noted that the Commission has held up the processing of over 1,000 applications for 5.9 GHz band deployments since December

³⁵ See, e.g., AUVSI Comments at 2 ("At this time there are approximately 123 planned or operational deployments across the United States using the 5.9GHz band. Hundreds of millions of dollars to date have made these projects a reality based on the necessary spectrum allocation."); City of New York Comments at 4-6; DENSO Comments at 2-3, 5-6; DOT Comments at 35-37; GM Comments at 22-23; IEEE 802 Comments at 4, 8-9; OmniAir Comments at 7, 11-12.

³⁶ DOT Comments at 36, 38.

³⁷ *Id.* In addition, transition and delay could "result in hundreds of thousands of additional deaths, injuries, and property damage as well as congestion due to crashes." DOT Comments at 18.

³⁸ Toyota Comments at 15-16.

2019, which has further stunted V2X investment and innovation.³⁹ The Commission’s cost/benefit analysis for its proposal should therefore be revised to account for the billions of dollars in investments in V2X deployments made by DOT, state departments of transportation, and OEMs and acknowledge the role that both the *NPRM* and the Commission’s V2X application freeze had in stranding investments in pending connected vehicle projects.

The record also demonstrates that the FCC erred in relying chiefly on a 2018 RAND economic study funded by the Wi-Fi industry to calculate the proposal’s costs and benefits.⁴⁰ The three most significant oversights that the Commission did not consider were: (1) the economic value of saved lives; (2) the \$800 billion in cost savings from preventing unimpaired roadway crashes; and (3) that the RAND study’s estimated \$189.9 billion in economic benefits assumed Wi-Fi usage in all 75 MHz of the 5.9 GHz band, despite the fact that the *NPRM* only proposes to relocate 45 MHz for unlicensed Wi-Fi.⁴¹ Therefore, the Commission should

³⁹ Although the Commission initiated a formal freeze in December 2019, the ITS America observed that the agency stopped processing applications altogether in October 2019. *See* ITS America Comments at 19; *see also* DSRC Comments at 2; Toyota Comments at 15; *Wireless Telecommunications Bureau and Public Safety and Homeland Security Bureau Announce Temporary Filing Freeze on the Acceptance and Processing of Part 90 Applications for Certain 5850-5925 MHz (5.9 GHz band) Spectrum*, Public Notice, 34 FCC Rcd 12333, 12334 (2019) (“The suspension of filing and processing imposed by this *Public Notice* applies to applications pertaining to new or expanded DSRC Service Roadside Unit location registrations in the Intelligent Transportation Service . . . that operate in the 5850-5895 MHz and/or 5905-5925 MHz portions of the 5.9 GHz band.”).

⁴⁰ *NPRM* ¶ 65.

⁴¹ Comments of the US Technical Advisory Group, ET Docket No. 19-138, at 4-5 (filed Mar. 9, 2020) (“USTAG Comments”); Panasonic Comments at 10; Honda Comments at 10; Toyota Comments at 20-21; City of New York Comments at 3; ITS America Comments at 24-25; Comments of IEEE 1609 Working Group, ET Docket No. 19-138, at 4 (filed Mar. 9, 2020) (“IEEE 1609 Comments”); Comments of the Washington State Department of Transportation, ET Docket No. 19-138, at 3 (filed Mar. 6, 2020) (“WDOT Comments”); Comments of the South Dakota State Department of Transportation, ET Docket No. 19-138, 3-4 (filed Mar. 5, 2020); AASHTO Comments at 21.

abandon its reliance on the RAND study and instead recognize the immense benefits of retaining the full 75 MHz of the 5.9 GHz band for V2X and the staggering costs of reallocating the spectrum for unlicensed.

B. The Proposed Band Plan Would Result in Disabling Interference Rendering the Frequencies Reserved for V2X Unusable.

The Commission’s proposed band plan is unworkable. Harmful interference from unlicensed operations will render even a reduced V2X allocation unusable for V2X’s life-saving applications, whether using DSRC or C-V2X. The record in this proceeding is compelling on this point: testing shows that allowing unlicensed operations in the 5.9 GHz band would create harmful interference to V2X technologies. The Commission should either abandon its plan to permit unlicensed operations in the 5.9 GHz band or impose technical requirements designed to protect V2X from harmful interference.

1. The Record Shows that The Commission’s Proposed Band Plan Would Result in Disabling Interference to V2X

Testing demonstrates that the Commission’s proposed band plan would likely lead to harmful interference from devices using unlicensed spectrum to V2X devices operating in the upper 30 MHz of the 5.9 GHz band. Spectrum for life-saving services such as V2X must be protected from harmful interference so that vital messages are not delayed, lost, or corrupted, or device performance compromised.

Commenters produced testing and analyses demonstrating that the FCC’s proposal would result in harmful interference to V2X applications. As IEEE noted, “[e]vidence of harmful interference from U-NII-4 operations into ITS operations in the 5.895-5.925 GHz band is already available; this is not a mere theoretical concern.”⁴² DOT concluded that unlicensed Wi-Fi

⁴² IEEE 1609 Comments at 14.

sharing in the 5.9 GHz band would result in “significant, negative degradation of V2X communications,” and that out-of-band emissions from unlicensed devices in adjacent channels would cause “critical interference” to V2X.⁴³ The risk of interference would be “compounded if Wi-Fi devices were also allowed to operate directly above the spectrum allocated to V2X.”⁴⁴ DOT expressed great concern that the Commission’s proposed band plan would “have a significant risk of harmful interference that would either degrade or make unusable the 30 MHz that would remain allocated for V2X, especially for safety applications.”⁴⁵ This outcome would decimate V2X and forfeit its life-saving capabilities.

