

**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  
 )

**COMMENTS OF THE  
INTELLIGENT TRANSPORTATION SOCIETY OF AMERICA**

Robert B. Kelly  
Kahina I. Aoudia  
Squire Patton Boggs (US) LLP  
2550 M Street, N.W.  
Washington, DC 20037  
(202) 457-6000

*Of Counsel*

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Shailen Bhatt  
President and Chief Executive Officer  
Timothy Drake  
Vice President, Public Policy and Regulatory  
Affairs  
Intelligent Transportation Society of  
America 1100 New Jersey Ave, SE  
Suite 850  
Washington, DC 20003  
(202) 721-4229

## SUMMARY

Vehicle-to-everything (“V2X”) technologies require high-speed, low-latency communications to allow vehicles to communicate with other vehicles, infrastructure, and road users to avoid crashes, fatalities, and injuries. The Federal Communications Commission’s (“FCC” or “Commission”) spectrum reallocation and proposed power limits on unlicensed devices will fail to protect the 5.895-5.925 GHz band for intelligent transportation system (“ITS”) operations, allowing harmful interference to negatively impact V2X communications. To safely move forward, the FCC must work with the U.S. Department of Transportation (“USDOT”) and the transportation industry to ensure that the 30 MHz reserved for ITS operations is free of harmful interference and usable for V2X technologies.

USDOT has released preliminary technical assessments related to the FCC’s proposal showing that out-of-channel interference (out-of-band emissions) may cause the 30 MHz retained for transportation safety communications to be unusable for such purposes due to expected interference from unlicensed devices operating in adjacent bands. Ford Motor Company’s (“Ford”) lab testing with Wi-Fi signal showed that if the Wi-Fi signal power in Channel 177 (5875-5895 MHz) at the receiver is above -65 dBm, there will be packet loss. Ford’s testing shows that significant packet loss in Channel 180 starts when the interference signal in 5875-5895 MHz at the receiver is above about -60 dBm.

In the FNPRM, the Commission requests comment on according ITS licensees reasonable compensation related to the FCC’s decision to require relocation of ITS out of the lower 45 MHz of the 5.9 GHz band. An unfunded transition to the new band plan would punish licensees who

invested their resources, often public funding, in promoting traffic safety and is both bad policy and bad law. The Communications Act of 1934, as amended, which is the FCC's enabling statute, requires that the Commission protect public safety. Since all incumbent licensees are invested in enhancing traffic safety, this statute impels the FCC to provide reasonable compensation for expenses incurred in complying with the Commission's mandate. In accord with thirty years of precedent, the Commission should mandate that entities having interests in the unlicensed use of the 5.9 GHz band pay the reasonable costs incurred by incumbent licensees transitioning out of the lower 45 MHz and from Dedicated Short Range Communications ("DSRC") to Cellular Vehicle-to-Everything ("C-V2X") technology.

Reimbursement is particularly necessary because the Commission's decision in this proceeding effectively erases a series of investments by state and local departments of transportation to increase safety at a time when their funding is already limited by COVID-19-related revenue decreases. Particularly when the budgets of these agencies have been significantly depleted by the pandemic, the Commission has a responsibility to mitigate the identifiable financial burden that this spectrum reallocation is placing on state and local departments of transportation. Ultimately, every dollar spent on DSRC devices by infrastructure owner operators was spent in the interest of improving transportation safety and efficiency – the main priority of the impacted agencies.

Finally, the record in this Docket demonstrates the need for additional spectrum beyond that available in the newly-curtailed 5.9 GHz band. ITS America seeks the FCC's re-engagement with ITS stakeholders and the transportation safety community in identifying suitable spectrum to accommodate all existing and emerging V2X lifesaving applications. To this end, ITS America urges that the FCC commit to participation in a multi-stakeholder effort with all necessary parties,

including USDOT, the National Telecommunications and Information Administration (“NTIA”), state Departments of Transportation (“DOTs”) leadership, and the private sector with the objective of re-establishing the U.S. as the world’s leader in the development and deployment of lifesaving advanced transportation safety services, including V2X and autonomous vehicles. Such an effort should undertake consideration of the need for replacement of the lost spectral capacity as well as the need for future allocations to provide for rapid deployment of new and advanced services.

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INTELLIGENT TRANSPORTATION SOCIETY OF AMERICA**

The Intelligent Transportation Society of America (“ITS America”) hereby respectfully submits its Comments regarding the *Further Notice of Proposed Rulemaking* (“FNPRM”) issued by the Federal Communications Commission (“FCC” or “Commission”) in ET Docket No. 19-138, as captioned above.<sup>1</sup> In the *FNPRM*, the FCC addresses issues related to the transition of Dedicated Short Range Communications (“DSRC”) operations to Cellular Vehicle-to-Everything (“C-V2X”) technology, other transition considerations, transmitted power and emissions limits, and other issues related to outdoor unlicensed operations in the 5850-5895 MHz band segment.

**I. Introduction and Background on ITS America**

ITS America is an association of public and private organizations that are focused on advancing the research and deployment of intelligent transportation technologies to save lives, improve mobility, promote sustainability, and increase efficiency and productivity. ITS America represents stakeholders across the transportation industry, including state, county, and city departments of transportation, metropolitan planning organizations, automotive manufacturers and suppliers, technology companies, engineering firms, and research universities. Our members

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<sup>1</sup> *In the Matter of Use of the 5.850-5.925 GHz Band*, ET Docket No. 19-138, First Report and Order, Further Notice of Proposed Rulemaking, and Order of Proposed Modification, 35 FCC Rcd 13440 (2020) (“*5.9 GHz Band Report and Order and FNPRM*”).

include private and public entities that are developing and deploying both DSRC and C-V2X technologies to provide Vehicle-to-Everything (“V2X”) services.

