

**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
	)	

**REPLY COMMENTS OF AT&T**

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based mobile network operators (“MNOs”), which may complement, but cannot replace, vehicle-to-everything (“V2X”) applications.

Proponents of the proposal to allocate 45 MHz in the 5.9 GHz band to unlicensed use cite to the value of that reallocation provided in the RAND Corporation study (“RAND Study”)<sup>2</sup> mentioned in the *Notice* and, to gloss over its shortcomings, to a similar study prepared by Wi-Fi Forward (“Wi-Fi Forward Study”).<sup>3</sup> These studies are flawed for many reasons, including their inaccurate underlying assumptions and an absence of any recognition or analysis of the costs of reallocation. Even if accurate, the benefits cited by those proponents pale in comparison to the costs from reallocation in the form of foregone improvements in transportation safety and the foregone reductions in loss of human life, personal injuries, and property damage that would otherwise follow those safety improvements. The Commission should be skeptical of the proponents’ studies and evaluate all the potential costs that opponents of reallocation explore, including the value of the loss of human life that the Commission has consistently considered in proceedings involving public safety.

Commenters also emphasize, and the U.S. Department of Transportation (the “USDOT”) has preliminarily demonstrated, that allowing exclusively unlicensed use in the lower 45 MHz of the 5.9 GHz band under the technical rules proposed in the *Notice* would create interference in the upper 30 MHz of the band for even the most basic V2X messages. This interference potential is not theoretical, and it is expected to be exacerbated by unlicensed use in the 6 GHz band,

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<sup>2</sup> Letter from Diana Gehlaus Carew, Doctoral Fellow, RAND Corp., to Marlene H. Dortch, Secretary, Federal Communications Commission, ET Docket No. 13-49 (filed Dec. 13, 2018).

<sup>3</sup> Raul Katz, Telecomm Advisory Services, LLC, *Assessing the Economic Value of Unlicensed Use in the 5.9 GHz and 6 GHz Bands*, (WiFi Forward: April 2020) (“Wi-Fi Forward Study”), available at <http://wififorward.org/wp-content/uploads/2020/04/5.9-6.0-FINAL-for-distribution.pdf>. As explained below, the report is misnamed, as it assesses benefits only, not value.

effectively squeezing the value out of the 30 MHz the Commission proposes leaving for ITS use. The interference concerns raised in this docket warrant reconsideration of the reallocation proposal or, at a minimum, robust testing and development of technical rules to protect the ITS systems that remain operational in the upper 30 MHz of the 5.9 GHz band.

## II. ANALYSIS AND ARGUMENT

### A. The Breadth and Depth of Opposition to the *Notice* Creates an Overwhelming Record Against Reallocating 45 MHz in the 5.9 GHz Band to Unlicensed Use.

Commenters express exceptionally broad and deep opposition to the Commission's proposal to reallocate the lower 45 MHz in the 5.9 GHz to unlicensed use. An American Association of State Highway and Transportation Officials study reports that of the 269 comments filed, 89% oppose the reallocation proposal in the *Notice*, only 9% support the proposal, and 2% are neutral or without a clear position.<sup>4</sup> Opposing commenters represent a broad spectrum of state and local government executives and legislators (e.g., Georgia, Tennessee); state and local transportation agencies and their associations (e.g., California Department of Transportation, American Association of State Highway Transportation Officials); federal entities, including expert Federal executive and independent agencies (e.g., U.S. Department of Transportation, National Transportation Safety Board); commercial interests, including automobile and truck manufacturers and their associations (e.g., General Motors, Toyota, Alliance for Automotive Innovation, 5GAA), freight and people movers and their associations (e.g., UPS, American Trucking Associations); Tier-1 and Tier-2 automotive suppliers (e.g., Bosch, LG, Panasonic, Continental, Autotalks, u-Blox); unmanned aerial systems companies and associations (e.g.,

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<sup>4</sup> See National Cooperative Highway Research Program ("NCHRP") Project 23-10, Evaluation and Synthesis of V2X Technologies, V2X Communications in the 5.9 GHz Spectrum, at 4 (March 2020), available at <http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP23-10-V2XCommunicationsMarch2020Update.pdf> (last accessed April 27, 2020).

Airbus UM, AUVSI), communications providers (e.g., AT&T, T-Mobile); and amateur radio operators. Such a widespread consensus across varying factions is rare and should not go unheeded.

Opponents sound common themes: reallocating the lower 45 MHz of the 5.9 GHz band to unlicensed use harms public safety, limits continued technology innovation and American leadership in the automotive and transportation sectors, and is both unsupported and unnecessary to achieve its laudable objective of unlocking more spectrum for unlicensed use. A bipartisan Committee of the U.S. House of Representatives warns that “[r]emoval of this dedicated spectrum would be counter to our national transportation policy goals, as affirmed by the DOT and the Congress with the passage of the FAST Act in 2015.”<sup>5</sup> The USDOT believes that “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 . . . [and] these safety innovations and improvements may be lost should the Commission proceed with its proposed reallocation of the 5.9 GHz band.”<sup>6</sup> And, the Intelligent Transportation Society of America succinctly summarizes that “every state transportation authority, among other experts, have expressed the concern that the Commission’s action will impede and delay the benefits of improved safety in the nation’s transportation network that V2X technologies will provide . . . and have urged the Commission to preserve the 5.9 GHz Band for [ITS] and transportation safety.”<sup>7</sup>

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<sup>5</sup> Letter from the Committee on Transportation and Infrastructure of the United States House of Representatives, at 5 (Jan. 22, 2020) (“US House Committee Comments”), available at <https://transportation.house.gov/imo/media/doc/2020-01-22%20Full%20TI%20Letter%20to%20FCC.pdf> (last accessed April 27, 2020).