Private sector testing reached the same conclusion. Ford conducted field and laboratory testing showing that Wi-Fi operations in adjacent channels to V2X would produce out of band emissions that “render the ITS channels unusable for safety applications.”⁴⁶ The Commission should recognize that harmful interference would critically jeopardize V2X communications for safety-of-life purposes.⁴⁷

2. If the Commission Moves Forward with its Proposed Band Plan, at a Minimum it Should Take Action to Protect V2X Communications.

As the Commission’s rules prohibit Part 15 devices from causing harmful interference,⁴⁸ the Commission should take action to protect V2X, a safety of life service, from harmful interference caused by unlicensed operations. The Commission could alter its band plan to keep

⁴³ DOT Comments at 47-49.

⁴⁴ *Id.* at 50-51, 55.

⁴⁵ *Id.* at 51.

⁴⁶ *See* Ford Comments at 9; *see also* Ford White Paper, Impact of U-NII-4 Band Wi-Fi Adjacent Channel Interference on 5.9 GHz V2X Safety Systems (“Ford White Paper”).

⁴⁷ Ford Comments at 9; Ford White Paper; DOT Comments at 51

⁴⁸ 47 C.F.R. §§ 15.5(b); 15.3(m).

Wi-Fi operations sufficiently removed from 5.9 GHz vehicle operations or, at minimum, impose technical solutions to protect V2X. Commenters supported restrictions on unlicensed use such as tighter out-of-band emission limits, requiring sensing technology like dynamic frequency selection, and potential indoor use limitations to protect V2X communications.⁴⁹ The Auto Innovators urge the Commission to consider these technical solutions and limitations to assure that V2X can operate in an environment free from harmful interference.⁵⁰

Guard bands could be another option to reduce the potential for adjacent band interference to V2X. Commenters supported the use of guard bands to alleviate harmful interference.⁵¹ However, if guard bands are necessary, spectrum for the guard band should not be taken from the V2X allocation, as doing so would further diminish the utility of the spectrum to support V2X applications.

Interference is not the only concern raised by the FCC's proposal. DOT also points out that the Commission's proposed technical rule changes in the band would strip priority of the V2X safety message. If the Commission adopts its proposal to remove sections 95.3159 and 90.377(d) and (e) of its rules, priority safety-of-life messages would have to wait for other users to finish transmitting—an unacceptable delay that would open the possibility of a crash

⁴⁹ See, e.g. Ford Comments at 10 (suggesting interference from U-NII-4 operation into the band above 5895 MHz be less than - 108 dBm/MHz measured at the C-V2X receiver); Comments of Cisco, ET Docket No. 19-138, at 15-16 (filed Mar. 9, 2020) (proposing an OOB adjustment, an OOB mask to limit emissions into the V2X band, and limiting U-NII-4 to indoor use); OmniAir Comments at 10 (suggesting an indoor use limitation on unlicensed transmissions and reconsidering the applicable spectrum mask); Panasonic Comments at 17 (proposing a restriction on use of U-NII-4 and adjacent 6 GHz band frequencies in vehicles); Toyota Comments at 18 (advocating for establishment of strict OOB limits).

⁵⁰ In addition, the testing discussed in Section V, *infra*, would help inform Commission decisions on appropriate technical rules for unlicensed and appropriate protections for V2X.

⁵¹ Toyota Comments at 18-19; OmniAir Comments at 10.

occurring.⁵² The Commission should reject this proposal and ensure that safety messages can be given proper priority and transmitted without delay.

III. THE NPRM GENERATED AN ENORMOUS RESPONSE FROM A BROAD AND DIVERSE GROUP OF COMMENTERS UNIFIED IN URGING PRESERVATION OF THE ENTIRE 5.9 GHZ BAND FOR V2X.

The record in this proceeding shows widespread support—from a diverse set of industries and commenters—for retention of the entire 75 MHz of the 5.9 GHz band for V2X services. It is imperative that V2X has the full 75 MHz to support operations, as all seven channels are needed to optimize the technology’s life-saving functions and support transmission of safety messages. Much of the world, including key U.S. trading partners, have already taken steps to allocate 75 MHz of spectrum for V2X. To retain global leadership and unlock the full benefits of this game-changing transportation technology and accommodate future innovations, the Commission should retain the entire 5.9 GHz band for V2X.

A. Commenters Agree That the Full 75 MHz of the 5.9 GHz Band Should be Retained for Vehicle Safety

The vast majority of commenters in this proceeding agree with the Auto Innovators that the full 75 MHz of the 5.9 GHz band should be retained for vehicle safety.⁵³ The automotive industry including automakers, suppliers, and technology companies voiced strong support for maintaining the entire band for V2X.⁵⁴ The trucking industry also advocated for preserving the

⁵² DOT Comments at 51.

⁵³ *See, e.g.* Auto Innovators Comments at 4-13; AASHTO Comments at 3; Comments of the American Public Transportation Association, ET Docket No. 19-138, at 2 (filed Mar. 6, 2020); Comments of the Automotive Safety Council, ET Docket No. 19-138, at 1-2 (filed Mar. 6, 2020); AUVSI Comments at 2.