For the reasons stated herein, ITS America urges that the Commission: (1) establish power limitations on unlicensed devices operating in the 5.850-5.895 GHz band that adequately protect ITS operations in the 5.895-5.925 GHz band; (2) establish a mechanism to reimburse incumbent licensees for costs incurred due to the reallocation of the 5.850-5.895 GHz band and the transition to the 5.895-5.925 GHz band; and (3) identify and provide additional spectrum elsewhere to support ITS operations.

## **II. The Commission Should Establish Power Limitations on Unlicensed Devices Operating in the 5.850-5.895 GHz Band that Adequately Protect ITS Operations in the 5.895-5.925 GHz Band**

V2X technologies require high-speed, low-latency communications to allow vehicles to communicate with other vehicles, infrastructure, and road users to avoid crashes, fatalities, and injuries. The FCC’s spectrum reallocation and proposed power limits on unlicensed devices will fail to protect the 5.895-5.925 GHz band for ITS operations, allowing harmful interference to negatively impact V2X communications. To safely move forward, the FCC must work with the U.S. Department of Transportation (“USDOT”) and the transportation industry to ensure that the 30 MHz reserved for ITS operations is free of harmful interference and usable for V2X technologies.

### **A. Power Limits Must Be Sufficient to Protect the Remaining 30 MHz from Harmful Interference from Unlicensed Devices**

The FCC has not established that the power limitations it proposes for outdoor unlicensed operations will protect ITS operations in the remaining 30 MHz from harmful interference.

Furthermore, the FCC has chosen to rely on analysis from the proponents of unlicensed devices

on the impact their devices will have on transportation safety communications and ignored the input of traffic safety experts at USDOT and the many transportation stakeholders that have commented in this proceeding and raised concerns about the introduction of harmful interference into ITS spectrum based on the FCC's band plan.

USDOT, Ford Motor Company ("Ford"), and others have submitted evidence that the Commission's proposed band plan would result in harmful interference to V2X systems operating in the reconfigured 5.9 GHz Band and render effective operations on the 30 MHz remaining for ITS difficult, if not impossible. USDOT has released preliminary technical assessments related to the FCC's proposal showing that out-of-channel interference (out-of-band emissions) may cause the 30 MHz retained for transportation safety communications to be unusable for such purposes due to expected interference from unlicensed devices operating in adjacent bands.<sup>2</sup> The Commission should heed the expert agency on transportation safety, USDOT, who clearly articulated their position on interference in their comments on this issue, noting that the "proposed reallocation will likely lead to harmful interference from Wi-Fi devices operating in the lower 45 MHz of the 5.9 GHz Band on V2X devices operating in the remaining upper 30 MHz. This potential interference would be compounded if Wi-Fi devices were also permitted to operate directly above the spectrum allocated to V2X. If this interference occurs, the actual value and efficacy of the remaining spectrum for V2X applications will be significantly compromised, particularly for safety-of-life applications."<sup>3</sup>

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<sup>2</sup> USDOT Preliminary Technical Assessment (Dec. 6, 2019) (<https://www.transportation.gov/sites/dot.gov/files/docs/research-and-technology/360181/oobe-energy-59-safety-band-final-120619.pdf>).

<sup>3</sup> Comments of U.S. Department of Transportation, ET Docket No. 19-138, at 4 (filed Mar. 13, 2020).

Other transportation stakeholders have also provided the Commission with evidence regarding the likelihood of harmful interference from unlicensed devices operating in the lower 45 MHz. Ford produced a definitive study, which found that frequently used Wi-Fi applications would pose a significant interference risk to ITS applications if out-of-band emissions (“OOBE”) of Wi-Fi devices are not limited in the vicinity of vehicles. Ford’s study concluded that Wi-Fi operation up to 5895 MHz leads to packet loss in V2X operating above 5895 MHz. Specifically, Ford’s lab testing with Wi-Fi signal showed that if the Wi-Fi signal power in Ch. 177 (5875-5895 MHz) at the receiver is above -65 dBm, there will be packet loss.<sup>4</sup> Ford’s testing shows that significant packet loss in Channel 180 starts when the interference signal in 5875-5895 MHz at the receiver is above about -60 dBm. It is significant that these tests, which even used different V2X technologies, observed a quite similar result.

The Internet & Television Association (“NCTA”) submitted to the record a paper authored by CableLabs, an organization founded and funded by American cable operators,<sup>5</sup> which attempted to dispute Ford’s findings on OOBE limit requirements. ITS America supports Ford’s filing in response to this study, which demonstrated critical flaws in CableLabs’ analysis.<sup>6</sup> Specifically, Ford found the following flaws with the CableLabs analysis:

- “Drawing conclusions about impact of Wi-Fi interference on C-V2X without running a single test with C-V2X equipment and using data not available for peer review,

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<sup>4</sup> Comments of Ford Motor Company, ET Docket No. 19-138, at 24-26 (filed Mar. 9, 2020).

<sup>5</sup> <https://www.cablelabs.com/30years/>.

<sup>6</sup> Ex parte filing of Ford Motor Company, ET Docket No. 19-138, at 4-6 (filed July 14, 2020). Available at: <https://ecfsapi.fcc.gov/file/10714280197780/Ford%20Motor%20Company%205.9%20GHz%20FCC%20NPRM%20ExParte%20July%20as%20Filed%20Final.pdf>.

