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 THE
INTELLIGENT TRANSPORTATION SOCIETY OF AMERICA

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SUMMARY

The Intelligent Transportation Society of America (“ITS America”) hereby respectfully submits its Reply to Comments regarding the Notice of Proposed Rulemaking issued by the Federal Communications Commission (“FCC” or “Commission”) in ET Docket No. 19-138, as captioned above. As evidenced by the Comments, an immense coalition of public and private sector transportation safety experts opposes the Commission’s proposed reallocation of 45 MHz from the ITS spectrum in the 5.9 GHz Band to unlicensed uses, speaking forcefully to the threat that this action poses to the safety of their communities. Numerous transportation stakeholders representing national transportation-industry associations, State DOTs, county DOTs, local governments, transit agencies, automobile OEMs, trucking companies and organizations, and various first responder, safety, and vulnerable road user associations uniformly expressed their opposition to band reallocation. Among other matters, these Commenters demonstrate that band reallocation would damage already deployed safety operations in many States and municipalities and would deter both the deployment and development of many promising new life saving technologies, including those associated with autonomous vehicles.

The Comments definitively put to rest the inaccurate and tired narrative that has been advanced by commercial interests seeking to gain access to free spectrum, that the 5.9 GHz Band has lain fallow, unused, and disregarded for twenty years. ITS America and many other Commenters established beyond doubt in the record that the 5.9 GHz Band has spurred the investment of billions in public and private sector funds and that many public and private sector experts in transportation safety have dedicated their careers to developing and deploying new life saving technologies in the Band, leading to operational systems throughout the country. The Alliance for Automotive Innovation’s landmark announcement that the automotive industry has committed to deploy, within five years, a total of at least five million radios on vehicles and
roadway infrastructure in the 5.9 GHz Band will accelerate the ubiquity of V2X technology in the 5.9 GHz Band that has been planned and is needed.

The Comments also show that the value of the 45 MHz band segment for unlicensed devices is negligible in comparison to the massive amount of spectrum newly available for unlicensed use above the 5.9 GHz Band. This new spectrum capacity should enable unlicensed devices to provide all the services they had described as hoped for in the 5.9 GHz Band. AT&T, a significant provider of Wi-Fi services, argued in opposition to the Commission’s proposed reallocation by noting that the 45 MHz of spectrum would add only a small fraction of bandwidth for unlicensed use while crippling the development of vehicle-safety communications systems.

Many Commenters raised concerns about the introduction of harmful interference into ITS spectrum upon the adoption of the NPRM’s band plan. Preliminary technical assessments related to the FCC’s proposal show 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. The record also reflects significant opposition to the NPRM’s reliance on flawed economic analysis to justify splitting the 5.9 GHz Band. Analysis in the record indicates that vehicle crashes in our transportation system translate into an annual economic harm to the Nation of approximately $300 billion in direct costs and over $800 billion when accounting for loss of life, injuries, and other quality-of-life factors. Comments noted that Vehicle-to-Vehicle and Vehicle-to-Infrastructure safety applications can mitigate the severity of up to 80 percent of non-impaired crashes.
The FCC does not have a record that satisfies the fundamental requirement of Section 1 of the Communications Act. In its Comments, ITS America urged the FCC to withdraw its proposal to reallocate the lower 45 MHz of the 5.9 GHz Band as inconsistent with the requirements of Section 1 of the Communications Act. ITS America noted the strenuous opposition to the Commission’s proposal from transportation safety advocates throughout the nation, including USDOT. The Commission may not simply dismiss the concerns by our Nation’s transportation safety experts (many of whom are public servants or otherwise involved in the noncommercial pursuit of improving safety and saving lives) as “not too surpris[ing].” That approach, based upon an erroneous reading of the record of the efforts by the transportation community to develop and deploy a safer transportation network, simply will not serve the public interest and does not meet the mandates of the Communications Act.

USDOT in its comments suggested that the Commission and USDOT collaborate and conduct a negotiated rulemaking to address jointly the issues of transportation safety and spectrum policy presented by the 5.9 GHz Band. The negotiated rulemaking process was designed to address exactly the circumstances encountered here. To the extent that the FCC continues proceedings regarding the 5.9 GHz Band, ITS America urges the Commission to accept USDOT’s invitation to a negotiated rulemaking.

ITS America agrees with the majority of Commenters that should the FCC continue to pursue its proposal, it must protect incumbent licensees consistent with its statutory obligations and with the past thirty years of FCC precedent. An abrupt 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 FCC’s enabling statute itself requires that the Commission protect the safety of life and property. Since all incumbent licensees are
invested in enhancing traffic safety this statute requires that the FCC do more to protect them than simple abandonment. The Commission owes an even greater obligation to those licensees it has itself licensed as public safety. In this respect, ITS America is doubtful that the Commission even has the legal authority necessary to require an unfunded relocation of public safety licensees under Section 1 of the Act.

By Public Notice, the FCC announced a freeze on accepting and processing applications for new or expanded facilities in the 5.9 GHz Band except for such facilities as are limited to operation on a single channel. This freeze has been applied retroactively to applications that were pending for as much as three months prior to the date of the Public Notice. The application freeze has stalled the processing of almost 500 applications proposing to add new facilities to improve transportation safety at facilities throughout the nation. The retroactive freeze has frustrated the efforts of public safety licensees to enhance transportation safety. Even should such authority to impose a retroactive licensing freeze exist, in this case application to public safety licensees appears once again to run afoul of the fundamental requirements of Section 1 of the Communications Act.

For these reasons, ITS America urges the Commission to withdraw its proposal to reallocate 45 MHz of the 5.9 GHz Band and otherwise to support the continued testing of band sharing between V2X and U-NII devices.
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To: The Commission

REPLY COMMENTS OF THE
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The Intelligent Transportation Society of America ("ITS America") hereby respectfully submits its Reply to Comments regarding the Notice of Proposed Rulemaking issued by the Federal Communications Commission ("FCC" or "Commission") in ET Docket No. 19-138, as captioned above.¹

I. Introduction

The Comments in this proceeding do not provide an adequate legal, policy, economic or technical basis for the FCC to adopt the proposed band reallocation. Over 200 parties submitted comments in response to the NPRM. The vast majority of these Commenters, including ITS America, urged that the FCC withdraw its proposal to reallocate 45 MHz (5850-5895 MHz) of the 5850-5925 MHz band ("5.9 GHz Band") for use by unlicensed devices. The Comments reflected a consensus of the nation’s transportation safety experts and many serious concerns that the FCC proposal will harm transportation safety and otherwise disregards the vast positive economic and environmental benefits of V2X technologies.² These Commenters collectively noted that the proposed reallocation of spectrum would impair the ability of already deployed...