<sup>6</sup> Comments of the National Telecommunications and Information Administration, U.S. Dept. of Transportation, ET Docket No. 19-138, at 2 (filed March 13, 2020) (“USDOT Comments”)

<sup>7</sup> Comments of the Intelligent Transportation Society of America, ET Docket No. 19-138, at 2

Commenters likewise dispel the premise underlying the *Notice*—that the 5.9 GHz band is and in the foreseeable future will continue to be underutilized for V2X technologies.<sup>8</sup> The American Association of State Highway and Transportation Officials explains that “[t]ransportation infrastructure owner operators . . . in 38 State and local agencies, supported by USDOT, have already made tens of millions of dollars of investment in DSRC deployments . . . [and] 11 states hav[e] pending license applications with the FCC representing 498 applications, with even more currently in planning and development.”<sup>9</sup> For example, the Utah Department of Transportation (“Utah DOT”) has invested millions in DSRC systems in the 5.9 GHz band, with “131 intersections and 87 fleet vehicles with DSRC equipment installed and operating, [] another 165 intersections and 90 vehicles slated for operation this year, pending license application approval[, and] . . . will also install dual-band DSRC/C-V2X roadside units in 69 non-intersection locations in early summer, accompanied by 35 fleet vehicles with either DSRC or C-V2X technology.”<sup>10</sup> “These are not pilot deployments, but are in a fully operational, permanent environment.”<sup>11</sup>

The USDOT estimates the immediate direct cost to taxpayers of replacing these and all

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(filed March 9, 2020) (“ITS America Comments”).

<sup>8</sup> *See, e.g.*, Comments of the American Ass’n of State Highway and Transportation Officials, ET Docket No. 19-138, at 5 (filed March 2, 2020) (“AASHTO Comments”) (AASHTO “strongly rejects the notion” that the 5.9 GHz spectrum has been “unused and fallow since its allocation.”); Comments of the DSRC Auto Safety Coalition, ET Docket No. 19-138, at 23-24 (filed March 9, 2020) (“DSRC Coalition”) (“[T]he Commission fails to consider the significant investments made by government and private sector entities in DSRC development and deployment, simply concluding, without comprehensive analysis or understanding, that the 5.9 GHz band has largely been left unused when that is clearly not the case.”).

<sup>9</sup> AASHTO Comments at 5.

<sup>10</sup> Comments of the Utah Dept. of Transportation, ET Docket No. 19-138, at 1-2 (filed March 9, 2020) (“Utah DOT Comments”).

<sup>11</sup> *Id.* at 1.

other existing ITS deployments in the country at \$500 million.<sup>12</sup> Moreover, reallocation of the 5.9 GHz band in the manner proposed will cause state and local agencies that are otherwise poised to invest in or deploy ITS, as well as private sector ITS investors, to reexamine their plans in light of the constricted spectrum scenario and to likely pull back on ITS investments, setting the technology back for years. This is not necessary. In recognition of the clear and overwhelming consensus that reallocating 45 MHz of the 5.9 GHz band to unlicensed use would harm the public interest, the Commission should act with regulatory humility and reconsider its proposal.<sup>13</sup>

**B. The Cost-Benefit Analysis Clearly Points to Retention of 75 MHz for ITS.**

The record demonstrates a cost-benefit balance that weighs heavily in favor of retaining the whole 75 MHz in the 5.9 GHz band for providing life-saving ITS.

**1. Wi-Fi Proponents' Studies are Flawed and Should be Disregarded.**

AT&T agrees with the Alliance for Automotive Innovation's proposals for calculating costs and benefits, and in particular, with its critique of using the RAND Study for that purpose.<sup>14</sup> As the Alliance for Automotive Innovation explains, the RAND Study examines only one side of the equation—the benefits of reallocating the 5.9 GHz band to unlicensed operations—without accounting for the costs reallocation would have on V2X technologies and the benefit sacrifice from the resultant decrease in transportation safety systems.<sup>15</sup> Toyota also concludes that “it is

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<sup>12</sup> AASHTO Comments at 5.

<sup>13</sup> Opponents' differences pertain only to the appropriate ITS/V2X communications technology to be used in the 5.9 GHz band, an issue that is best resolved by others and not the Commission. *See, e.g.,* Comments of American Honda Motor Co, Inc., ET Docket No. 19-138, at 5 (filed March 9, 2020) (“Honda Comments”); USDOT Comments at 6; Comments of AT&T Services, Inc., ET Docket No. 19-138, at 24 (filed March 9, 2020) (“AT&T Comments”).

<sup>14</sup> Comments of Alliance for Automotive Innovation, ET Docket No. 19-138, at 36-42 (filed March 9, 2020) (“Automotive Alliance Comments”).