- Not considering in-vehicle unlicensed Wi-Fi devices. Such devices will create persistent levels of harmful interference,
- Lacking statistical confidence in simulations. CableLabs analysis is based on data from about 22000 vehicles and one hour of traffic in Bologna, Italy. [Ford] show[s] that such sample is not sufficient to simulate on average a single intersection crash in the United States and therefore cannot be used to draw safety related conclusions,
- Not accounting for stationary vehicles involved in crashes. Such scenarios are critical in early applications of V2X such as Intersection Movement Assist (IMA) and Left Turn Assist (LTA),
- Utilizing a flawed methodology for assessing interference risk to crash avoidance. The Safety Alert Failure Rate, which their analysis is based on, distorts the purpose of V2X as it measures interference risk when Basic Safety Messages (BSMs) are received too late for V2X safety applications to prevent a crash,
- Arguing that expanded channel availability and average Wi-Fi activity factor will reduce the likelihood of interference impact of Wi-Fi. Such arguments are untenable given the: a) desirability for Wi-Fi proponents of a single 160 MHz channel below 6 GHz, b) channel activity patterns for popular Wi-Fi applications, and c) ever-expanding Wi-Fi operation at scale.
- Claiming that the C-V2X can accommodate harmful interference by unlicensed UNII-4 devices because the C-V2X communication range will typically exceed the recommended 300 m proposed by NHTSA. In critical NLOS applications in-vehicle unlicensed U-NII-4

devices can diminish C-V2X range from recommended 300 m to less than 50 m at an intersection thereby annulling the C-V2X accident mitigation potential.”<sup>7</sup>

The NCTA and CableLabs study did not demonstrate any errors in Ford’s results or testing methodology. “Instead, they offered an alternative yet flawed analysis that did not include a single test with C-V2X equipment.”<sup>8</sup> Given these significant flaws in the CableLabs study that have been identified by Ford, the Commission must refrain from relying on CableLabs’ analysis to determine appropriate interference limits. Additional testing is needed before establishing power limits for outdoor unlicensed devices operating in the lower 45 MHz of the 5.9 GHz Band to ensure that unlicensed devices operating in adjacent bands will not interfere with safety of life communications by V2X.

**B. The FCC Erroneously Equates its Proposed Power Limitations for U-NII-4 with those of U-NII-3**

The FNPRM proposes the introduction of high-power outdoor U-NII-4 with unacceptably high OOB, erroneously equating these proposed power limitations with those of U-NII-3. The record includes empirical data from several sources showing evidence of actual harmful interference to ITS, including from the Commission’s own Laboratory, USDOT, Ford, and the CAMP automaker consortium.

However, in the 5.9 GHz Band First Report and Order, the Commission states that it was “not persuaded” by this empirical data because it continues to rely on its previous conclusion that

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<sup>7</sup> *Id.*

<sup>8</sup> *Id.* at 6.

U-NII-3 OOB limits are sufficient.<sup>9</sup> This reliance misses two important factors that separate the proposed outdoor U-NII-4 OOB limits from the U-NII-3 OOB limits:

1. U-NII-3 limits are based on peak interference measurements, while the proposed U-NII-4 limits would be based on average interference measurements. As the Commission acknowledges elsewhere, average measurements are more than 10 dB lower than peak. Thus, even if the Commission wants to rely on U-NII-3 limits, it must reduce the U-NII-4 limits by 10 or more dB to compensate for the Commission's choice to change the measurement.
2. As a practical matter, the actual interference into 5895-5925 MHz from U-NII-3 (5725-5850 MHz) devices is quite different from the actual interference from U-NII-4 (or combined U-NII-3 and U-NII-4) devices operating all the way to the band edge (5895 MHz). While the ITS community was justifiably concerned with the very loose U-NII-3 limits in Channel 172 (5855-5865 MHz) of the previous ITS band, there was never a practical risk of serious U-NII-3 interference into Channels 180, 182, and 184. The closest U-NII-3 20 MHz Wi-Fi channel (1815-1835 MHz) is 60 MHz removed from the new ITS band edge (5895 MHz). The closest U-NII-3 40 or 80 MHz Wi-Fi channel stops at 1815 MHz and is thus 80 MHz away from the new ITS band edge. There are no U-NII-3 160 MHz Wi-Fi channels to interfere with the ITS band. 60 MHz is a significant guard band for a 20 MHz channel, and 80 MHz is a significant guard band for a 40 or 80 MHz channel. By contrast, the U-NII-4 plan encourages 20, 40, 80 and 160 MHz Wi-Fi operation all the way to 5895 MHz, with zero guard band.

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<sup>9</sup> *5.9 GHz Band First Report and Order*, 35 FCC Rcd 13475, para. 83.

The Commission's prior reliance on U-NII-3 limits does not support its U-NII-4 proposal regarding harmful interference. Combined with the existence of multiple data sets that directly contradict that conclusion, ITS deployment stakeholders can have no confidence that the Commission's proposal will protect ITS from harmful interference.