² Additionally, more than 80 Commenters from amateur radio operators and their associations opposed the NPRM.
and emerging Vehicle-to-Everything (“V2X”) technologies in the band to improve the safety of motor vehicles, bicyclists, public transportation and pedestrians, among others and would strand billions in investment of both public and private funds. These comments were also largely technologically neutral, understanding that regardless of the type of technology used for V2X applications – either Dedicated Short Range Communication (“DSRC”) or Cellular Vehicle-to-Everything (“C-V2X”) – needs the full 75 MHz of spectrum to fully utilize current and future transportation safety applications.

The handful of Commenters that supported the Commission’s proposal consist largely of commercial entities that would directly benefit from gaining access to the reallocated band. None of these Commenters, however, addressed the trade-off costs in lives lost, injuries incurred, and collisions not prevented due to the loss of this spectrum for transportation safety.

II. Commenters Opposed to Band Reallocation Include Stakeholders Across the Transportation Industry

The Commission’s proposal to reallocate the lower 45 MHz band segment for use by unlicensed devices has been vigorously opposed by the majority of Commenters as harming the safety of the nation’s transportation network and as contrary to the public interest. Numerous transportation stakeholders representing national transportation-industry associations, State DOTs, county DOTs, local governments, transit agencies, automobile OEMs, trucking companies and organizations, and various first responder, safety, and vulnerable road user associations uniformly expressed opposition to band reallocation. Commenting national transportation-industry associations, including: AAA, AASHTO, AMPO, APTA, APWA, ARTBA, ASCE, IBTTA, ITE, ITS America, NACTO, NTSB, SAE, and NSC, opposed the band reallocation. Every state DOT has opposed the FCC’s proposal, and twenty state DOTs
submitted comments opposing the band reallocation, including: Arkansas, California, Colorado, Connecticut, Georgia, Idaho, Kentucky, Maryland, Michigan, Minnesota, Montana, North Dakota, Oregon, Pennsylvania, South Dakota, Tennessee, Texas, Utah, Washington, and Wyoming. A number of other county and local public entities also submitted comments opposing the proposal, including: Gwinnett (GA), Macomb (MI), Maricopa (AZ), Orange (CA), and St. Louis (MO), the North Central Texas Council of Governments, and the San Diego Association of Governments; the cities of Arlington (TX), Columbus (OH), Eugene (OR), Fremont (CA), Frisco (TX), Medford (OR), and New York (NY); and the Tampa Hillsborough Expressway Authority, Contra Costa Transportation Authority, and Central Ohio Transit Authority.

First responder, safety, and other organizations likewise oppose the NPRM: the National Sheriffs’ Association, International Association of Fire Fighters, National School Transportation Association, the League of American Bicyclists, various additional bicycling and walking advocacy organizations, Securing America’s Future Energy, OmniAir, and the Vision Zero Network. Automotive and trucking organizations also universally oppose the reallocation of the lower band segment: the Alliance for Automotive Innovation, Automotive Safety Council, Motor & Equipment Manufacturers Association, DSRC Auto Safety Coalition, and 5G Automotive Association; individual automakers BMW, Fiat Chrysler, Ford, General Motors, Honda, Hyundai, Jaguar/Land Rover, Nissan, Toyota, Volkswagen, and Volvo; and trucking organizations the American Trucking Associations, the Truck and Engine Manufacturers Association, Volvo Group, UPS, and the Commercial Vehicle Safety Alliance.
A. Commenters Establish that the FCC’s Proposed Band Reallocation Will Compromise Traffic Safety

Representatives of an immense coalition of users of our national transportation system have been unanimous in their strong opposition to this NPRM, speaking forcefully to the threat that this action poses to the safety of their communities. Public and private sector Commenters alike in opposition to the Commission’s proposed band reallocation present a compelling case for why adopting such a proposal would dramatically undermine our national transportation safety framework. Among other matters, the Commenters demonstrate that band reallocation would damage already deployed safety operations in many States and municipalities and would deter both the deployment and development of many promising new life saving technologies, including those associated with autonomous vehicles. Commenters referenced remarks made by Diana Furchtgott-Roth, the Deputy Assistant Secretary for Research and Technology at U.S. Department of Transportation (“USDOT”), who observed that “[t]he Federal Aviation Administration would never allow unlicensed devices to operate in FAA bands for radar and communications that protect the safety of hundreds of thousands of air travelers at any time…” And, “The safety of hundreds of millions of automobile passengers would be no less important. The integrity of the safety band should be preserved.”

In its Comments, ITS America pointed to USDOT research which found that removing 45 MHz from the existing 75 MHz allocated to transportation safety would result in the “[l]oss of life-saving vehicle safety applications – crash avoidance, vehicle-to-pedestrian applications (at a time when bicycle and pedestrian fatalities are increasing), coordinated intersection movement, and others,” and the “[l]oss of broad and significant safety and mobility benefits including

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3 Remarks by Deputy Assistant Secretary Diana Furchtgott-Roth, Transportation Research Board Annual Meeting, Washington, DC (Jan. 13, 2020).
system efficiency through vehicle-to-infrastructure communications, road weather notices, transit and freight logistics, and public safety applications.” The Institute of Transportation Engineers stated that reallocation of “this safety spectrum at a time when an average of 100 people per day are dying on our nation’s roadways in motor vehicle crashes and CAV technology is just emerging in the marketplace is shortsighted.”

The National Association of City Transportation Officials commented that “[c]onnected vehicle technologies offer the U.S. a powerful set of tools to save lives, but this potential can only be realized if these technologies are given the certainty of the 5.9 GHZ Safety Spectrum.” The American Public Transportation Association argued that “[t]his spectrum is essential for the current and future deployment of safety critical communications systems in all types of vehicles, including those serving the needs of public transportation.”

The City of New York noted that “improved vehicle design and technologies are needed to help the City reduce road traffic deaths to zero. Connected vehicles need to be part of that strategy and any delays caused by the NPRM’s proposed 5.9 GHz reallocation, the FCC’s application freeze, and the uncertainties involved in deployment of unproven technologies, threaten to undermine traffic safety at a time when it is desperately needed.”

AT&T, itself a “significant user and provider of Wi-Fi services over unlicensed spectrum,” opposes this spectrum reallocation, arguing that “[t]he Commission has allocated substantial swaths of spectrum for unlicensed use over the last few years… The 45 MHz of spectrum from the 5.9 GHz band would add only a small fraction of bandwidth to this vast inventory of spectrum dedicated to unlicensed use, with a commensurate incremental public

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benefit. But, the allocation away from ITS would cripple development of the vehicle safety communications ecosystem and the delivery of automotive safety benefits to the American public. Enhancing AT&T’s argument, at its meeting on April 23, 2020, the FCC adopted a Report and Order making an additional 1200 MHz available for unlicensed use between 5925-7100 MHz.