⁵⁴ *See, e.g.* Comments of Autotalks, ET Docket No. 19-138, at 2 (filed Mar. 9, 2020); Comments of the BMW Group, ET Docket No. 19-138, at 3 (filed Mar. 9, 2020) (“BMW Comments”); DENSO Comments at 2-3; DSRC Comments at i; Comments of the European Automobile Manufacturers Association and European Association of Automotive Suppliers, ET Docket No. 19-138, at 1-2 (filed Mar. 9, 2020) (“ACEA/CLEPA Comments”); Comments of Fiat

entire 5.9 GHz band for V2X.⁵⁵ Additional support came from a wide variety of stakeholders beyond the automotive industry, including:

- equipment and technology manufacturers,⁵⁶
- wireless carriers,⁵⁷
- public safety and transportation groups,⁵⁸
- consumer groups,⁵⁹
- first responders,⁶⁰

Chrysler Automotive US, ET Docket No. 19-138, at 3 (filed Mar. 9, 2020) (“FCA Comments”); GM Comments at 19-20; Ford Comments at 7-9; Comments of German Association of the Automotive Industry, ET Docket No. 19-138, at 2 (filed Feb. 27, 2020); Comments of HARMAN International, ET Docket No. 19-138, at 1-3 (filed Mar. 9, 2020); Honda Comments at 10; HATCI Comments at 3-5; Comments of Jaguar Land Rover Limited, ET Docket No. 19-138, at 3 (filed Mar. 9, 2020) (“Jaguar Land Rover Comments”); Comments of Motor & Equipment Manufacturers Association, ET Docket No. 19-138, at 1, 3-6, 9 (filed Mar. 9, 2020); Comments of Nissan Group, ET Docket No. 19-138, at 1 (filed Mar. 9, 2020); Toyota Comments at 3-15; Comments of Volkswagen, ET Docket No. 19-138, at 4 (filed Mar. 9, 2020); Comments of the Volvo Group, ET Docket No. 19-138, at 2 (filed Mar. 9, 2020) (“Volvo Comments”).

⁵⁵ ATA Comments at 2; *Ex Parte* Letter from Chris Spear, President & CEO, American Trucking Association, to Chairman Ajit Pai *et al.*, FCC, ET Docket No. 19-138, at 1-2 (filed Feb. 5, 2020).

⁵⁶ *See, e.g.*, Comments of LG Electronics, ET Docket No. 19-138, at 1 (filed Mar. 9, 2020); Panasonic Comments at 4, 7; Qualcomm Comments at 9-16; Comments of Robert Bosch, LLC, ET Docket No. 19-138, at 5 (filed Mar. 9, 2020) (“Robert Bosch Comments”); Comments of NXP Semiconductors Inc., ET Docket No. 19-38, at 1 (filed Mar. 9, 2020).

⁵⁷ Comments of AT&T Services, Inc., ET Docket No. 19-138, at 3, 5-17 (filed Mar. 9, 2020) (“AT&T Comments”); Comments of T-Mobile USA, Inc., ET Docket No. 19-138, at 1 (filed Mar. 9, 2020).

⁵⁸ Comments of the National Public Safety Telecommunications Council, ET Docket No. 19-138, at 1 (filed Mar. 9, 2020); American Highway Users Alliance Comments at 3; ITS America Comments at 3; Comments of the Mineta Transportation Institute, ET Docket No. 19-138, at 1 (filed Mar. 9, 2020); Comments of the National Safety Council, ET Docket No. 19-138, at 1 (filed Feb. 27, 2020).

⁵⁹ Consumer Reports Comments at 1.

⁶⁰ Comments of the Traffic Safety Committee of the National Sheriffs’ Association, ET Docket No. 19-138, at 1 (filed Mar. 9, 2020).

- wireless standards and connected vehicle standards groups,⁶¹
- a shipping service provider,⁶² and
- numerous bicycling and walking organizations.⁶³

DOT also voiced vigorous support for retention of the entire 5.9 GHz band for V2X.⁶⁴

DOT warned that “V2X communications that can be relied on to support nationwide interoperability for [V2X’s] safety-critical applications must be able to receive time-sensitive critical information across the entire spectrum.”⁶⁵ Further, “[t]he preservation of the entire 5.9 GHz band for V2X communications offers the Nation an advantage for maintaining and extending leadership in the deployment of innovative V2X applications, including those related to automation. However, these safety innovations and improvements may be lost should the Commission proceed” with its proposal.⁶⁶

Further, at the state level there is deep, bipartisan support for preserving the full 5.9 GHz band for V2X. All the states that participated in the comment round of this proceeding supported retention of the entire band for V2X, with support coming from red and blue states alike, as well as the purple states of Florida, Wisconsin, Michigan, Ohio, Pennsylvania and Arizona.⁶⁷ In light

⁶¹ IEEE 802 Comments at 2, 11; IEEE 1609 Comments at 15; SAE Comments at 2, 9-12; USTAG Comments at 4-5.

⁶² Comments of United Parcel Service, ET Docket No. 19-138, at 1-5 (filed Mar. 9, 2020).

⁶³ Comments of the League of American Bicyclists *et al*, ET Docket No. 19-138 (filed Mar. 9, 2020).

⁶⁴ DOT Comments at 2.

⁶⁵ *Id.* at 25.

⁶⁶ *Id.* at 2.