### **III. The Commission Should Establish a Reimbursement Fund for ITS Incumbent Licensees' Expenses Resulting from the 5.9 GHz Band Reallocation**

In the proceedings that led to the 5.9 GHz Band First Report and Order, ITS America urged that, consistent with almost thirty years of precedent, any licensees displaced by the Commission's action be provided with reasonable compensation of their expenses incurred in complying with an otherwise unfunded mandate.<sup>10</sup> In the FNPRM, the Commission requests comment on according ITS licensees reasonable compensation related to the FCC's decision to require relocation of ITS out of the lower 45 megahertz of spectrum, "including suggestions on which particular types of costs should be considered as appropriate for possible compensation ... as well as the process by which such compensation might be determined or implemented."<sup>11</sup>

An unfunded transition to the new band plan would punish licensees who invested their resources, often public funding, in promoting traffic safety and is both bad policy and bad law. The Communications Act of 1934, as amended, the FCC's enabling statute, requires that the Commission protect public safety.<sup>12</sup> Since all incumbent licensees are invested in enhancing traffic safety, this statute requires that the FCC do more to protect them than the simple abandonment advocated by certain commenters.<sup>13</sup> The Commission owes an even greater obligation to those licensees it has itself licensed as public safety.

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<sup>10</sup> Reply Comments of ITS America, ET Docket No. 19-138, at 44 (filed Mar. 9, 2020).

<sup>11</sup> *FNPRM*, 35 FCC Rcd at 13507, para. 167.

<sup>12</sup> 47 U.S.C. § 151.

<sup>13</sup> See Comments of NCTA-The Internet & Television Association, ET Docket No. 19-138, at 43-44 (filed Mar. 9, 2020).

**A. The Commission Should Establish a Reimbursement Fund Consistent with Precedent**

Since auction authority was granted to the Commission in 1993,<sup>14</sup> the FCC consistently has ensured that incumbent licensees that were displaced because of a spectrum reallocation were entitled, at a minimum, to receive the reasonable costs of relocation, generally to “comparable facilities.” In the 800 MHz proceeding, the FCC required that Nextel pay for “all channel changes necessary to implement the reconfiguration.”<sup>15</sup> Additionally, Nextel was required to “ensure that relocated licensees receive at least comparable facilities when they change channels.”<sup>16</sup> Similarly, the FCC required the reimbursement of 1,200 microwave licensees that were dislocated to clear spectrum for Personal Communications Services. The Commission authorized a third party, UTAM, Inc., to manage the transition and ensure that product deployments in the band would not cause any harmful interference. UTAM assessed and collected clearing fees to pay for the cost of the relocation from product manufacturers for use of the band.<sup>17</sup>

Consistent with precedent, the Commission must accord displaced incumbent licensees reasonable compensation. The Commission should enable the reimbursement of expenses incurred by incumbents in relocating their operations to comparable facilities and to reimburse the stranded investment of other public and private sector parties in developing and deploying V2X

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<sup>14</sup> Omnibus Budget Reconciliation Act of 1993.

<sup>15</sup> *In the Matter of Improving Public Safety Communications in the 800 MHz Band, et al.*, WT Docket No. 02-55, et al., Report and Order, Fifth Report and Order, Fourth Memorandum Opinion and Order, and Order, 19 FCC Rcd 14969, 15064, paras. 177-78 (2004) (“800 MHz Order”).

<sup>16</sup> *Id.*

<sup>17</sup> *In the Matter of Amendment of the Commission’s Rules Regarding a Plan for Sharing the Costs of Microwave Relocation*, WT Docket No. 95-157, First Report and Order and Further Notice of Proposed Rulemaking, 11 FCC Rcd 8825 (1996).

technologies.<sup>18</sup> The Commission should mandate that entities having interests in the unlicensed use of the 5.9 GHz band pay the reasonable costs incurred by incumbent licensees transitioning out of the lower 45 MHz and from DSRC to C-V2X technology.

The UTAM model appears to be the most applicable to the 5.9 GHz band dislocation as the spectrum here, as there, has been reallocated for unlicensed use. Dislocated V2X licensees should be entitled to recover all their costs of dislocation, including those associated with the mandated technology transition. Commission speculation aside, there is no basis in the record to conclude that those specific licensees would have transitioned technology in their systems without the FCC's mandate. In addition, the initial source of their funding, whether public or private funds, is irrelevant to the issue of what funds will be needed to comply with the Commission's mandate, or what loss will be taken by an inability to reconfigure to comparable facilities.

To enable this fair compensation, the Commission should select and authorize a third-party fund administrator to assess clearing costs on a predetermined basis on all manufacturers that provide equipment to operate on an unlicensed basis in the lower 45 MHz band segment. Clearing costs should also be assessed on the Wireless Internet Service Providers (WISPs) and other service providers that will benefit from the availability of this spectrum for their commercial operations. The fund administrator, in turn, must advance to incumbent licensees sufficient funds to cover all reasonable costs of securing comparable facilities.

#### **B. Scope of Costs that Should be Reimbursed**

Licensees should be fully reimbursed for the full scope of expenses incurred in complying with the FCC's mandate. These include expenses incurred through development, deployment,

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<sup>18</sup> *800 MHz Order*, 19 FCC Rcd 15064, paras. 177-78; *In the Matter of Expanding Flexible Use of the 3.7 to 4.2 GHz Band*, GN Docket No. 18-122, Report and Order and Order of Proposed Modification, 35 FCC Rcd 2343, 2422 para. 194 (2020) (“*C-Band Report and Order*”).

and relocation of V2X technologies include funding spent on V2X equipment, V2X vendors, staff overhead for all employees who manage V2X deployment administration (licensing, funding applications, communications, project management, etc.), staff overhead for employees who manage V2X devices on the ground (installation, testing, maintenance, etc.), benefits for those employees, legal fees pertaining to V2X deployments, consultants advising these V2X deployments, and associated lifecycle costs (such as the costs that agencies will incur when they must pull buses out of their transit fleets to swap one V2X radio for another). Federal funds allocated to V2X deployments should also be reimbursed, given that deployers had a reasonable expectation that the Commission would not radically modify granted licenses, and otherwise would have spent those funds on alternative transportation safety measures. Additionally, funds spent on applying for V2X license applications in the months leading up to the Commission's 5.9 GHz licensing freeze announcement, when the Commission halted accepting applications for V2X licenses without announcing that policy change publicly, should be reimbursable.