B. Commenters Establish that the Commission’s Proposal Will Harm First Responders and Vulnerable Roadway Users

Beyond the NPRM’s general threat to the national transportation safety network, a broad coalition of Commenters demonstrated how the proceeding is poised to undermine a valuable safety tool for groups who need it most: vulnerable road users and emergency responders. The nation’s first responders have definitively come out in opposition to band reallocation. The National Sheriffs’ Association argued in favor of “keeping the 5.9 GHz band dedicated for public safety,” arguing that “[w]ith the existing system of a completely dedicated band, there will be significant enhancements in road safety to decrease vehicle collisions, vehicle-pedestrian crashes, and save lives – lives of our citizens and lives of first responders.” The International Association of Fire Fighters commented that their association “strongly believes allowing unlicensed uses on the designated 5.9 GHz frequency safety band will compromise the safety of emergency responders.”

As the League of American Bicyclists argued in their comment, “[b]icyclist and pedestrian fatalities are on the rise, both in real numbers and as a percentage of overall fatalities.

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10 Comments of the National Sheriffs’ Association, ET Docket No. 19-138 (filed Mar. 9, 2020).
Currently one in every five roadway fatalities are a bicyclist or pedestrian.”¹² These groups “are twenty percent of fatalities even though we make up twelve percent of transportation trips.”¹³ They maintain that “[v]ehicle-to-everything (V2X) technology can be an incredible tool as part of a safe systems approach,” enabling a system that is “designed to anticipate and accommodate errors by drivers and other road users” and “designed to reduce or eliminate opportunities for crashes resulting in forces beyond human endurance.”¹⁴ Transportation For America offered a similar assessment, commenting that “V2X technology has the potential to dramatically improve safety for these vulnerable road users, and all road users. Limiting the spectrum available to this technology, at this crucial stage in the development of the technology will put these communities at risk unnecessarily and sends a signal that safety is not a priority.”¹⁵

The American Traffic Safety Services Association argued that the “Commission risks putting American motorists’, passengers’, pedestrians’, bicyclists’, motorcyclists’, and road construction workers’ lives at risk.”¹⁶ The National School Transportation Association spoke to the increasing prevalence of school buses employing systems which “depend on the 75 MHz available to receive uninterrupted crash avoidance signals,” and that “[d]elays in a school bus receiving a crash-avoidance message due to signal interference can mean the difference between a catastrophic crash, and a narrow miss.”¹⁷

¹³ Id.
¹⁴ Id.
C. Commenters Establish that the FCC’s Proposed Band Plan is Unworkable

Many Commenters raised concerns about the introduction of harmful interference into ITS spectrum upon the adoption of the NPRM band plan. For example, USDOT’s comment stated that V2X benefits “depend on the continued availability of the full 75 MHz and the assurance that V2X communications can reliably occur without harmful interference.” USDOT defines interference to cooperative communications in three ways:

- Transmission of the V2X message is suppressed – the device senses that the spectrum is in use and it cannot broadcast a message.
- The V2X message is corrupted upon reception – two or more messages arrive at the receiver, overlapping and causing errors in demodulation and packets.
- The receiving devices cannot “hear” the incoming messages and/or the safety-critical messages are not prioritized over the less-critical messages.

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. Commenters pointed to the coupling of this significant hazard of harmful interference with the already severe reduction in spectrum available to ITS technologies as a serious threat to many of the life-saving vehicle safety applications V2X enables. Toyota commented that “the presence of harmful interference will quite possibly make most or all of the 30 MHz of spectrum unusable for safety

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critical crash avoidance applications” and “puts the public at risk.”\textsuperscript{20} and testing completed by Ford indicated that “[i]nterference was shown to cause unacceptable outage of critical basic safety message communications preventing the C-V2X system from performing as intended.”\textsuperscript{21}

General Motors’ comment provided that the “plan would render the band, in effect, unusable for either DSRC or C-V2X communication protocols. As a result, several potential lifesaving V2X applications will be lost. This allocation is plainly inadequate.”\textsuperscript{22} Additionally, they contended that “[s]lashing 60 percent of the 75 megahertz 5.9 GHz band and therefore limiting ITS technologies to only 30 megahertz will strand already-deployed V2X units and users, foreclose advanced safety features of the future, and compromise the technology’s lifesaving potential. In effect, this proposal, which will only marginally benefit commercial, non-safety unlicensed uses, will likely end V2X.”\textsuperscript{23}

D. Commenters Establish that the FCC’s Proposed Band Reallocation is Based on a Flawed Economic Analysis

The record reflects significant opposition to the NPRM’s reliance on flawed economic analysis to justify splitting the 5.9 GHz Band. As USDOT noted, a “good portion of the rationale for this decision appears to … come from the FCC’s reliance on a RAND study that both overstates the economic benefits [of] reallocation and does not address in any way the transportation public safety costs and benefits, and thus offers a precarious analysis that this draft NPRM treats as given.”\textsuperscript{24} General Motors wrote that “[t]he NPRM’s proposed reallocation relies almost entirely on the increased consumer demand for unlicensed uses, inexplicably ignoring the

\textsuperscript{20} Comments of Toyota Motor Corporation, ET Docket No. 19-138, at 17 (filed Mar. 9, 2020).
\textsuperscript{22} Comments of General Motors LLC, ET Docket No. 19-138, at 2 (filed Mar. 9, 2020).
\textsuperscript{23} Id. at 1.
parallel imperative to prevent crashes and save lives on our roadways.”25 Panasonic noted that “[a]ny economic or social benefits from increased video streaming capacity pale in comparison to what V2X can do to make American roadways safer and more economically efficient.”26

USDOT’s analysis indicates that vehicle crashes in our transportation system translate into an annual economic harm to the Nation of approximately $300 billion in direct costs and over $800 billion when accounting for the loss of life, injuries, and other quality-of-life factors. As a large number of Commenters indicated, the National Highway Traffic Safety Administration estimates that safety applications enabled by V2V and V2I could eliminate or mitigate the severity of up to 80 percent of non-impaired crashes.27 Such a reduction in crashes could expect to reduce significantly this annual national cost of fatalities, injuries, and economic loss. As ITS America commented, “USDOT estimates that the FCC proposal may reasonably be expected to defer accident reduction for another five years, given the time required to develop, standardize, and deploy equipment. The costs of the deaths and injuries that could have otherwise been prevented will total billions of dollars annually.”28