⁶⁷ *See, e.g.* AASHTO Comments at 1-3; Comments of the California Department of Transportation, ET Docket No. 19-138, at 3 (filed Mar. 6, 2020); City of New York Comments at 5-6; Comments of the Colorado Department of Transportation, ET Docket No. 19-138, at 1-2 (filed Mar. 9, 2020) (“CDOT Comments”); Comments of the Georgia Department of Transportation, ET Docket No. 19-138, at 15 (filed Mar. 9, 2020); Comments of the Maryland

of this enormous support from a diverse range of commenters for retaining the entire 5.9 GHz band for V2X, the Commission should reject the band plan proposed in the *NPRM*.

B. The FCC Should Give Special Weight to the Views of DOT in Light of the Congressional Directive to Do So.

The Commission should give great weight to DOT's comments in this proceeding, as Congress in the Transportation Equity Act for the 21st Century directed the Commission to consult with DOT regarding spectrum for V2X.⁶⁸ Specifically, the Act stated that the FCC "shall consider in consultation with the Secretary [of Transportation] spectrum needs for the operation of intelligent transportation systems, including spectrum for the dedicated short-range vehicle-to-wayside wireless standard."⁶⁹ To move forward with the *NPRM*'s proposal and disregard DOT's conclusions on the importance of the 5.9 GHz band for V2X and the dangers of harmful interference would have the effect of dismissing Congress's direction.

Congress has also evidenced its commitment to preserving the 5.9 GHz band for auto safety. Earlier this year, a bipartisan group consisting of 38 members of the House Committee on Transportation and Infrastructure highlighted how the Commission's proposal will impede the development and deployment of ITS technologies that can prevent traffic fatalities.⁷⁰ The letter discussed Congress's commitment to the advancement and deployment of ITS through the

Department of Transportation, ET Docket No. 19-138, at 1, 3 (filed Mar. 9, 2020); Comments of the Michigan Department of Transportation, ET Docket No. 19-138, at 1-3 (filed Mar. 9, 2020); Comments of the Pennsylvania Department of Transportation, ET Docket No. 19-138, at 1 (filed Mar. 9, 2020); Comments of the Utah Department of Transportation, ET Docket No. 19-138, at 1-2, 14 (filed Mar. 9, 2020); WDOT Comments at 1-2.

⁶⁸ Transportation Equity Act for the 21st Century at § 5206(f).

⁶⁹ *Id.*

⁷⁰ Letter from Members of the House Committee on Transportation and Infrastructure to Members of the Federal Communications Commission, 1 (Jan. 22, 2020) ("Congressional Letter").

enactment of the 2015 FAST Act,⁷¹ and added that removing any of the 75 megahertz dedicated for such operations would be counter to the national transportation policy goals encompassed in that Act.⁷² The Commission should not disregard Congress's directives and should instead incorporate DOT's analysis and conclusions into its consideration of how to optimize use of the 5.9 GHz band for the benefit of the American public.

C. 75 MHz of Spectrum is Needed to Unleash the Full Potential of V2X

The record in this proceeding demonstrates that all seven channels of the 5.9 GHz band are needed to support V2X communications. Commenters opposed the Commission's proposal to reallocate 45 MHz of spectrum, consisting of four of the seven channels in the 5.9 GHz band. Preserving only 30 MHz of spectrum for V2X would undercut the technology's immense societal and life-saving benefits by eliminating the spectrum needed to support critical V2V and V2I safety applications.

The 5.9 GHz band channel allocations have been used to support transmittal of the Basic Safety Message ("BSM") as well as other applications benefiting the public such as signal phase and timing, personal safety message, road traffic information data, and over-the-air updates. DOT explained that more than 30 MHz of spectrum will be necessary to effectively maintain V2X safety applications,⁷³ finding that if the Commission proceeds with its proposed reallocation of V2X applications to the upper 30 MHz of the 5.9 GHz band, many critical V2X

⁷¹ Fixing America's Surface Transportation Act, Pub. L. No. 114-94, §§ 6001 et seq., 129 Stat. 1312, 1561 (2015) (encouraging the deployment of vehicle-to-infrastructure communications, which operates over the 5.9 GHz band, by amending five grants and programs to allow Congressional funding for installation of such equipment.).

⁷² Congressional Letter at 5.

⁷³ DOT Comments at 2.

applications that would reduce accidents and further emergency response would be lost.⁷⁴ DOT specifically noted that: (i) V2I road-weather applications, which can eliminate 25 percent of crashes on freeways caused by inclement winter weather; (ii) V2I system efficiency applications, which can reduce speed and variability on highway segments by 18 percent to 58 percent, resulting in lessened rear-end crashes; and (iii) V2I public safety/emergency response applications, which can reduce emergency vehicle travel times by up to 23 percent and cut the number of stops made by 15 percent, would be compromised under the Commission’s proposal.⁷⁵ As GM noted, by eliminating four of the channels, the FCC “is effectively taking important vehicle safety applications off U.S. streets.”⁷⁶ In particular, V2X applications designed to aid vulnerable road users in urban areas, such as pedestrians and bicyclists, stand to be limited or lost entirely if they have only 20 or 30 megahertz in which to operate.⁷⁷ All channels in the 5.9 GHz band must be made available for V2X.

Commenters urged the Commission to not just consider the spectrum needs of today but also plan for anticipated spectrum needs in the future. Although V2X technologies have already been deployed, further innovation is ongoing. DOT advised that retaining 75 MHz for V2X “provides room for innovation in V2X technologies, which would be foreclosed under this NPRM.”⁷⁸ Ford estimated that “a minimum of an additional 40 MHz in the 5.9 GHz band will be needed soon for advanced ITS applications” featuring larger payloads and multi-way data

⁷⁴ *Id.* at App’x C.