<sup>15</sup> *Id.* at 40-41.

quite likely that the benefits lost [i.e., the costs] by repurposing the spectrum away from transportation safety outweigh the WiFi-related benefits claimed by the RAND study funded by Wi-Fi advocates.”<sup>16</sup> And, even if the benefit calculations performed in the RAND Study were methodologically correct, which they are not, the benefits that it claims would derive from reallocation are vastly overstated, as those calculations presume Wi-Fi use of the *entire* 75 MHz in the band rather than just the 45 MHz proposed for reallocation in the *Notice*.<sup>17</sup>

The deficiencies in the RAND Study appear to have spurred Wi-Fi Forward, which is focused on finding more unlicensed spectrum for Wi-Fi use (not on any other beneficial use of the spectrum), to fund and publish the Wi-Fi Forward Study (after the initial comment round) that attempts to correct some of those deficiencies. But, the Wi-Fi Forward Study is merely a transparent attempt to provide a *post hoc* rationale for the proposal in the *Notice* to stop shared-use testing in the 5.9 GHz band and reallocate the lower 45 MHz in the band to unlicensed use despite the Commission having already ordered the opening of the 6 GHz band to unlicensed sharing.<sup>18</sup> Like the RAND Study, the Wi-Fi Forward Study is deeply flawed.

First, the Wi-Fi Forward Study, like the RAND Study, makes no attempt in any part of the 62-page report to calculate the *net* benefits of the reallocation proposed in the *Notice*. That is, it does not examine or even consider any economic losses or other costs associated with spectrum reallocation that would offset any economic value created by unlicensed use of the 5.9 GHz band.

Second, the Wi-Fi Forward Study asserts that Wi-Fi throughput with current unlicensed

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<sup>16</sup> Comments of Toyota Motor Co., ET Docket No. 19-138, at 20 (filed March 9, 2020) (“Toyota Comments”).

<sup>17</sup> ITS America Comments at 24; Automotive Alliance Comments at 41.

<sup>18</sup> *Unlicensed Use of the 6 GHz Band, Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz*, ET Docket No., 18-295, GN Docket No. 17-183, Report and Order, FCC 20-51 (2020).

spectrum allocations creates a bottleneck for users that depresses their purchase of higher throughput broadband service.<sup>19</sup> But, it fails to address or model the myriad of potentially more efficient ways consumers may improve their Wi-Fi performance, and thus maximize utilization of their broadband service, without an additional 45 MHz of unlicensed spectrum. Those strategies include, for example, increasing the use of ethernet for applicable devices (typically including fixed/non-mobile consumer devices such as TVs, media streamers or game systems, printers, etc.), repositioning their Wi-Fi router, or employing Wi-Fi extenders to improve coverage.<sup>20</sup>

Third, the Wi-Fi Forward Study incorrectly presumes that substantial CAPEX savings will be generated from offloading cellular data traffic onto Wi-Fi networks—and that this is both a “free” benefit due to Wi-Fi and one that is unaccounted for in its prior calculations of GDP, consumer surplus, and producer surplus increases.<sup>21</sup> The CAPEX analysis is severely misguided, relying on outdated assumptions about the current state of mobile technologies, spectrum, and networks. While mobile virtual network operators (“MVNOs”), which lack network facilities, may have a vested financial interest in offloading as much data traffic as possible to Wi-Fi networks,<sup>22</sup>

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<sup>19</sup> Wi-Fi Forward Study at 5, 17-18, 22-33.

<sup>20</sup> For example, AT&T Internet customers can use the free AT&T Smart Home Manager app to map their home’s Wi-Fi coverage, with an augmented reality (AR) display showing them points of strong, fair, and weak coverage. They can then, also within the same app, assess whether and how Wi-Fi extenders might improve their Wi-Fi network’s performance. *See AT&T Release, Applying the Latest Technology in our Quest for Better Home Wi-Fi* (July 15, 2019), available at [https://about.att.com/innovationblog/2019/07/better\\_home\\_wifi.html](https://about.att.com/innovationblog/2019/07/better_home_wifi.html) (last accessed April 27, 2020).

<sup>21</sup> Wi-Fi Forward Study at 7, 20-21, 37-40. The Wi-Fi Forward Study also leaves unexplained why it advances only cellular CAPEX savings as an additional benefit from Wi-Fi expansion. Presumably, there may be resultant CAPEX savings in all sorts of industries such as ethernet cabling or constructors of pneumatic tube systems.

<sup>22</sup> *See* Chris Mills and Fiona Armstrong, *United States of America, Special Report: State of MVNOs* at 19 (2019) (“Wi-Fi traffic offloading, which uses network setting profiles on consumer devices to actively push devices onto the public hotspot network, has largely been seen as a way for cable companies to reduce their mobile network bill from Verizon.”), available at

that is often not the case for facilities-based MNOs. In the last decade, facilities-based MNOs, which handle the vast majority of data traffic, have increased their spectrum inventories, densified their LTE and LTE-Advanced networks, and begun deploying 5G networks, dispelling the notion that facilities-based MNOs want or need to significantly rely on Wi-Fi offload.