The economic savings that accompany a decrease in traffic crashes can be further quantified by viewing data gathering during stay-at-home orders in the current COVID-19 pandemic. The Road Ecology Center at UC Davis demonstrated that the number of “collisions and especially injury and fatality collisions have been reduced by half” in California following

the state’s adoption of a stay-at-home order.\textsuperscript{29} They found that this 50 percent reduction in crashes within California over the 22-day period after the order’s adoption resulted in $1 billion in savings to the public compared to costs associated with crashes at the rate experienced in the 22 days prior to the stay-at-home order.\textsuperscript{30}

There are a number of key takeaways here that are relevant to the analysis of economic tradeoffs that the FCC must consider. First, this $1 billion in mitigated economic loss was in just one state over the course of only a 22-day period. Such savings to the public would be significantly increased if extrapolated nationally and over the course of a year. If this 22-day period was extended to an entire year, the resulting savings would total more than $16 billion in California alone. Additionally, while these savings were experienced after a decrease in collisions of 50 percent, NHTSA has estimated that V2X technologies can mitigate up to 80 percent of collisions,\textsuperscript{31} further magnifying the economic benefits quantified in the UC Davis study.

Any reduction afforded to traffic congestion experienced by road users is an economic multiplier for the creation of gross domestic product, but the case for V2X’s impact on improving our national freight system is especially compelling. USDOT finds that while “trucks account for only six percent of the miles traveled in urban areas, they account for 26 percent of the total cost of congestion as measured in delay and wasted fuel. These annual costs top $23 billion. Further, accidents in the trucking industry result in $19 [billion] in damage, lost goods,

\begin{itemize}
\item \textsuperscript{29} Special Report (Update): Impact of COVID19 Mitigation on Numbers and Costs of California Traffic Crashes, Road Ecology Center at UC Davis (April 15, 2020). Available at: https://roadecology.ucdavis.edu/files/content/projects/COVID_CHIPs_Impacts_updated_415.pdf.
\item \textsuperscript{30} Id.
\item \textsuperscript{31} Proposed rule would mandate vehicle-to-vehicle (V2V) communication on light vehicles, allowing cars to ‘talk’ to each other to avoid crashes, NHTSA (Dec. 2016).
\end{itemize}
lost driver time, and accidents resulting in approximately 5000 deaths each year.\textsuperscript{32} The American Association of State Highway and Transportation Officials (AASHTO) estimates that V2X can do much towards improving “the $10 trillion value of goods shipped by truck each and every year.”\textsuperscript{33} Through accident reduction, platooning, and fuel efficiency, this multi-trillion dollar market will be amplified. This is one reason why the American Trucking Association has spoken out forcefully in opposition to this NPRM.\textsuperscript{34}

Supporters of band reallocation have recently published a second economic analysis, this time from WifiForward.\textsuperscript{35} This study does not mention transportation safety once, or offer any analysis of the tradeoffs between additional spectrum for unlicensed devices and the costs of taking spectrum away from transportation safety. Additionally, the basis of the analysis’ economic argument is the claim that opening up the lower 45 MHz of the 5.9 GHz Band for unlicensed device use “will generate a contribution of $23.042 billion to the US GDP as a result of faster Wi-Fi download speed between 2020 and 2025,”\textsuperscript{36} and that “faster Wi-Fi speed enabled by the 45 MHz channel in 5.9 GHz will yield $5.098 billion in consumer surplus between 2020 and 2025.”\textsuperscript{37} They also claim that opening up the 6 GHz band for unlicensed devices will yield “a total economic value of $83.06 billion in GDP contribution, $67.78 billion in producer surplus and $2.92 billion in consumer surplus between 2020 and 2025.”\textsuperscript{38} This analysis acknowledges the tremendous spectrum windfall that unlicensed device companies will experience due to the

\textsuperscript{34} Comments of the American Trucking Association, ET Docket No. 19-138 (filed Mar. 9, 2020).
\textsuperscript{36} Id., at 4.
\textsuperscript{37} Id.
\textsuperscript{38} Id., at 5.
FCC’s 6 GHz proceeding, and correctly notes that the benefit they expect to garner from the 5.9 GHz reallocation is minor in comparison. The marginal benefit expected by unlicensed device proponents in this particular 45 MHz of spectrum, $28 billion over five years, is also considerably less than the loss of numerous economic, mobility, and environmental benefits that would accompany retention of the 5.9 GHz Band for transportation communications, which Commenters enumerated in the record of this proceeding.

E. Commenters Establish That Band Reallocation Will Impair the Mobility, Fuel Savings, and Environmental Quality Gains of a More Efficient Transportation Network

Beyond mitigating the direct costs of deaths and injuries, V2X can play a major role in alleviating congestion, which is a massive economic and environmental burden on all users of our national transportation system. USDOT commented that “V2X technology using the 5.9 GHz band can significantly reduce crashes, system inefficiencies, and traffic congestion in ways that are unique from vehicle-based sensors and other technologies, most notably by having significantly greater capability to address non-line-of-sight crashes.”39 USDOT cited research that indicated that “regular traffic congestion costs … over $166 billion annually, which translates into significant personal and business costs, including… [d]elays of up to 54 hours in congestion annually for each commuter (nearly seven full working days in extra traffic delay), which translates to over $1,000 in personal costs.”40

Road users of all type will benefit from the fuel savings experienced due to this decrease in congestion. Securing America’s Future Energy expanded on this benefit in detail in their comment: “Traffic congestion is a significant contributor to U.S. oil consumption. Americans

40 Id. at 8.
waste 3.3 billion gallons of fuel due to congestion every year, and the broader nationwide costs of gridlock amount to $179 billion annually. On a system-wide level, V2I communications can effectively prioritize traffic signal timing, reducing travel time and delays. Field testing has demonstrated that combining multiple signal control applications – ITS Signal Systems, Freight Signal Priority, and Transit Signal Priority – can yield travel time reductions of up to 27 percent and reduce fuel wasted due to congestion.”

“SAFE’s research has found that if widely deployed, the combination of V2X, advanced driver-assistance features, and autonomous vehicle technologies holds the potential to achieve system-wide fuel savings of 18 to 25 percent while saving thousands of lives.” This research is consistent with USDOT research referenced by ITS America in our comment, which indicated that environmental benefits provided by V2X technologies include a 20 percent reduction in vehicle-miles-traveled through Low Emissions Zone applications.