⁷⁵ *See id.* at 15-16, App’x C (noting that National Highway Traffic Safety Administration studies suggest that just four V2X applications could save 7,000 lives and prevent 1.8 million traffic injuries).

⁷⁶ GM Comments at 8.

⁷⁷ *Id.* at 8, n. 10.

⁷⁸ DOT Comments at 32.

exchanges such as sensor sharing, intent/trajectory sharing, vulnerable road user safety, and platooning for trucking.⁷⁹ In addition, vehicle-to-pedestrian/cyclist communications will increase amid future “smart city” mobility scenarios, and spectrum should be set aside for these purposes to avoid accidents and fatalities.

V2X is a game-changer for automotive safety. It would be short-sighted to assume that sensors are a substitute for V2X technologies. As DOT explained, in-vehicle sensors may be susceptible to “blind spots” where they do not have a direct line-of-sight relationship between the vehicles involved.⁸⁰ V2X technologies can estimate crash probabilities prior to the point at which line-of-sight is established, giving drivers more time to mitigate or avoid the crash.⁸¹ The combination of sensors and V2X, with access to dedicated spectrum, will best provide revolutionary enhancements to driver safety and will support automated driving behavior in the future. It is clear that “V2X technology using the 5.9 GHz band can significantly reduce crashes, system inefficiencies, and traffic congestion in ways that are unique from vehicle-based sensors and other technologies, most notably by having significantly greater capability to address non-line-of-sight crashes.”⁸² There is no ready substitute for V2X. The Commission should ensure that the full potential of V2X is realized by allocating all 75 MHz of the 5.9 GHz band to these technologies.

⁷⁹ Ford Comments at 8-9.

⁸⁰ See DOT Comments at 16; *see also* Panasonic Comments at 14 (“While technologies like LIDAR, 76-81 GHz band radar or other line-of-sight sensors can support advanced driver assistance systems (e.g. automatic emergency braking or lane-keeping), harnessing the advantages of fully automated transportation will require cooperation between different vehicles with different levels of automation and the transportation infrastructure.”).

⁸¹ DOT Comments at 17.

⁸² *Id.* at 9.

D. International Harmonization Demands Preserving the Entire 5.9 GHz Band for V2X.

Allocating 75 MHz for V2X would be consistent with international trends. Many countries have already followed the guidance of the International Telecommunications Union to make 75 MHz or more available for V2X. The 2019 World Radio Conference (“WRC”) suggested in WRC recommendation 2088[1] in conjunction with ITS ITU-R recommendation M.2121-0[2] to designate 75 MHz in 5850-5925 MHz for ITS in all regions worldwide. As ACEA/CLEPA noted, “many countries have already designated the same or a similar amount of spectrum in the 5.9 GHz band for V2X communications, including Canada (75 MHz), Mexico (75 MHz), Australia (70 MHz), South Korea (70 MHz), Singapore (50 MHz), CEPT member states (70 MHz), Europe (70 MHz), and Russia (70 MHz).”⁸³

Some countries are also looking to boost the amount of spectrum for V2X by making additional allocations. Despite suggestions to the contrary, 30 MHz is not enough to support V2X communications.⁸⁴ In light of this fact, the European Union is seeking to expand its initial allocations of 30 MHz.⁸⁵ Japan too is currently seeking comment on a proposed frequency reorganization action plan that would allocate the 5.9 GHz band for V2X, and is considering both DSRC and C-V2X technologies. The Commission should follow the lead of much of the

⁸³ See ACEA/CLEPA Comments at 1; see also DOT Comments at 33.

⁸⁴ See e.g. New America, Open Technology Institute Issue Brief, *The 5.9 GHz Band: Removing the Roadblock to Gigabit Wi-Fi*, at 14-15 (March 2020).

⁸⁵ A March 2019 report issued by CEPT proposes “a change of the spectrum regulation from 5875-5905 MHz (30 MHz) to 5875-5915 (40 MHz) and sharing possibilities between 5915-5925 MHz (10 MHz) with urban rail.” CEPT ECC Report 71, *Report from CEPT to the European Commission in Response to the Mandate to Study the Extension of the Intelligent Transport Systems (ITS) Safety-Related Band at 5.9 GHz* (Mar. 8, 2019) <https://www.ecodocdb.dk/download/19a361a9-d547/CEPTRep071.pdf>.

international community which has made ample spectrum available for V2X in the 5.9 GHz band.

In addition, commenters note that international spectrum harmonization, particularly with Mexico and Canada, would have benefits. Alignment with major trading partners is important to the transportation industry and DOT.⁸⁶ Specifically, DOT noted that maintaining harmonized V2X spectrum with Canada and Mexico would position the United States to have a single standard manufactured for export in North America.⁸⁷ Further, several commenters note that harmonized spectrum will ensure continued V2X operability while moving across North American borders.⁸⁸ This is critical, as operability across borders will “assure[] U.S. citizens and transit and freight carriers that their safety is preserved as they travel across borders and that there will be a system that works consistently for them when they arrive. It also assures our citizens that Canadian and Mexican drivers will participate in our safety systems as they journey through the United States.”⁸⁹

In addition, if the United States takes a different approach than the rest of world, investment may be reduced, and innovation stifled. AUVSI noted that “[a]s the United States reallocates its spectrum use, companies analyzing the global market will be hesitant to invest,

⁸⁶ DOT Comments at 34.