### **C. Costs to Transition from DSRC to C-V2X**

In the *5.9 GHz Band First Report and Order*, the Commission stated that “the U.S. DOT confounds the costs of transitioning to the upper 30 megahertz of the 5.9 GHz band with those of transitioning to C-V2X. However, the latter cost is necessitated by market factors, including substantial support for the C-V2X technology by proponents of ITS, coupled with a general understanding that a single interoperable ITS standard best promotes public safety. Moreover, existing DSRC licensees have recently begun to employ C-V2X on an experimental basis, telling us that the transition to C-V2X is already ongoing. Thus, we view it as inappropriate to include as part of the transition calculation, costs of transitioning to C-V2X.”<sup>19</sup> ITS America disagrees with

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<sup>19</sup> *FNPRM*, 35 FCC Rcd 13499, para. 143.

the Commission's assessment. In any event, this assessment was made in the context of the balancing of costs and benefits resulting from the Commission's decision to reallocate the lower 45 MHz and is not applicable to the issue of expenses eligible for cost reimbursement for dislocated licensees. DSRC licensees have invested significant funding to deploy a technology that now is being made obsolete by the Commission's decision, and who now must invest additional funding in transitioning to a technology that was outside the scope of their original investment. Furthermore, the Commission's justification in withholding these transition costs seems to be that a transition to C-V2X was a foregone conclusion, which is not a position shared by DSRC operators.

Indeed, certain incumbent licensees had plans to deploy DSRC alone, and, in some cases, deploy C-V2X in coordination with DSRC technology. For example, the Georgia Department of Transportation made plans to equip over 2,600 intersections with V2X roadside infrastructure, over 1,600 of which were to use DSRC while the remaining were planned to be equipped with technology using both DSRC and C-V2X.<sup>20</sup> In Connecticut, the Department of Transportation was undertaking two projects planned to investigate the potential for applying dual DSRC/C-V2X units along a major arterial highway.<sup>21</sup> The Tennessee Department of Transportation deployed and had further plans to deploy DSRC devices along interstates, connector roads and signalized intersections.<sup>22</sup> The Kentucky Transportation Cabinet had plans to deploy 49 DSRC – roadside units beginning in April 2020 along two corridors in central and South-Central Kentucky.<sup>23</sup> These

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<sup>20</sup> Comments of Georgia Department of Transportation, ET Docket No. 19-138, at 1-2 (filed Mar. 9, 2020).

<sup>21</sup> Comments of State of Connecticut Department of Transportation, ET Docket No. 19-138, at 3 (filed Mar. 9, 2020).

<sup>22</sup> Comments of State of Tennessee Department of Transportation, ET Docket No. 19-138, at 2, 3-4 (filed Mar. 6, 2020).

<sup>23</sup> Comments of Commonwealth of Kentucky Transportation Cabinet, ET Docket No. 19-138, at 2 (filed Mar. 9, 2020).

are only a few examples of projects that were planned to deploy DSRC alone, or DSRC alongside with C-V2X technology.

While ITS America is technology neutral and sees the merits of both C-V2X and DSRC, it is clear that the Commission should provide fair compensation for the costs that will be incurred to transition from DSRC to C-V2X in addition to the costs to transition from the lower 45 MHz to the upper 30 MHz of the 5.9 GHz band.

#### **D. Estimates of Costs Likely to be Incurred**

The USDOT estimated that the minimum funding required for a transition as a result of the reallocation of the 5.9 GHz band would amount to \$645 million, which is the cost that state and local departments of transportation would likely be required to pay just to transition connected roadway infrastructure.<sup>24</sup>

For example, “[i]t will cost [the Georgia Department of Transportation] over \$6,000,000 to convert existing infrastructure.”<sup>25</sup> Further, the Utah Department of Transportation indicated that it anticipates costs to transition DSRC to C-V2X to be over \$1,500,000.<sup>26</sup> In addition, converting the University of Michigan Transportation Research Institute’s Ann Arbor Connected Environment to CV2X is estimated to cost over \$14,000,000.<sup>27</sup> The Pennsylvania Department of Transportation also noted that, “[a]lthough there is not enough information at this time to

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<sup>24</sup> See Reply Comments of Auto Innovators, ET Docket No. 19-138, at 13 (filed Apr. 27, 2020) referring Comments of USDOT, ET Docket No. 19-138, at 36, 37 (filed Mar. 13, 2020).

<sup>25</sup> Comments of Georgia Department of Transportation, ET Docket No. 19-138 at 6 (filed Mar. 9, 2020).

<sup>26</sup> Comments of Utah Department of Transportation, ET Docket No. 19-138 at 6 (filed Jun. 2, 2021).

<sup>27</sup> Comments of University of Michigan Transportation Research Institute, ET Docket No. 19-138 (filed Jun. 2, 2021).

determine the cost of reconfiguring the DSRC radios, there will certainly be financial implications; most likely in the range of hundreds of thousands of dollars.”<sup>28</sup>

**E. Harm if Reimbursement is Not Provided**

Reimbursement is particularly necessary because the Commission’s decision in this proceeding is effectively eliminating a series of investments by state and local departments of transportation to increase safety at a time when their funding is already limited by COVID-19-related revenue decreases. Particularly when the budgets of these agencies have been significantly depleted by the pandemic, the Commission has a responsibility to mitigate the identifiable financial burden that this spectrum reallocation is placing on state and local departments of transportation. Ultimately, every dollar spent on DSRC devices by infrastructure owner operators was spent in the interest of improving transportation safety and efficiency – the main priority of the impacted agencies.