F. Commenters Opposed to the NPRM Have Established Legal Infirmities in the NPRM

In its Comments, ITS America urged the FCC to withdraw its proposal to reallocate the lower 45 MHz of the 5.9 GHz Band as it is inconsistent with the requirements of Section 1 of the Communications Act that the Commission must act in a manner that promotes public safety. ITS America noted the strenuous opposition to the Commission’s proposal from transportation safety advocates throughout the nation, including USDOT.

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42 Id.
As described above, the initial Comments submitted by USDOT and many other experts in transportation safety demonstrate overwhelming opposition to the Commission’s proposal based upon concerns that it will cause irreversible and lasting damage to the deployment of a safer transportation network throughout the U.S. USDOT notes that its preliminary research shows that the possibility for harmful interference from unlicensed use of the 5.9 GHz Band is real and argues that, “if such interference from unlicensed devices does pose a threat to V2X applications, as USDOT’s analysis indicates, that means that the proposal will effectively provide even less spectrum for V2X than the Commission intended.” AASHTO notes the important goal of eliminating fatal vehicle crashes in the United States, and argues for the entire 75 MHz of the 5.9 GHz Band to be preserved for V2X because “without the full 5.9 GHz spectrum available to use for connected vehicle technologies it will be significantly more difficult to eliminate these fatal vehicle crashes.”

The Commission may not simply dismiss these concerns by transportation safety experts (many of whom are public servants or otherwise involved in the noncommercial pursuit of improving safety and saving lives) as “not too surpris[ing].” The Court in NAB v. FCC was very clear that the Commission must accord precedence in circumstances such as this to public safety. A dismissive approach based upon an erroneous reading of the record of the efforts by the transportation community to develop and deploy a safer transportation network simply will not serve the public interest and does not meet the mandates of the Communications Act.

47 Howard Buskirk, O’Rielly, Unsurprised by 5.9 GHz Opposition, Expects FCC to Act Soon, Communications Daily (Mar. 11, 2020).
48 Nat’l Ass’n of Broad. v. FCC, 740 F.2d 1190, 1213 (D.C. Cir. 1984) (“While this mandate does not grant public safety broadcasters an absolute right to a particular spot in the spectrum, we do believe it requires the FCC to give their needs priority over those of commercial broadcasters such as DBS”).
FCC does not have a record in this proceeding that satisfies the fundamental requirement of Section 1 of the Act.

ITS America also observed in its Comments the failure of the Commission’s proposal to satisfy either Section 316 (modification of license) or Section 312 (revocation of license) with respect to its treatment of incumbent 5.9 GHz Band licensees. As ITS America and many other Commenters have observed, the FCC’s proposal would remove 85 percent of the bandwidth now allocated to these incumbents and provide at most a single channel for transmission based upon an untested band plan that USDOT’s preliminary study has shown would receive harmful interference. ITS America concurs with the Alliance for Automotive Innovation that under these circumstances the Commission may not proceed with an effective revocation of license under Section 312 of the Act, “[b]ecause the 5.9 GHz Part 90 and 95 incumbents have satisfied the conditions of their licenses and are not in violation of the FCC’s character and fitness policies, there is no basis to revoke their licenses….”

In its Comments, NCTA observes that “[E]arlier this year, the Commission reasoned that “the primary consideration in determining whether a 316 modification is valid is whether the licensee will be able to provide substantially the same service after the modification as it was able to provide before. In the C-Band proceeding, the Commission concluded under that standard that reclaiming 300 megahertz of spectrum from incumbent satellite operators was not a fundamental change under Section 316. In this regard, the FCC found that even though incumbents had significant operations in the band across the United States, they could continue

their existing services in the remaining 200 megahertz of the C-Band by using technologies like compression. The case for Section 316’s application is significantly stronger here. DSRC as envisioned by the Commission in 1999 has failed to materialize; rather than the “widespread . . . base” the Commission envisioned when endorsing the DSRC standard, DSRC deployments are few and far between, with RSU deployments limited to particular heavily subsidized testing areas and pilots.”

NCTA’s arguments are based upon legal and factual inaccuracies. NCTA’s logic in arguing that one licensee’s rights under Section 316 of the Act are somehow affected by the number of other licensees simply misreads the statute which is very specifically intended to apply to individual licensees. NCTA’s logic reduces to the claim that since there are not “enough” incumbents its acceptable to deprive them of their statutory rights. Of course, as shown throughout the comments in this proceeding, NCTA is likewise mistaken in its tired narrative regarding the deployment of V2X technologies.

NCTA’s reliance upon the MOBILE NOW Act to support the Commission’s proposal is similarly misplaced. Nowhere in that Act is there any direction to the Commission regarding the 5.9 GHz Band. To the contrary, that Act specifically directs, among other things, that “[i]n making … spectrum available, the Department of Commerce and the FCC must consider: (1) the need to preserve critical existing and planned federal government capabilities; (2) the impact on existing state, local, and tribal government capabilities; (3) international implications; (4) appropriate enforcement mechanisms and authorities; and (5) the importance of the deployment of wireless broadband services in rural areas.”

The FCC’s proposal in fact fails the test

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established by the MOBILE NOW Act as the record establishes, among other things, both federal government capabilities and state and local capabilities in providing for a safe transportation network will be substantially harmed.\textsuperscript{54}

The comments show that the NPRM’s proposal does not have the support of transportation safety experts. The FCC is not the expert agency in this area and in order to meet its fundamental obligations to protect public safety under Section 1 of the Act it must accord great weight and precedence to the views of the experts and, in particular, the expert Federal agency, USDOT. The record here simply does not provide an adequate legal basis for the Commission to adopt its proposal. Accordingly, the Commission should withdraw its proposal to reallocate 45 MHz to unlicensed uses.

\textbf{G. A Negotiated Rulemaking Would Be a Positive Step Towards Consensus}

As shown above, the record here does not support further action by the Commission on band reallocation. To the extent that the FCC continues proceedings regarding the 5.9 GHz Band, USDOT in its comments suggested that the Commission and USDOT collaborate and conduct a negotiated rulemaking to address jointly the issues of transportation safety and spectrum policy presented by the Band. In its Comments, USDOT advocated for the two parties to work with “stakeholders from the telecommunications and automotive industries; States and local authorities; transportation safety advocates; other relevant public interest entities; and

interested Federal agencies in a collaborative endeavor to share resources and identify solutions."