⁸⁷ Letter from Elaine L. Chao, Secretary, Department of Transportation, to Ajit Pai, Chairman, Federal Communications Commission, at 2 (Nov. 20, 2019)

⁸⁸ Comments of the Commercial Vehicle Safety Alliance, ET Docket No. 19-138, at 1 (filed Mar. 9, 2020); Comments of Securing America’s Future Energy, ET Docket No. 19-138, at 10 (filed Mar. 9, 2020); Comments of CAR2CAR Communications, ET Docket No. 19-138, at 14 (filed Mar. 9, 2020); Comments of the Institute of Transportation Engineers, ET Docket No. 19-138, at 5 (filed Mar. 6, 2020).

⁸⁹ DOT Comments at 10.

invent, or even manufacture products which are useless in such a large market.”⁹⁰ The Commission’s proposed band plan and reallocation plan would jeopardize U.S. leadership in this important and growing sector, and limit the transferability of technology across countries, to the detriment of American consumers and manufacturers.

E. The Commission Lacks Authority to Adopt the Proposed Band Plan.

The Communications Act imposes significant limitations on Commission action that would change the rights of existing licensees, and the *NPRM*’s proposal to reduce the allocation for V2X would exceed this authority. First, Section 316 authorizes the FCC to “modif[y]” a station license or construction permit consistent with the “public interest, convenience, and necessity.”⁹¹ However, the FCC’s “power to ‘modif[y]’ existing licenses does not enable it to fundamentally change those licenses.”⁹² Second, Section 312 of the Act permits the FCC to revoke a license only upon the occurrence of specifically enumerated circumstances, such as making “false statements” to the Commission or “willful or repeated violation” of Commission rules.⁹³ None of these circumstances would apply here.

Commenters explained that decimating the licensed allocation for V2X could constitute a violation of Section 316 of the Communications Act. The Commission has acknowledged that a fundamental change in violation of Section 316 occurs when a licensee cannot provide substantially the same services under very similar terms.⁹⁴ The Commission’s proposed band

⁹⁰ AUVSI Comments at 2

⁹¹ 47 U.S.C. § 316(a)(1).

⁹² *Id.*

⁹³ *Id.* § 312(a).

⁹⁴ *See Cmty. Television, Inc. v. FCC*, 216 F.3d 1133, 1141 (D.C. Cir. 2000) (citing *In re Advanced Television Systems and Their Impact Upon Existing Television Broadcast Service*, Memorandum Opinion and Order on Reconsideration of the Fifth Report and Order, 13 FCC Rcd 6860, 6873-74 (2000)) (The Commission reasoned it had authority under Section 316 to modify

plan, which would substantially modify Part 90 and 95 DSRC licenses to reduce available operating bandwidth from 75 MHz to 10 MHz, would represent a fundamental change to the DSRC licenses and therefore an impermissible modification.⁹⁵

Further, commenters noted that a band plan that provides no spectrum for DSRC licensees would constitute an impermissible revocation of existing licenses and run afoul of Section 312 of the Act.⁹⁶ If the Commission does not set aside spectrum for DSRC, the existing licenses would be essentially revoked without cause. As ITS America explained, “[b]ecause the 5.9 GHz Part 90 and 95 incumbents have satisfied the conditions of their licenses and are not in violation of the FCC’s character and fitness policies, there is no basis for an ‘intentional sanction’ to revoke their licenses.”⁹⁷ The *NPRM*’s proposal also strays from the Commission’s typical and longstanding approach of providing comparable replacement spectrum or requiring new users to compensate incumbent users when a band is repurposed.⁹⁸ As the Commission’s band plan would represent a fundamental change to existing licensee rights and there is no basis for license revocation, the Commission’s proposed action in the *NPRM* would be unlawful under the Communications Act.

existing broadcaster licenses through the issuance of initial digital TV licenses even though it chose not to require 100 percent simulcasting because broadcasters would be providing “essentially the same services” to the public during the digital transition.); *Expanding Flexible Use of the 3.7 to 4.2 GHz Band*, Report and Order and Order of Proposed Modification, at ¶ 129 (rel. Mar. 3) (“effectively revoking a license or substantially disrupting a licensee’s ability to provide service may amount to a fundamental change,” but “if a licensee can continue to provide substantially the same service, a modification to that license is not a fundamental change.”).

⁹⁵ GM Comments at 13; ITS America Comments at 13-14; AASHTO Comments at 15.

⁹⁶ ITS America Comments at 15.

⁹⁷ *Id.*

⁹⁸ See, e.g. *Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies*, Memorandum Opinion & Order, 9 FCC Rcd 1943 (1994).

IV. THE AUTO INNOVATORS HAVE ACHIEVED CONSENSUS ON A BAND PLAN THAT CREATES A CLEAR PATH FORWARD.

A. The Auto Industry’s Consensus Band Plan is the Highest Valued Use of the 5.9 GHz Band.

The Commission should abandon its proposed band plan and adopt the Auto Innovators’ consensus band plan, which would enable V2X to realize its full potential and deliver life-saving benefits to all Americans. Focused dialogue among the Auto Innovators membership – virtually the entire auto industry – resulted in this milestone proposal. This industry consensus plan provides for present use of the 5.9 GHz band as well as “future-proofing” for next generation auto safety technologies. The Auto Innovators urge the Commission to adopt its band plan, as described below:

- LTE C-V2X exclusively will operate in the upper 20 MHz of the 5.9 GHz band;
- DSRC exclusively will operate in the lower 20 MHz of the 5.9 GHz band; and
- The remaining 30 MHz in the middle of the band will be made available on a priority basis to Next-Gen DSRC and Advanced (5G) C-V2X applications as they are developed and deployed.⁹⁹

This band plan will be in effect for five years after adoption by the Commission.