Also, this cellular CAPEX “saving” is not a free benefit from Wi-Fi; it is purchased at the expense of both the foregone alternative uses of 5.9 GHz spectrum and the costs that must be incurred by Wi-Fi producers and its unlicensed users to take advantage of this spectrum. In any event, it is highly unlikely that the Wi-Fi Forward Study’s aggregation of its presented collection of potential benefits (GDP increase, consumer surplus increase, producer surplus increase and cellular CAPEX savings) is valid. The proper calculation of each of these parameters is a general equilibrium-like exercise that requires all to be considered simultaneously. Instead, Wi-Fi Forward conducted its calculations by extracting parameters from a collection of inconsistent and idiosyncratic prior studies and applied them piecemeal and inconsistently in the present exercise. Thus, it is highly likely that the Wi-Fi Forward Study double-counts benefits in the summation of its figures for GDP increase, consumer surplus increase, producer surplus increase and cellular CAPEX savings.

Fourth, the Wi-Fi Forward Study optimistically estimates over \$54 billion in benefit from an ostensible increase in high-throughput Wi-Fi connectivity from unlicensed use in the 5.9 GHz and 6 GHz bands by enterprises (e.g., business facilities, industrial plants, campuses) harnessing

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<https://www.tutela.com/hubfs/Assets/USA%20State%20of%20MVNOs%20Report%20-%20October%202019.pdf> (last accessed April 27, 2020). This financial incentive for cable-backed MVNOs to use free 160 MHz wide channels on unlicensed spectrum to sell gigabit Wi-Fi service underscores the irony of NCTA’s assertion that the Commission’s allocation of the 5.9 GHz band for ITS communications, a public safety use, was an “extraordinary gift.” Comments of NCTA-The Internet & Television Ass’n, ET Docket No. 19-138, at 12 (filed March 9, 2020) (“NCTA Comments”).

Internet of Things (“IoT”) and augmented reality/virtual reality (“AR/VR”) applications.<sup>23</sup> This figure should be ignored. It is supported by the nonsensical assertion that “cellular networks will not be able to handle the extremely high throughput, low latency required by these applications[.]”<sup>24</sup> To the contrary, cellular 5G networks are intentionally being designed to support IoT and AR/VR applications in enterprise settings.<sup>25</sup> Moreover, the Wi-Fi Forward Study and the data on which it bases its Wi-Fi traffic assumptions fail to account for the likelihood that enterprise investments in future 3.5 GHz licenses will reduce their reliance on Wi-Fi. The use of cellular 4G LTE and 5G networks for enterprise communications, whether through private networks operating on this (or similar) spectrum or on an MNO’s radio access network, will be increasingly common for enterprise critical applications where the absence of an interference risk is paramount. This factor, and not capacity constraints, will set the value of unlicensed spectrum for Wi-Fi. Lastly, the Wi-Fi Forward Study calculates savings to “enterprise” customers that replace cellular with Wi-Fi use based on a “dollar per GB” derived from “retail” consumer 4G plans,<sup>26</sup> whereas in reality enterprise IoT and AR/VR services are offered with a completely different pricing and service structure.

These few, of the many, flaws in both the RAND Study and the Wi-Fi Forward Study collectively demonstrate why they cannot be relied upon to evaluate the economic benefits of reallocating the lower 45 MHz of the 5.9 GHz band to unlicensed use. If there is any instruction offered by the Wi-Fi Forward Study, it is the importance of correct sequencing in the calculation and aggregation of benefits. The Wi-Fi Forward Study chooses to first calculate general benefits

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<sup>23</sup> Wi-Fi Forward Study at 6, 49.

<sup>24</sup> *Id.* at 47.

<sup>25</sup> See, e.g., <https://www.business.att.com/learn/5G.html> (last accessed April 27, 2020).

<sup>26</sup> Wi-Fi Forward Study at 47-48.

from reallocation of 45 MHz in the 5.9 GHz band, arriving at \$23 billion in claimed GDP increase. It then incrementally calculates benefits from a reallocation of 1200 MHz in the 6 GHz band, for an additional \$83 billion in claimed GDP increase. But, if the Wi-Fi Forward Study had, as it should have done,<sup>27</sup> reversed the order of its calculations to first compute the benefits from the 1200 MHz reallocation (using the same methodology as it employed for the 5.9 GHz band) and then compute the benefits of the incremental 45 MHz reallocation, it almost surely would have computed a GDP increase substantially above \$83 billion for the 1200 MHz 6 GHz band reallocation, with then (due to diminishing marginal returns) only a miniscule incremental GDP increase attributable to the subsequent reallocation of 45 MHz in the 5.9 GHz band. Thus, the policy implications of the Commission’s actions last week on the 6 GHz band confirm there is little need for or benefit from reallocation of 45 MHz in the 5.9 GHz band.<sup>28</sup>

## **2. The Costs of Reallocation to the Public Safety and Lives Outweigh any Benefits From Unlicensed Use.**

Even if the Commission accepts the flawed benefits estimates from unlicensed advocates—which it should not—the Commission must still balance those benefits against the costs associated with the erosion or elimination of the ability of the 5.9 GHz band to deliver V2X

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<sup>27</sup> The Wi-Fi Forward Study should have first calculated the benefits of reallocating the 1200 MHz of 6 GHz spectrum because that reallocation has already occurred (*supra* n.18) and, consequently, any ostensible benefits arising from a potential later reallocation of 45 MHz from the 5.9 GHz band would be incremental.