USDOT and the transportation community invest in, develop, and deploy life-saving technologies and systems throughout the nation’s transportation network. Their roles and a safe transportation network are critical in many ways to the nation’s best interest, a role that has never been clearer than it is today. For the Commission to adopt a decision that has been strongly and thoroughly opposed as causing irreparable and lasting damage to traffic safety by safety experts in the Federal government, in every state, by the National Safety Council, the National Transportation Safety Board, and AAA, among others is completely irresponsible. Under these circumstances, the Commission’s decision will not have the acceptance of the transportation community and its long-standing partnership with the Commission will be disrupted, trust lost, and investment impaired. This is not an acceptable outcome for any party. ITS America urges that the Commission, should it wish to continue the debate over use of the 5.9 GHz Band, accept USDOT’s invitation to a negotiated rulemaking.

Congress established negotiated rulemakings as a regulatory tool when it passed the Negotiated Rulemaking Act in 1990. Congress intended for negotiated rulemaking to supplement traditional notice and comment rulemaking established by the Administrative Procedure Act, with the goal of preventing litigation by convening interested stakeholders during the rulemaking process to build consensus towards a final rule. The Act requires the convening agency to form a committee of interested stakeholders and the agency may issue any agreement from the committee as a proposed rule.

A negotiated rulemaking regarding the intersecting issues of transportation safety and spectrum policy would help build consensus among interested participants in the docket and will bring needed buy-in from the transportation community that has objected strenuously to the FCC’s approach. If the FCC decides to move forward with a negotiated rulemaking regarding the future of the 5.9 GHz Band, all interested parties would benefit from participating in the rulemaking process and working together to craft a consensus solution through the honest exchange of ideas. The decision to undertake a negotiated rulemaking will lead to increased transportation safety and the effective deployment of spectrum for public use. In addition, the Commission would ensure that its long-standing legacy of partnership with the transportation community to develop and deploy lifesaving technologies would remain undisturbed.

ITS America, therefore, supports USDOT’s proposal of a negotiated rulemaking to address the issues in this Docket, provided that all relevant V2X technologies, including both DSRC and C-V2X technologies, are considered and that the negotiated rulemaking be undertaken and finalized in a reasonable timeframe, such as within nine months of beginning such a rulemaking.

III. The Comments Establish that Harmful Interference Would Occur in the Realigned 5.9 GHz Band

USDOT, Ford and others have submitted evidence that the Commission’s proposed band plan would result in harmful interference to V2X systems operating the reconfigured 5.9 GHz Band and render effective operations on the 30 MHz remaining for ITS difficult, if not impossible. Several Commenters in support of band reallocation have argued for loose and inadequate limits on out of band emissions (OOBE). They also claim that, in any event, those
limits are irrelevant, as OOBE “will not have meaningful impact on DSRC or C-V2X.”\textsuperscript{56} Both of these claims are demonstrably flawed.

The first argument that loose OOBE limits will be sufficient to prevent harmful interference from permeating into the remaining 30 MHz reserved for V2X in this NPRM, as articulated by Comcast, the Wi-Fi Alliance, WISPA, and others, is refuted by empirical evidence provided by numerous parties, particularly by Ford Motor Company and the FCC itself. Both studies find that out of band emissions (“OOBE”) would have to be below a low threshold to avoid interference, and the limits proposed by the previously named supporters of this NPRM do not meet that threshold. Both tests found 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) at the receiver is above -65 dBm, there will be packet loss.\textsuperscript{57} This result is similar to Figure 11 of the FCC Phase 1 test plan report, copied below.\textsuperscript{58} That figure shows that significant packet loss in Channel 180 starts when the interference signal in 5875-5895 at the receiver is above about -60 dBm. It is significant that these independent tests, which even used different V2X technologies, observed a quite similar result. Further testing that supports this conclusion has been provided by CAMP and USDOT.

\textsuperscript{56} Comments of Broadcom, Inc. and Facebook, Inc., ET Docket No. 19-138, at 3 (filed Mar. 9, 2020).
For additional context, below are a series of scenarios that could elaborate on the data presented by Ford, the FCC, and others.

1) In-car Wi-Fi

Assume someone is using Wi-Fi inside the cabin of a car, e.g. kids playing a Wi-Fi enabled game. Giving the benefit of the doubt, assume also these devices use very low power of 10 dBm (10 milliwatts) and there is a 35 dB path loss between the Wi-Fi transmit antenna and the V2X antenna on the roof of the car. That means the Wi-Fi signal at the V2X receiver is 10-35 = -25 dBm. That is 40 dB above the level that Ford found causes interference, and roughly 35 dB above the level that the FCC found causes interference. A 40 dB gap means the interference signal is 10,000 times higher than acceptable. Every time a Wi-Fi packet is transmitted, it will blind the car from all the ITS packets being received.
2) High power Outdoor Wi-Fi hot spot operating at the side of the road.

Assume a cable operator sets up a Wi-Fi hotspot using moderate power (24 dBm) and mounted on a pole next to the street. Further assume the hotspot is about 10 meters from a vehicle, that there is line-of-sight, and that the path loss of the Wi-Fi signal is about 65 dB. That means the Wi-Fi interference at the V2X receiver will be about 24 - 65 = -41 dBm. As with the in-vehicle case, that is 19 to 24 dB above the level that FCC and Ford found causes interference. The Wi-Fi signal would have to be attenuated by something like 84 or 89 dB to get from 24 dBm down to -60 or -65 dBm, and that sort of attenuation requires on the order of a hundred meters. If the hotspot operated instead at the proposed maximum radiated power of 36 dBm EIRP, the interference range around the pole could be even higher.\(^{59}\)

3) Medium power indoor Wi-Fi Access Point

Assume there is a wireless LAN in a building adjacent to the roadway. To give the benefit of the doubt, assume the Wi-Fi transmissions are at 20 dBm (100 milliwatts) and that there exists a wall between the Wi-Fi transmitter and the V2X receiver, adding about 10 dB of path loss. Assume the Wi-Fi device is 20 meters from the V2X receiver, and that the path loss is about 76 dB (66 pure path loss plus 10 dB for the wall). The Wi-Fi interference energy at the V2X receiver can be expected to be about 20 - 76 = -56 dBm. That is closer, but it is still about 4 to 9 dB above the interference level measured by FCC and Ford.