Following that period, a process will be used to select the single technology, whether DSRC or C-V2X and their respective future iterations, that will be permitted to use the 5.9 GHz band.

After a single technology is selected, a ten-year phaseout period will ensue, whereby the technology that does not prevail will retain its initial exclusive 20 MHz allocation in either the upper or lower portion of the band. After this ten-year phaseout, the chosen technology will have full access to all 75 MHz of the 5.9 GHz band.

⁹⁹ This portion of the 5.9 GHz band will continue to be used by existing DSRC deployments which will operate at secondary priority to next generation technologies as they are rolled out.

The Auto Innovators' band plan offers several advantages over the *NPRM's* band plan. First, this approach offers both DSRC and C-V2X the ability to make beneficial and efficient use of the spectrum with existing technologies in the near-term, which will help Americans continue to realize the safety, societal, and environmental benefits of V2X. Second, the band plan is future-oriented. Dedicating the middle portion of the band to next generation technologies building on DSRC or C-V2X will promote continued growth and innovation by OEMs and suppliers, who would now have a path forward for deploying these technologies on a set timeframe. Third, the proposal provides flexibility in the interim for deployment of V2X with the added benefit of having an end date by which a single V2X technology will be deemed predominant and the other phased out. This band plan represents a landmark consensus commitment by the auto industry to continue to put the 5.9 GHz band to use for the benefit of Americans, both today and going forward.

B. Contingent on Preservation of the Entire 5.9 GHz Band for V2X, the Auto Industry is Committed to an Aggressive Build-Out Scenario: At Least Five Million V2X Radios Within Five Years.

The Auto Innovators, along with other OEM stakeholders across the automotive industry, are actively deploying V2X technologies and stand ready to bring additional applications into use, delivering countless benefits to the American public and saving lives. Suggestions made to the contrary are incorrect,¹⁰⁰ and there is ample evidence in the record of existing and planned OEM deployments in the 5.9 GHz band—despite uncertainty about the Commission's plan for the band.

The automotive industry continues to deploy V2X technologies in the 5.9 GHz band to the benefit of the American public. Following FCC assurance that all 75 MHz of spectrum in the

¹⁰⁰ NCTA Comments at 2, 15; OTI and Public Knowledge Comments at 26-28.

5.9 GHz band will be maintained for transportation safety, using both C-V2X and DSRC, the Auto Innovators make the following industry-wide commitment: **within 5 years, a total of at least 5 million radios on vehicles and roadway infrastructure will have been deployed, including any previous V2X deployments.** This collective, industry-wide commitment will incentivize and expedite deployments in the 5.9 GHz band. The Auto Innovators fully expect that following this 5-year commitment, consumer demand for V2X technologies will continue to grow.

This commitment will supplement the efforts already being taken by the automotive industry to deliver the benefits of V2X to consumers. For example:

- BMW has participated in C-V2X safety and use case trials, and C-V2X Release 14 is “ready for integration” in vehicle communication platforms beginning with the BMW 2021 market rollout.¹⁰¹ According to BMW research, C-V2X should be ready to begin integration into the next generation of vehicle communication platforms.
- FCA US has invested more than \$30 million at its proving grounds in Michigan to develop and test autonomous vehicles and safety applications such as V2X.¹⁰²
- Ford has committed to deploying C-V2X starting in the 2022 calendar year in both the U.S. and China markets.
- General Motors deployed DSRC in its model year 2017-2019 Cadillac CTS vehicle and announced intentions to offer V2X in a future Cadillac crossover before extending the technology to all Cadillac models in the United States.
- Honda has developed V2X applications that can detect and protect both pedestrians and motorcyclists.¹⁰³ Additionally, Honda, in partnership with the Ohio Department of

¹⁰¹ BMW Comments at 2.

¹⁰² FCA Comments at 2.

¹⁰³ Honda Comments at 6 (citing Honda, Honda Demonstrates Advanced Vehicle-to-Pedestrian and Vehicle-to-Motorcycle Safety Technologies, <https://hondanews.com/channels/corporate/releases/honda-demonstrates-advanced-vehicle-to-pedestrian-andvehicle-to-motorcycle-safety-technologies/videos/honda-demonstrates-advanced-vehicle-to-pedestrian-and-vehicletomotorcycle-safety-technologies> (last visited Mar. 6, 2020)).

Transportation, is deploying the highest-density V2X environment of its kind with the U.S. State Route 33 Smart Mobility Corridor.

- The Hyundai America Technical Center, Inc. (“HATCI”) has led a number of DOT-funded projects through the Crash Avoidance Metrics Partnership, including V2V safety application development and communication research and V2I application development.¹⁰⁴
- Jaguar Land Rover has deployed V2X-connected cars globally.¹⁰⁵
- Panasonic, a leading supplier of V2X solutions, developed CIRBUS, a V2X application that allows road users, infrastructure, roadways, and traffic operators to communicate in real time about potential traffic hazards.¹⁰⁶
- Robert Bosch, LLC, a supplier of V2X technologies, has developed advanced applications for both DSRC and C-V2X, and is examining the possibility of co-existence between the technologies.¹⁰⁷
- Toyota has been a global leader on V2X, deploying more than 100,000 DSRC-equipped Toyota and Lexus vehicles in Japan.
- Volkswagen installed DSRC for V2X capabilities, such as assisted driving and collective intelligence, in its new Golfs in Europe. Additionally, Audi announced an initial V2X deployment project with the Virginia Department of Transportation and Qualcomm that will give vehicles greater information for safe navigation around work zones beginning in the third quarter of 2020.¹⁰⁸
- Volvo Group “is planning to offer V2X solutions globally where the required frequency allocation is in place” over the next three years.¹⁰⁹

The Auto Innovators and industry at large are on the precipice of harnessing the immense safety and automation benefits of the 5.9 GHz band—and it is remarkable that these technological

¹⁰⁴ HATCI Comments at 12.