<sup>28</sup> It seems likely that the benefits of unlicensed use of the 1200 MHz of 6 GHz spectrum will occur *before* the incremental ostensible benefits that might be generated by unlicensed use of the 5.9 GHz band. *See Release, Wi-Fi Alliance® delivers more value from Wi-Fi® in 6 GHz* (April 23, 2020) (announcing that IDC expects “the first Wi-Fi 6E access points available by the fourth quarter of 2020” and that “initial forecasts expect[] more than 316 million Wi-Fi 6E devices will enter the market in 2021”), available at <https://www.wi-fi.org/news-events/newsroom/wi-fi-alliance-delivers-more-value-from-wi-fi-in-6-ghz> (last accessed April 27, 2020). Even if this 5.9 GHz proceeding rapidly concluded in the manner proposed in the *Notice*, the time-phased benefits modeled in the Wi-Fi Forward Study simply do not hold up and defy the Commission’s own expectation of the rapid benefits of the 6 GHz proceeding.

benefits. AT&T agrees with the Alliance for Automotive Innovation, Toyota, and other commenters that the Commission’s cost analysis must, as the Commission has done in multiple proceedings, consider the value of human life, injuries, health care costs, and property damage,<sup>29</sup> and “properly account for the true cost of taking spectrum *away* from V2X before considering moving forward with the proposed band plan.”<sup>30</sup> Reallocating 45 MHz in the 5.9 GHz band from ITS to unlicensed use will directly result in these costs tied to human life, injuries, health care costs, and property damage. The Intelligent Transportation Society of America, among many others, agrees: “The costs of the deaths and injuries that could have otherwise been prevented will total billions of dollars annually.”<sup>31</sup>

AT&T also agrees with Honda’s assertion that the Commission’s reallocation proposal “will lead to a collapse of V2X usage” and “render the 30 MHz useless for V2X transportation safety[.]”<sup>32</sup> Ford, General Motors, Toyota, and all other automobile manufacturers who filed comments made similar arguments.<sup>33</sup> Public safety agencies and advocates concur. The NTSB

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<sup>29</sup> Automotive Alliance Comments at 36-39; Toyota Comments at 20. The Alliance for Automotive Innovation correctly observes that the Commission has considered these costs in proceedings pertaining to a three-digit dialing code for a national suicide prevention hotline, wireless 911 location accuracy requirements, the Emergency Alert System and Wireless Emergency Alerts, and broadband network outage reporting. It would be strikingly inconsistent for the Commission to use the USDOT’s Economic Value of a Statistical Life to conduct a cost/benefit analysis in these communications-related public safety proceedings, which it has done in at least two cases, and to *not* use the same metric in a cost/benefit analysis in this transportation-related public safety proceeding in which the USDOT itself is involved.

<sup>30</sup> Automotive Alliance Comments at 36-39.

<sup>31</sup> ITS America Comments at 21.

<sup>32</sup> Honda Comments at 7.

<sup>33</sup> Comments of General Motors LLC, ET Docket 19-138, at 7 (filed March 9, 2020) (“GM Comments”) (“To realize the tremendous potential benefits of V2X in the United States, it is critical that the Commission preserve the entire 5.9 GHz band for transportation safety.”); Comments of Ford Motor Co., ET Docket No. 19-138, at 7 (filed March 9, 2020) (“Ford Comments”) (“Given the potential safety and orchestration benefits that C-V2X can bring to our transportation eco-system, we believe current and future applications will require sufficient

Chairman explains that the reallocation proposal in the *Notice* will derail, or at best severely delay, the development of automated vehicle technologies because limiting transportation safety applications to only 30 MHz of bandwidth “would make V2X applications functionally infeasible.”<sup>34</sup> V2X applications complement vehicle-based line-of-sight collision avoidance systems, which cannot accurately identify obstacles or actions outside their field of observation, by improving the reliability and accuracy of data, extending the range of threat detection, and detecting crash risks that are undetectable by vehicle-based sensors.<sup>35</sup> The USDOT agrees, citing the potential for V2X technology using the 5.9 GHz band to significantly reduce crashes, system inefficiencies, and traffic congestion in ways that are distinct from vehicle-based sensors and other technologies, most notably by having significantly greater capability to address non-line-of-sight crashes.<sup>36</sup> But the Commission’s proposal would hinder these benefits from V2X technologies by reducing the available spectrum to unusable levels. The Commission must account for this potential and consequent impact in lives lost, injuries, and property damage.

To be sure, these costs are real. The USDOT believes that V2X technologies can play

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spectrum protected for ITS use. It is for these reasons that we believe the FCC should maintain all 75 MHz of the 5.9 GHz spectrum for ITS applications.”); Toyota Comments at 1 (“A drastic reduction in the amount of spectrum available to DSRC means that at least some of the applications reflected on the DSRC channel usage plan will likely be lost to the United States market. Reducing the applications that can be provided will – without doubt – significantly limit the ability of the technology to realize its full potential.”).

<sup>34</sup> Comments of the Chairman, National Transportation Safety Board, ET Docket No. 19-138, at 5 (filed March 4, 2020) (“NTSB Comments”). *See also* Utah DOT Comments at 3 (“[B]ased on our experience, UDOT believes that 30 MHz of spectrum is inadequate for the successful implementation of ITS services and that the change proposed in the NPRM will thwart our efforts to save lives and improve traffic safety and operations.”); AASHTO Comments at 11 (“Bandwidth analysis shows that the full 75 MHz of the 2003 allocation is required to support of the applications currently deployed and under development.”).