\(^{59}\) A similar scenario results when a Wireless Internet Service Provider (“WISP”) sets up a Point-to-Point (“PtP”) link originating from a tower or rooftop along the roadside right of way to transmit across the roadway. Under UNII-3 regulations there is no EIRP restriction for PtP, and EIRP could be over 50 dBm (100W) limited only by power spectral density and out of band emission restrictions. Assume that the antenna is within 50 meters of the curb lane, there is line of sight and the path loss of the UNII signal is about 79 dB. In this scenario, that means the PtP link interference at the V2X receiver could be greater than 50 – 79 = -29 dBm – similar to the interference produced by an access point at 10 meters from the roadway.
These examples can lead us to conclude that Wi-Fi should clearly not be allowed in cars or outdoors. Indoor-only shared use would require significant limitations, which proponents of this NPRM have uniformly fallen short of proposing.60

While the record establishes the threshold of OOBE limitations that are needed to prevent interference from impacting V2X transmissions, a few Commenters in support of this NPRM have argued that these limits are irrelevant, suggesting that V2X devices can handle interference without major detriment to their ability to function. For example, Broadcom/Facebook ("Broadcom") argued that “the characteristics of ITS and RLAN technologies will allow for coexistence and protect ITS from harmful interference regardless of the OOBE limit imposed,” articulating the following argument: A portable Wi-Fi network [RLAN] would be active on-the-air < 1 percent of the time; a typical ITS device will be active on-the-air < 6 percent of the time; a packet error ratio [PER] of up to 20 percent is acceptable for ITS; therefore, the likelihood of 3 or more RLAN and ITS "collisions" (transmitting at the same time) within 10 transmissions (which would exceed 20 percent PER) is about 0.01 percent, "extremely low". Furthermore, Broadcom argues that DSRC and C-V2X are more likely to interfere with each other than Wi-Fi is to interfere with either and that longer range ITS transmissions are less important than shorter range transmissions (such as for crash prevention) and that the shorter range transmissions are more resilient. They use all of this to argue that there is no OOBE limit needed in 5895-5925 MHz. There are three major flaws with this argument worthy of highlighting.

First, to understand the implications of Broadcom’s argument assume that there is an "interference budget." In other words, there is a certain amount of ITS packet loss that is acceptable, such that the safety applications still work if PER is below that threshold. Broadcom claims the threshold is 20 percent. The main flaw in their argument is that Part 15 devices are allowed to completely use up the ITS device's "interference budget." That is evident in their evaluation of the probability that Wi-Fi would cause packet losses 3 or more times out of 10 ITS transmissions.

The reality is that the ITS system uses wireless communication, which are by their nature susceptible to RF effects (noise, interference, fading, etc.). Furthermore, ITS communications are largely mobile, decentralized, and ad hoc in nature. ITS stations may transmit simultaneously. As a result, ITS systems are susceptible to some packet loss due to propagation conditions, and packet collisions. ITS applications, like those that use the Basic Safety Message, are designed to be tolerant of some loss due to these systemic, unavoidable causes. Part 15 of the FCC’s rules governing unlicensed devices is clear that such devices may not cause harmful interference to licensed services, such as ITS.61 The Broadcom position that interference from unlicensed devices can add 20 percent PER on top of the loss inherently experienced by ITS communication reflects an incomplete understanding of the method of communication between ITS devices, which require consistent and immediate transmission through an already imperfect system to prevent crashes and loss of life. The sum of the additional PER loss caused by U-NII interference with the threshold being suggested in their comment and the natural ITS packet loss equates to a

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61 47 C.F.R. § 15.5(b).
scenario in which ITS devices will not be appropriately reliable due to interference from unlicensed devices in the reallocated band segment.

Furthermore, the Broadcom analysis above assumes that in an RLAN there is only one transmitting device that is active less than 1 percent of the time and that its activity is in the form of isolated individual transmissions, i.e. a packet here, a packet there, but no bursts of packets. In reality, there will be multiple transmitters in any given RLAN, there will often be several independent RLANs operating in any given geographic region, and transmission patterns exhibit in a burst, not a packet here and a packet there. So, the aggregate interference impact in a region will likely be much, much higher than portrayed by Broadcom’s analysis.

Finally, while a given ITS station might limit its transmissions to no more than 6 percent duty cycle, it is listening to other ITS stations the other 94 percent of the time. Therefore, in areas with high vehicle and pedestrian density every close-by Wi-Fi transmission will likely prevent reception of an important ITS message. Just based on these three primary points, Broadcom's contention that the basic nature of ITS and Wi-Fi mean there will not be any interference is deeply flawed.

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.”

IV. Comments Supporting Band Reallocation Fail to Establish that Realignment Would Serve the Public Interest

A small number of Commenters supported band reallocation. These Commenters consist primarily of interests that would directly benefit from free access to the reallocated spectrum repurposed from safety to commercial use.

A. Commenters Advocating Band Reallocation Misstate Transportation Community Support

The Comments in support of the FCC’s band reallocation proposal evidence a fundamental lack of knowledge and expertise regarding transportation safety. Several of these parties misstate the obvious lack of support among the transportation community and otherwise substitute their non-expert opinions regarding safety for those of the experts.

**Comcast:** “The NPRM’s plan to modernize and improve the 5.9 GHz Band has broad support from industry, public advocacy groups, economists, and lawmakers.”

**NCTA:** “the Commission—supported by technology, telecommunications, and automotive companies, as well as think tanks and consumer groups—has unanimously recognized that it is time to move on, and has proposed rules that would enable unlicensed broadband operations in the lower 45 megahertz of the band.”

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**ITS America Response:** As evidenced by the overwhelming opposition to the FCC’s re-channelization proposal in terms of proportion and scope of groups who submitted comments in opposition, this point is without merit. The coalition in opposition to band reallocation is far wider and more diverse than the narrow group of self-interested commercial entities that advocate the reallocation. This coalition includes state departments of transportation, first responders, school transportation safety advocates, bicyclists, and a host of organizations dedicated to promoting safety both within and outside of our nation’s transportation system. Furthermore, this coalition is not without corporate support, with automakers, technology companies, and key private sector stakeholders in this field weighing in on the record with their concerns about this plan. For example, AT&T notes, “[R]eallocating the lower 45 MHz of the 5.9 GHz band for exclusively unlicensed Wi-Fi use would deliver only incremental public benefits and have a minimal impact on investment in the unlicensed device ecosystem. 45 MHz would represent a small sliver of the large unlicensed spectrum pie available to developers, but that 45 MHz controls the fate of ITS development in the 5.9 GHz band.”\(^{65}\) While Comcast’s argument imagines that the larger community is eager to trade transportation safety spectrum for “4K video streaming, cloud-based gaming, and smart home technologies,”\(^{66}\) the evidence clearly articulated in the record heavily suggests the contrary.