¹⁰⁵ Jaguar Land Rover Comments at 1.

¹⁰⁶ Panasonic Comments at 3.

¹⁰⁷ Robert Bosch Comments at 3.

¹⁰⁸ *Id.* at 3; Press Release, Audi of America, Virginia DOT and Qualcomm Announce Initial C-V2X Deployment in Virginia, Audi Newsroom (Jan. 22, 2020), <http://media.audiusa.com/en-us/releases/384>.

¹⁰⁹ Volvo Comments at 6.

developments have continued despite ongoing uncertainty from the Commission regarding the future use of the 5.9 GHz band. Specifically, the companies with deployed or announced deployments account for over 60% of the U.S. automotive market share.

Continued and future V2X deployments will depend on a regulatory environment where use of designated spectrum is assured and the risk of harmful interference is minimized.

Accordingly, commenters overwhelmingly agreed that the Commission should encourage V2X projects by resolving the regulatory uncertainty that the *NPRM* has fomented.¹¹⁰ The Commission should preserve the entire 5.9 GHz band for V2X.

V. THE COMMISSION SHOULD CONTINUE TESTING AND COORDINATION WITH DOT TO EVALUATE POSSIBLE CO-CHANNEL SHARING WITH UNLICENSED.

The Auto Innovators agree with commenters that it is imperative that the FCC and DOT not only complete the joint, three-phase testing to evaluate the possibility of co-channel sharing between V2X and unlicensed but also expand testing to include IEEE Next Generation V2X and 5G V2X technologies.¹¹¹ These testing efforts would help the Commission develop appropriate technical rules for unlicensed use and determine effective protection mechanisms for critical V2X communications. However, such testing should not further delay use of the 5.9 GHz band by either DSRC or C-V2X users.

¹¹⁰ See, e.g., Toyota Comments at 14 (“[T]here is no doubt that deployment of the technology has been negatively impacted by the regulatory uncertainty that the Commission has perpetuated over the last seven years about continued access to the entire band for transportation safety purposes. The Commission has also taken overt action to depress deployment.”); GM Comments at 5 (“Regrettably, the significant uncertainty of the rules created by ongoing FCC statements in recent years about changing the spectrum rules one way, or another, and now the proposals within this NPRM, have threatened any further deployments.”); Volvo Comments at 6 (“The regulatory uncertainties have delayed our ITS commercialization plans in Europe and the U.S. The proposed channel plan from the FCC will negatively impact our commercialization plans and delay V2X technology rollout in the U.S. market.”).

¹¹¹ Auto Innovators Comments at 42-44.

Commenters urged the Commission to resume and complete its three-phase testing program.¹¹² Although technologies using a “detect and vacate” approach showed promise, additional, larger scale field testing is necessary to evaluate the potential for co-channel sharing, as well as packet prioritization functionality.¹¹³ The Auto Innovators agree with AT&T and GM that Phases II and III of testing should continue while OEMs and state departments of transportation move forward with V2X deployment, including both DSRC and C-V2X.¹¹⁴ As technology continues to evolve, Commission testing should also incorporate IEEE Next Generation V2X and 5G V2X technologies.¹¹⁵ The completion of this testing could aid in development of meaningful sharing standards that minimize harmful interference from unlicensed to important V2X safety applications while allowing shared device use in the band. Such testing should not, however, delay any V2X deployments in the 5.9 GHz band. As GM noted, interagency testing should not interrupt OEMs from working together to “achieve a framework to support commitments to deploy V2X technologies at scale and in a timely manner in the United States.”¹¹⁶

¹¹² ITS America Comments at 3, 10; AASHTO Comments at 6; ATA Comments at 1-2; AT&T Comments at 16-17, 25; CDOT Comments at 2; DENSO Comments at 3; Volvo Comments at 7.

¹¹³ Auto Innovators Comments at 43.

¹¹⁴ See AT&T Comments at 5 (“AT&T proposes that the Commission . . . lift the freeze on granting new DSRC licenses . . . and permit the operation of C-V2X PC5. . . .”); see also GM Comments at 15-16; DENSO Comments at 3-5; ITS America Comments at 3, 28.

¹¹⁵ While Phase 1 of FCC and DOT testing involved laboratory testing, Phases 2 and 3 consisted of field testing with varying levels of vehicles, test devices, and “real-world scenarios.” *The Commission Seeks to Update and Refresh the Record in the “Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band” Proceeding*, Public Notice, 31 FCC Rcd 6130, 6139 (rel. June 1, 2016).

¹¹⁶ GM Comments at 16.

VI. CONCLUSION

The Auto Innovators joins commenters in this proceeding in urging the Commission to revise its proposed band plan to preserve the entire 75 MHz of the 5.9 GHz band for V2X. Designating this spectrum for life-saving V2X technologies will deliver enormous value to the American public and promote U.S. global leadership in connected vehicle technology.

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