<sup>35</sup> NTSB Comments at 5 (“the weakness of vehicle-based sensors is a strength of a communication-based system”).

<sup>36</sup> USDOT Comments at 9.

a significant role in reducing the 6 million+ U.S. police-reported vehicle crashes per year and the resulting 36,560 lost lives, over 2.7 million injuries, and property damage amounting to annual economic harm of about \$300 billion in direct costs and over \$800 billion when accounting for the loss of life, injuries, and other quality-of-life factors. The USDOT also demonstrates that V2I applications can help reduce traffic congestion, which leads to over \$166 billion in annual costs, including those arising from traffic delays and wasted fuel.<sup>37</sup> The American Association of State Highway and Transportation Officials and many other commenters likewise cite to these potential benefits of ITS operating over the 5.9 GHz band.<sup>38</sup> The Committee on Transportation and Infrastructure for the U.S. House of Representatives says that “to understand the significance of this technology, safety advocates have compared [it] to the next seat belt or airbag in terms of saving lives and opening the door to safer self-driving cars that can effectively look around corners and through buildings.”<sup>39</sup> But, these benefits require the use of the whole 75 MHz in the band.<sup>40</sup>

Moreover, the economic value of removing the current uncertainty in the 5.9 GHz band by providing the clear direction proposed in the *Notice* does NOT exceed the benefits of retaining the whole 5.9 GHz band for ITS.<sup>41</sup> As Toyota explains, “the Commission’s proposal is far from the

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<sup>37</sup> *Id.* at 1-2, 8.

<sup>38</sup> AASHTO Comments at 3, 6; NTSB Comments at 2; DSRC Coalition Comments at 4.

<sup>39</sup> US House Committee Comments at 2.

<sup>40</sup> *See, e.g.*, GM Comments at 7; Ford Comments at 7; DSRC Coalition at 8 (“The full 75 megahertz currently allocated in the 5.9 GHz band is needed to take advantage of current, near-future, and long-term automobile safety technologies necessary to minimize loss of life and property and to propel U.S. leadership in AVs.”).

<sup>41</sup> The greatest uncertainty associated with the Commission’s path toward testing ITS sharing with unlicensed usage stemmed from the re-channelization proposal. The detect-and-vacate sharing mechanism provides the necessary certainty to the transportation industry about which channels will be available for ITS use. A rigorously validated detect-and-vacate technology assures automotive companies and transportation owner-operators that their investment in ITS

regulatory certainty that [the automotive] industry has been seeking.”<sup>42</sup> Regulatory certainty provides economic value only if the new state of certainty is, in fact, more valuable. Here, the *Notice* proposes to replace the uncertainty associated with potential sharing of the 5.9 GHz band with the certainty of a proposed band plan that provides “no evolution path for LTE V2X.”<sup>43</sup> We fail to see the net value in that proposal. Instead, we continue to believe, and agree with Toyota, GM, Volvo, the Alliance for Automotive Innovation, ITS America, the DSRC Coalition, and many other commenters, that the Commission would maximize the value of the 5.9 GHz band by resuming the three-phase shared use test plan.<sup>44</sup> This action offers the potential to preserve V2X benefits and add the benefits of unlicensed use sought by the Commission and unlicensed advocates.

**C. Reallocating the Lower Portion of the 5.9 GHz Band to Unlicensed Use Will Create Interference for ITS in the Upper Part of the Band.**

Numerous commenters explain that if the lower 45 MHz of the 5.9 GHz band is allocated to unlicensed use, Wi-Fi intrusion into the remaining 30 MHz will render it unusable for V2X. The NTSB Chairman, citing the USDOT testing, explains the potential for interference from this unlicensed use into the middle 10 MHz of the 5.9 GHz band:

The tests documented interference at up to 500 meters (1,640 feet) from a Wi-Fi antenna, with a typical interference distance within 200 to 300 meters (656 to 984 feet). While the extent of the interference varied depending on the spectral occupancy of the Wi-Fi device (the closer it was to the FCC-proposed 10-MHz band for DSCR-communication, the greater the interference), the results showed

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deployments will be protected. That certainty holds so long as the Commission commits to (a) completing a rigorous testing process in conjunction with USDOT and NTIA and (b) regardless of the outcome of the testing, protecting the incumbent ITS use from interference.

<sup>42</sup> Toyota Comments at 15.

<sup>43</sup> *Id.* at 25.