For those state and local departments of transportation that have invested in DSRC, not only has that investment been stranded by the Commission, but every dollar that must now be spent to comply with this proceeding is a dollar that cannot be spent on other measures to improve transportation safety in communities across the country. For agencies deploying V2X technologies, it was not about making a profit from the deployment of V2X devices, it was about making an investment in the significant potential that these technologies have to dramatically reduce transportation fatalities. The Commission has a responsibility to ensure that agencies who invested in these technologies to benefit public safety are reimbursed such that transportation safety is not, in fact, reduced through this rulemaking.

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<sup>28</sup> Comments of Commonwealth of Pennsylvania Department of Transportation, ET Docket No. 19-138, at 2 (filed Mar. 9, 2020).

#### **IV. The Commission Should Identify Additional Spectrum for ITS Operations**

ITS America believes the record before the Commission overwhelmingly demonstrates the need for at least the 75 MHz of spectrum for V2X.<sup>29</sup> Assuming though that the full 75 MHz will no longer be available for V2X in the 5.9 GHz band, ITS America supports a robust effort by all stakeholders to identify further spectrum allocations to support the development and deployment of both existing and developing V2X services.

In this respect, the FCC's re-engagement with ITS stakeholders and the transportation safety community is critical. The steady stream of Commission statements regarding a perceived lack of progress in ITS technologies despite the efforts of many dedicated public servants at USDOT, state Departments of Transportation (DOTs), and elsewhere that preceded the *5.9 GHz Band First Report and Order* unfortunately departed from the FCC's previous engagement with the transportation community in promoting the deployment of lifesaving ITS technologies. Prior to that decision, the FCC had participated in partnership with the ITS community to promote the deployment of these technologies. The Commission's prior efforts in this regard provide a basis for renewed collaboration between the nation's spectrum authorities and its transportation safety experts to promote the national interest in improving the safety of its surface transportation network.

ITS America, accordingly, urges that the FCC commit to full participation in a multi-stakeholder effort with all necessary parties, including USDOT, NTIA, state DOT leadership, and the private sector with the objective of re-establishing the U.S. as the world's leader in the

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<sup>29</sup> See Comments of U.S. Department of Transportation, ET Docket No. 19-138, at 8 (filed Mar. 13, 2020); Comments of Continental, ET Docket No. 19-138, at 8 (filed Mar. 9, 2020); Letter from Volkswagen, ET Docket No. 19-138, at 2 (filed June 19, 2020); Comments of American Association of State Highway Transportation Officials, ET Docket No. 19-138, at 2 (filed Mar. 2, 2020); Comments of the National School Transportation Association, ET Docket No. 19-138, at 2 (filed Mar. 9, 2020).

development and deployment of lifesaving advanced transportation safety services, including V2X and autonomous vehicles. Such an effort should undertake consideration of the need for replacement of the lost spectral capacity as well as the need for future allocations to provide for rapid deployment of new and advanced services. In this respect, ITS America notes that while the use of LiDAR, radars, or other line of sight sensors is important and to be encouraged, they are not a substitute for the needed spectral capacity to support deployment of V2X and ultimately AV technology that requires much broader and more robust communications and capability.

**A. The Need to Improve Transportation Safety Remains**

Preliminary estimates from the National Safety Council (NSC) on roadway fatalities and crashes show that 42,060 people died on U.S. roads last year – an eight percent increase from the previous year. The fatality rate increased by 24 percent, which is the highest increase in nearly 100 years.<sup>30</sup> This loss of life is not only tragic – it is unnecessary and preventable. ITS America, the USDOT, and the transportation safety community have repeatedly demonstrated that V2X technologies are the best tool in our toolbox to dramatically reduce fatalities; no other presently available transportation safety improvement has the potential to so substantially reduce crashes on American roads.

This is not an abstract anticipated improvement in transportation safety; rather, V2X technologies have applications that can target specific areas of transportation safety that have been deteriorating in recent years. For example, when equipped with sufficient spectrum, V2X technologies have the potential to significantly improve safety for vulnerable road users such as pedestrians and bicyclists, preventing collisions that disproportionately occur in low income and

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<sup>30</sup> National Safety Council, Preliminary Semiannual Estimates. Available at: <https://injuryfacts.nsc.org/motor-vehicle/overview/preliminary-estimates/>.

minority communities. Pedestrian traffic fatalities have increased by 51 percent from 2009 to 2019, accounting for 17.2 percent of all traffic deaths in 2019.<sup>31</sup> The Governors Highway Safety Administration recently released troubling data suggesting that the number of pedestrians killed in motor vehicle crashes per mile traveled increased by 20 percent in the first half of 2020 relative to the same period in 2019, even as the overall number of miles driven nationally decreased by 16.5 percent.<sup>32</sup> Additionally, cyclist fatalities have increased by 36 percent since 2010.<sup>33</sup> These statistics are even more disturbing in low income and minority communities. Between 2009 and 2018, pedestrian deaths rose 69 percent in urban areas, and cycling deaths increased by 48 percent.<sup>34</sup> In 2019, most pedestrian traffic deaths, 82 percent, occurred in urban settings.<sup>35</sup> Latino cyclists face fatality rates 23 percent higher than whites do, and for African Americans, they are 30 percent higher. Low-income, Black, and Latino communities also have higher vehicular traffic volumes, trucking routes, major arterial roads, intersections that are unsafe or impassable by foot or bike, and an overall lower level and quality of walking and cycling infrastructure.<sup>36</sup>

Some of the most promising V2X applications are designed to address these problems and enhance safety for vulnerable road users. While these applications show tremendous potential for vulnerable road user safety – the Commission’s recent spectrum allocation presents a significant

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<sup>31</sup> National Safety Council, Pedestrians. Available at: <https://injuryfacts.nsc.org/motor-vehicle/road-users/pedestrians/data-details>.