<sup>44</sup> See Toyota Comments at 4; Automotive Alliance Comments at 42-45; GM Comments at 12; Comments of Volvo Group North America, ET Docket No. 19-138, at 7 (filed March 9, 2020); ITS America Comments at 3, 10; DSRC Coalition at 20.

that even at the most distant range, unfiltered signals from Wi-Fi devices reduced the integrity of safety-critical DSRC communication.<sup>45</sup>

The USDOT likewise reminds the Commission of the potential for this new interference source and the testing supporting that conclusion.<sup>46</sup> The USDOT also observes that “[t]his potential interference would be compounded if Wi-Fi devices were also permitted to operate directly above the spectrum allocated to V2X[,]”<sup>47</sup> which the Commission approved last week by allocating 1200 MHz of 6 GHz spectrum to unlicensed use. “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>48</sup> State and local transportation agencies likewise seek protection from this interference.<sup>49</sup>

Non-governmental commenters are equally concerned about the viability of ITS if the Commission adopts the proposals in the *Notice*. 5GAA explains:

Unlicensed operations in the proposed U-NII-4 band present an even more serious risk to C-V2X Direct operations. This is because wideband operations enabled by combining the 5.725-5.850 GHz (“U-NII-3”) band and the new U-NII-4 band will have a much longer signal rolloff into adjacent bands than currently is the case from operations in the narrower U-NII-3 band. Unfortunately, the *NPRM*’s proposed rules for unlicensed operations in the U-NII-4 band do not take this risk of increased interference into account. If adopted as proposed, these rules would jeopardize the integrity of critical C-V2X Direct safety applications, and likely would render the upper 30 MHz of 5.9 GHz band useless for C-V2X Direct safety communications.<sup>50</sup>

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<sup>45</sup> NTSB Comments at 4.

<sup>46</sup> USDOT Comments at 49-51.

<sup>47</sup> *Id.* at 2.

<sup>48</sup> *Id.*

<sup>49</sup> *See, e.g.*, Comments of the Central Ohio Transit Authority, ET Docket No. 19-138, at 8-9 (filed March 9, 2020); Comments of the Wyoming Dept. of Transportation, ET Docket No. 19-138, at 4 (filed March 3, 2020); Utah DOT Comments at 4; Comments of Washington State Dept. of Transportation, ET Docket No. 19-138, at 3 (filed March 6, 2020).

<sup>50</sup> Comments of the 5G Automotive Ass’n, ET Docket No. 19-138, at 40 (filed March 9, 2020) (“5GAA Comments”).

The Alliance for Automotive Innovation observes that “[s]uccessful functioning of V2X requires the Basic Safety Message to be transmitted 10 times per second” and that this “constant communication between and among vehicles and infrastructure” must occur absent harmful interference.<sup>51</sup> Toyota expresses concern that “the presence of harmful interference will quite possibly make most or all of the 30 MHz of spectrum unusable for safety critical crash avoidance applications.”<sup>52</sup> Others consider interference to be a certainty.<sup>53</sup> GM believes that “the lack of basic protections from harmful interference means that this 30 [MHz] would be unusable for safety applications.”<sup>54</sup> Ford even conducted its own testing, concluding that “[o]perating Wi-Fi in channels adjacent to the ITS band (U-NII-4) produces out-of-band emissions that render the ITS channels unusable for safety applications.”<sup>55</sup> All these commenters create an abundant record demonstrating interference concerns that are sufficient for the Commission to reverse course and not reallocate the lower 45 MHz of the 5.9 GHz band to unlicensed use.

**D. Commercial Wireless Networks Will Complement, Not Replace, V2X Applications over the 5.9 GHz Band.**

NCTA opposes exclusive spectrum for ITS in the 5.9 GHz band, arguing that “other licensed spectrum [is] already being considered for this purpose”<sup>56</sup> and quoting part of an article for the overall proposition that “AT&T, for example, ‘expects to use existing cellular bands for infrastructure-based 5G automotive services that require ultra-reliable, low-latency

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<sup>51</sup> Automotive Alliance Comments at 24-29.

<sup>52</sup> Toyota Comments at 17.

<sup>53</sup> Automotive Alliance Comments at 25.

<sup>54</sup> GM Comments at 2.

<sup>55</sup> Ford Comments at 9.

<sup>56</sup> NCTA Comments at 20.

communication (URLLC).”<sup>57</sup> NCTA’s argument is misleading because it confuses the role of cellular networks using licensed spectrum and relies on an incomplete quote of AT&T’s position.

The full quote pertaining to AT&T’s position on the use of licensed spectrum reads as follows:

*While leaving 5.9GHz to support V2X applications that don't run on its own network, AT&T expects to use existing cellular bands for infrastructure-based 5G automotive service that require ultra-reliable, low-latency communication (URLLC), said Cameron Coursey, Vice President and CTO of IoT at AT&T.*<sup>58</sup>

Mr. Coursey’s explicit reservation of 5.9 GHz spectrum for V2X applications clearly distinguishes the V2V/V2I/V2P uses of that band from V2N services delivered by MNOs using other licensed spectrum, even those V2N services requiring URLLC. It also reiterates an important point that AT&T has consistently articulated for years to NHTSA,<sup>59</sup> to the USDOT,<sup>60</sup> and now to this Commission<sup>61</sup>—MNO delivered V2N services (including prospective 5G URLLC communications) are a complement to, not a replacement for, short-range, direct V2V/V2I/V2P applications relying on the whole 75 MHz in the 5.9 GHz band. 5GAA’s comments likewise caution against conflating these concepts.<sup>62</sup> NCTA and other reallocation proponents conveniently gloss over this important point.

AT&T agrees with the USDOT that “[t]he current allocation of the 5.9 GHz band is ideally

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<sup>57</sup> *Id.*

<sup>58</sup> Stephen Lawson, *Light Reading*, “For self-driving cars, exotic 5G tech will run on familiar frequencies” (Nov. 28, 2019) (emphasis added), available at <https://www.lightreading.com/iot/for-self-driving-cars-exotic-5g-tech-will-run-on-familiar-frequencies/d/d-id/755997> (last accessed April 27, 2020). Cameron Coursey also represents AT&T on 5GAA’s Board of Directors.