<sup>32</sup> Governors Highway Safety Association - Pedestrian Traffic Fatalities by State: 2020 Preliminary Data. Available at: <https://www.ghsa.org/resources/Pedestrians21>.

<sup>33</sup> Insurance Institute for Highway Safety, Fatality Facts 2019: Bicyclists. Available at: <https://www.iihs.org/topics/fatality-statistics/detail/bicyclists#:~:text=Posted%20March%202021,-.Trends,their%20lowest%20point%20in%202010>.

<sup>34</sup> National Highway Traffic Safety Administration: Traffic Safety Facts - 2018 Fatal Motor Vehicle Crashes: Overview. Available at: <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812826>.

<sup>35</sup> National Safety Council, Pedestrians. Available at: <https://injuryfacts.nsc.org/motor-vehicle/road-users/pedestrians/data-details>.

<sup>36</sup> Safe Routes to Schools National Partnership: At the Intersection of Active Transportation and Equity. Available at: [https://www.saferoutespartnership.org/sites/default/files/resource\\_files/at-the-intersection-of-active-transportation-and-equity.pdf](https://www.saferoutespartnership.org/sites/default/files/resource_files/at-the-intersection-of-active-transportation-and-equity.pdf).

issue – personal safety messages (PSMs) are unlikely to be usable within a limited 30 MHz environment.

**B. Transportation Stakeholders Have Clearly Established that 30 MHz is Not Sufficient to Support Advanced ITS Operations**

There was overwhelming consensus by transportation safety experts such as USDOT,<sup>37</sup> the National Transportation Safety Board,<sup>38</sup> SAE International,<sup>39</sup> and a wide coalition of transportation safety stakeholders that 30 MHz was insufficient to provide the full range of V2X safety services of today and the near future. The position of this community was unambiguous – by removing 45 MHz from the 75 MHz allotted to V2X communications, the Commission would be significantly undermining the capacity of V2X communications to save lives on American roads.

In response to the Commission’s proposal to reallocate the majority of the spectrum reserved for V2X communications, ITS America established a Future of V2X Working Group that includes representatives from infrastructure owner operators (IOOs), automotive manufacturers, and technology companies to evaluate the potential effect of the proposal on the types of messages and V2X applications that could be deployed. The Working Group drafted a preliminary application map that attempts to show the message types and applications that will likely be deployed in the proposed limited 30 MHz spectrum environment and the message types and applications that would likely be lost in such a scenario.<sup>40</sup>

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<sup>37</sup> Comments of U.S. Department of Transportation, ET Docket No. 19-138, at 50 (filed Mar. 13, 2020).

<sup>38</sup> Comments of the National Transportation Safety Board, ET Docket No. 19-138, at 4 (March 4, 2020).

<sup>39</sup> Comments of SAE International, ET Docket No. 19-138, at 9 (March 9, 2020).

<sup>40</sup> <https://itsa.org/wp-content/uploads/2021/01/ITS-America-30-MHz-Application-Map-1-27-21.pdf>.

The Working Group met regularly over the course of several months to discuss the impact that a limited 30 MHz environment would have on V2X deployment and evaluated numerous V2X applications based on several inputs: spectrum requirements, stakeholder priority, and likely safety benefit. Spectrum requirements were calculated based on assumptions about the number of vehicles within communication range, packet size, repetition rate, activity factors, spectral efficiency, and channel utilization. Stakeholder priority was assessed both through informal discussion among Working Group members and a limited survey of IOO priorities for applications. The likely safety benefit of an application was assessed through informal discussion and the National Highway Traffic Safety Administration's (NHTSA) Vehicle Safety Communications Project final report evaluating the potential safety benefits of V2X applications.<sup>41</sup> These evaluations led the Working Group to create a priority list of V2X message types and applications.

While the working group was able to identify certain basic V2X applications that likely would be deployed in a 30 MHz interference-free environment (which the current power limits suggested by the Commission would not guarantee), several advanced message types and applications are unlikely to be deployed. Unfortunately, the group determined that envisaged applications for vulnerable road user protection, sensor sharing, and maneuver coordination (respectively using personal safety messages (PSM), sensor data sharing messages (SDSM), and maneuver sharing /coordinating messages (MSCM)) would be unlikely to effectively function in the remaining 30 MHz.

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<sup>41</sup> Vehicle Safety Communications – Applications (VSC-A) Final Report, National Highway Traffic Safety Administration (April 2006) available at:<https://www.nhtsa.gov/DOT/NHTSA/IRD/Multimedia/PDFs/Crash%20Avoidance/2006/Vehicle%20Safety%20Communications%20Project%20-%20Final%20Report.pdf>.

PSMs allow communications between vehicles and vulnerable road users such as pedestrians and cyclists. V2X devices can send and receive individualized messages and alerts to significantly improve crosswalk safety for pedestrians and cyclists by warning drivers when they are about to turn into an occupied crosswalk. These applications can warn vehicles about vulnerable road users such as pedestrians or bicyclists who are outside a vehicle's line-of-sight but are about to enter the vehicle's path. This has tremendous potential for improving safety for visually-impaired pedestrians as well, giving them an additional avenue to interface with the drivers around them to ensure that they can cross the road safely.