<sup>59</sup> Comments of AT&T Services, Inc. to National Highway Traffic Safety Administration, Docket No. NHTSA-2016-0126, at 4-5 (filed April 12, 2017).

<sup>60</sup> Comments of AT&T Services, Inc. to U.S. Dept. of Transportation, Docket No. DOT-OST-2018-0210, at 4, 8, 16 (filed Feb. 25, 2019).

<sup>61</sup> AT&T Comments at 12-15.

<sup>62</sup> 5GAA Comments at 31-33.

suitable for V2X.”<sup>63</sup> The USDOT emphasizes the Commission’s efforts since 1999 and the resulting carefully crafted technical rules for the band:

[T]wo separate channels are designed—one for crash avoidance V2X (CH. 172) and one for public safety V2X (CH. 184). The crash-avoidance channel is protected from spectrum interference from unlicensed Wi-Fi devices operating below the 5.9 GHz by a protective 5 MHz reserve band that absorbs the energy from those unlicensed devices. The public safety channel is higher-powered for those times when public safety and emergency response must silence or suppress nearby communications in order to provide priority. The remaining channels are for safety, system efficiency, and mobility applications that can tolerate a small amount of interference or that can wait a few hundred milliseconds to transmit. In order to use and reuse the available spectrum, a control channel helps applications navigate to open spectrum.

These channel allocations have been used to support a basic set of V2X messages that underpin a wide range of public benefit applications and use the entirety of the existing 75 MHz in real-world use . . . .<sup>64</sup>

The USDOT also emphasizes the importance of continuing an allocation in the 5.9 GHz band that is aligned with the country’s major trading partners.<sup>65</sup> And, the Alliance for Automotive Innovation explains that reallocation outside of the 5.9 GHz band is not feasible for V2X given the propagation characteristics of the band, international harmonization, and the hundreds of existing or planned deployments already utilizing the spectrum.<sup>66</sup> In light of the many years of effort that has been expended carefully crafting the regulations and the ecosystem to enable the provision of ITS in the 5.9 GHz band, changing course to rely on other spectrum bands, like cellular networks operating on commercial licensed spectrum, would delay the benefits of safer driving in America.<sup>67</sup>

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<sup>63</sup> USDOT Comments at 14.

<sup>64</sup> *Id.* at 15.

<sup>65</sup> *Id.* at 33-34.

<sup>66</sup> Automotive Alliance Comments at 29-30.

<sup>67</sup> 5GAA Comments at 33.

**E. OTI/PK’s Proposal to Prohibit Commercial Use of the 5.9 GHz Band Without Cybersecurity and Privacy Protections Is Beyond the Scope of This Proceeding.**

New America’s Open Technology Institute (“OTI”) and Public Knowledge (“PK”) jointly urge the Commission to restrict the use of ITS licenses “to non-commercial, safety-related services,”<sup>68</sup> asserting that “[t]he only discernible rationale for more than 30 [MHz] is that additional channels can be used to offer in-vehicle advertising, video entertainment, and other high-bandwidth and for-profit services . . . .”<sup>69</sup> This assertion is completely debunked by the record, which clearly illustrates the need for the whole 75 MHz to permit not only the safety-related V2X applications originally envisioned for the band at the time of allocation but also the nascent uses supporting the safe deployment of automated vehicles. It is also shown to be demonstrably false through accelerating incorporation of commercial V2N services into vehicles across nearly all automotive manufacturers. Nevertheless, AT&T has no objection to clarifying that the 75 MHz in the 5.9 GHz band allocation for ITS should exclusively support transportation safety and safety-enhancing<sup>70</sup> applications and not commercial transactions.

OTI and PK also jointly propose that the Commission condition ITS use of the 5.9 GHz band on other privacy and cybersecurity requirements.<sup>71</sup> These issues are beyond the appropriate scope of this spectrum proceeding. Automotive cybersecurity risks must be addressed holistically

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<sup>68</sup> Comments of New America’s Open Technology Institute and Public Knowledge, ET Docket No. 19-138, at 29 (filed March 9, 2020) (“OPI/PK Comments”).

<sup>69</sup> *Id.* at 28.

<sup>70</sup> There are many V2V and V2I applications that, as the Commission noted in its *Notice*, enhance transportation system efficiency rather than vehicle safety *per se*. See *Notice*, 34 FCC Rcd at 12627. Such applications are not commercial—though they may have economic benefits to society—and indirectly improve road safety by reducing traffic congestion, which can be a key contributor to crashes.

<sup>71</sup> OPI/PK Comments at 30.

from an engineering perspective, as they significantly involve the design of the ‘up-the-stack’ layers of the V2X ecosystem and the vehicle architecture. Potential security concerns with short-range, direct V2V/V2I communications cannot be disentangled from the broader V2X and automotive cybersecurity issues. And from a regulatory perspective, automotive cybersecurity clearly impacts automotive safety and thus, at those touchpoints, clearly falls under the jurisdiction of National Highway Transportation Safety Administration and not the Commission.

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Respectfully submitted,



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