Numerous meetings with the Commission have highlighted the promise of applications utilizing SDSM and MSCM messages to improve transportation safety and efficiency,<sup>42</sup> but the summary of their benefit is that they are vital to allow vehicles to communicate information gained from vehicle-based sensors, such as radar and LiDAR, to other vehicles, and to provide cooperative operation among automated vehicles. Applications using these message types would allow automated vehicles to react to information outside of their line-of-sight by sharing information with other V2X-equipped vehicles, greatly enhancing the capabilities of their safety technologies. USDOT has noted that the decreased cooperative capabilities of automated vehicles will occur because of this spectrum reallocation,<sup>43</sup> highlighting as the expert transportation safety agency that the Commission's spectrum reallocation will significantly harm the potential for automated vehicles to act collectively rather than by each vehicle responding to situations individually.

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<sup>42</sup> See Continental Ex Parte Notice, ET Docket No. 19-138, at 1 (filed Nov. 2, 2020); Continental Ex Parte Notice, ET Docket No. 19-138, at 2 (filed Oct. 16, 2020); Continental Ex Parte Notice, ET Docket No. 19-138, at 1 (filed Oct. 7, 2020); Continental Ex Parte Notice, ET Docket No. 19-138, at 1 (filed Oct. 1, 2020); Continental Ex Parte Notice, ET Docket No. 19-138, at 2 (filed Sep. 30, 2020); Continental Ex Parte Notice, ET Docket No. 19-138, at 2 (filed Aug. 31, 2020);

<sup>43</sup> Reply of USDOT, ET Docket No. 19-138, at 82 (filed under NTIA) (filed Mar. 13, 2020).

Anticipating a future where a greater proportion of the national vehicle fleet utilizes autonomous vehicle technology, the Commission's elimination of these capabilities will significantly reduce the future safety of American roads. When combined with the need for increased protections for vulnerable road users made immediately apparent by the regular increase in pedestrian and cyclist fatalities, the loss of safety functionality in these two areas alone is enough to warrant prioritization by the Commission. A multi-stakeholder partnership led by the FCC and USDOT would begin to lessen the significant regulatory uncertainty in the deployment of V2X devices, giving V2X deployers the confidence to move forward with their ambitious public safety goals achievable with these technologies. ITS America is confident that an additional spectrum agreement can be reached in partnership with USDOT and the transportation industry that would appropriately balance the needs for transportation safety with the various priorities of the Commission.

### **C. Attributes of Suitable Spectrum for ITS Operations**

While ITS America believes that a partnership of the Commission, USDOT, the Department of Commerce, and stakeholders in the transportation industry should determine which spectrum is the best candidate for reallocation for V2X communications, it concurs with the suggestions of our partner organizations in considering important attributes that will make spectrum suitable to V2X communications.

In its prior comments in this Docket, 5GAA noted that the "NPRM is conflating commercial spectrum used for 5G network services with the type of dedicated spectrum required for 5G-based advanced CV2X Direct, and is suggesting that the existence of the former obviates the need for the latter. Spectrum allocated for 5G network services is used in very different ways than spectrum for advanced C-V2X Direct. Mid-band spectrum dedicated for high-capacity, ultra-

low latency, highly-reliable, safety critical direct V2V, V2I, and V2P communications is required for 5G- based advanced C-V2X Direct services. This is especially so in rural areas of our country, where the timing of widescale 5G network deployment remains uncertain.”<sup>44</sup> “The critical safety functions of certain advanced C-V2X applications and the location-dependent nature of information communicated necessitates dedicated mid-band spectrum for direct V2V, V2I, and V2P communications.”<sup>45</sup> ITS America echoes the conclusions of 5GAA on this matter – low-latency, mid-band spectrum is required for the instantaneous, reliable message transmission that is required to avert crashes and coordinate vehicle actions at high-speeds.

ITS America urges the Commission to collaborate with USDOT to identify spectrum for V2X that fits these characteristics. While such spectrum outside of the 5.9 GHz band is not readily available, this need for additional spectrum would not be at hand if the Commission had not prioritized cable-industry desires over those of transportation operators, entertainment products over safety products, and demand from the cable industry over the safety of travelers . The body of evidence on the impact of that decision was clear then, as it is clear now – and the FCC must act to provide appropriate additional spectrum to enable the next generation of transportation safety technologies that their recent actions have so significantly undermined.

## **V. CONCLUSION**

For the reasons stated herein, ITS America urges that the FCC adopt rules implementing the transition of the 5.9 GHz band as directed by the *5.9 GHz Band First Report and Order* that ensure that the remaining 30 MHz available to V2X services is free from harmful interference and that the dislocated licensees are provided fair compensation.

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<sup>44</sup> Comments of 5GAA, ET Docket No. 19-138, at 32 (filed Mar. 9, 2020).

<sup>45</sup> *Id.*

Respectfully Submitted,

Robert B. Kelly  
Kahina I. Aoudia  
Squire Patton Boggs (US) LLP  
2550 M Street, N.W.  
Washington, DC 20037  
(202) 457-6000

*Of Counsel*

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Shailen Bhatt  
President and Chief Executive Officer  
Timothy Drake  
Vice President, Public Policy and Regulatory  
Affairs  
Intelligent Transportation Society of America  
1100 New Jersey Ave., SE  
Suite 850  
Washington, DC 20003  
(202) 721-4229