**WISPA:** “The Commission’s proposed approach is also fundamentally consistent with views previously expressed by some ITS stakeholders, including the Department of Transportation (“DOT”), which has expressed its interest in an approach that would both “preserve the ability for transportation safety applications to function in the 5.9 GHz spectrum” while also “exploring

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methods for sharing the spectrum with other users.” The Commission’s proposal meets these
criteria, preserving future opportunities for as-yet undeveloped ITS applications in the upper
portion of the band while also opening up a significant amount of spectrum for unlicensed
uses.”67

**ITS America Response:** This proposal in no way meets the criteria of USDOT, who have called
this proposal “unworkable” and described their actions regarding the FCC’s proposal as follows:

- “The Department expressed concern that the proposal would significantly reduce the
  spectrum available for transportation safety and unduly disrupt the V2X ecosystem that
  has been developing since 2014, when critical safety test results were completed that
demonstrated the technological capabilities of V2X safety-of-life applications. Thus, US
DOT asked that FCC refrain from moving forward with the NPRM, and requested that
FCC reengage with DOT and other stakeholders to develop a revised proposal that would
strike the right balance in promoting transportation safety and spectrum efficiency. In the
event that the Commission nonetheless decided to proceed with its rulemaking, the
Department offered a variety of suggestions to revise the NPRM and to ensure that FCC
could take full advantage of the government and industry resources available to aid in this
endeavor. Unfortunately, upon review, FCC's published NPRM is essentially unchanged,
and the Department's concerns remain the same, as the Commission did not appear to
take account of US DOT's comments or of the far-reaching effects of this proposal.”68

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67 Comments of the Wireless Internet Service Providers Association, ET Docket No. 19-138, at 5 (filed Mar. 9,
2020).
“The preservation of the entire 5.9 GHz band for V2X communications offers the Nation an advantage for maintaining and extending leadership in the deployment of innovative V2X applications, including those related to automation. However, these safety innovations and improvements may be lost should the Commission proceed with its proposed reallocation of the 5.9 GHz band. Reducing the spectrum available for V2X communications from 75 MHz to 30 MHz, and then further dividing that 30 MHz between two communication technologies, will reduce the utility of V2X by severely limiting the amount and type of messages that can be sent at any one time. Such a restriction will also hamper the future development of cooperative automated driving systems, given their expected spectrum needs. Further, the Department’s preliminary testing of the proposed reallocation, shared with the Commission in November 2019 and discussed in the comments below, shows 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.”

Specifically, transportation safety advocates are not opposed to sharing the 5.9 GHz Band with unlicensed devices, but, crucially, only if testing indicates that sharing would not interfere with the ability of V2X technologies to function. The FCC had committed to completing three phases of testing by January 2017 to ascertain the technical feasibility of a sharing arrangement.

but, as of April 2020, has yet to finish phases two and three. The Commission acknowledged that the results of the first phase of testing showed “promise.” USDOT, in partnership with the FCC, is currently conducting testing under phase two. V2X proponents have continued to request that these three phases of testing be completed before the FCC decides to permanently give away the majority of the 5.9 GHz spectrum. Any decision by the FCC prior to the completion of testing to determine if it is possible for the economic benefits of expanded spectrum for Wi-Fi to coexist with the societal benefits of keeping 75 MHz for transportation safety technology, at best, would be premature.

B. Commenters Advocating Band Reallocation Rely on A Failed Narrative of V2X Development and Deployment

For the past seven years, those parties seeking access to the 5.9 GHz Band have relied upon a misleading, incomplete and inaccurate narrative of the scope and investment in the nationwide public and private sector effort to develop and deploy lifesaving V2X technologies in the 5.9 GHz Band. To this end, they claimed the 5.9 GHz Band was “failed,” “unused,” and “fallow.” Backed by almost unlimited resources, these parties have purveyed the view that the transportation community was uninvolved and disinterested in utilizing the 5.9 GHz Band. Unsurprisingly, the Comments of these parties again relay this tired and false narrative.

NCTA: “While taxpayer-funded research and development has its place, these enormous expenditures of public funds have not changed the core fact that “[t]he promise of ubiquitous vehicle-to-vehicle and vehicle-to-infrastructure communications in this band has never
materialized” in the more than twenty years DSRC has held exclusive rights to this spectrum and will not do so any time soon.”

**CEI:** “As the Commission notes in the full NPRM, “In the 20 years since the Commission designated the 5.9 GHz band for DSRC use, the band has seen limited deployment” and now lays “largely fallow.” Given this prolonged lack of utilization and the absence of any sort of scale DSRC deployment on the horizon, it is entirely appropriate and warranted for the Commission to act and reallocate this spectrum.”

**ITS America Response:** While the 5.9 GHz Band was allocated in 1999, the spectrum was not usable until service rules were adopted, licensing commenced, and a spectrum-sharing agreement with the incumbent satellite industry negotiated. This agreement was not reached until 2008. In the meantime, transportation safety experts worked with the National Highway Traffic Safety Administration to develop standards for these technologies that could allow the complex and instantaneous communications to function reliably every time.

Additionally, when the band environment and technology had advanced to the point where reliability could be assured, the cable industry and Wi-Fi advocates began aggressively seeking the use of the band for their businesses. Less than five years later, in 2013, the FCC opened a proceeding to examine the potential for band sharing between unlicensed devices (and the cable industry) and transportation uses. Even then, most of the V2X community indicated they would support band sharing if testing showed that sharing would cause no harm to safety.

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71 Comments the Competitive Enterprise Institute, ET Docket No. 19-138, at 7 (filed Mar. 9, 2020).
As automakers needed certainty that the requisite spectrum would remain available to justify investing in deploying V2X technologies within their vehicles, the FCC sent the exact opposite signals. A perfect example of this uncertainty is the letter from FCC Commissioners O’Rielly and Rosenworcel to Toyota North America in May 2018, shortly after the company announced in April 2018 that it would deploy V2X technologies in all its Toyota vehicles sold in the United States beginning in 2021. Instead of supporting this development, the commissioners stated that they believed “it necessary to bring to your attention several factors that Toyota should keep in mind when committing capital expenditures to DSRC technology.”\(^7\) Namely, this letter suggested that the FCC could re-channelize the 5.9 GHz Band, prompting Toyota to withdraw its plans to deploy V2X. **Even supporters of this proposal acknowledge the damage to deployment this letter caused.**\(^3\) Now, the Commission is pointing to a lack of deployment as a reason to claim that the 5.9 GHz spectrum is “laying fallow.” In fact, on April 23, 2020, the Alliance for Automotive Innovation released a commitment from the automotive industry to deploy at least five million V2X devices on vehicles and roadway infrastructure within five years,\(^4\) the transportation industry truly is on the cusp of widespread V2X deployment.

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\(^3\) Comments of NCTA – The Internet & Television Association, ET Docket No. 19-138, at 41 (filed Mar. 9, 2020).

C. Commenters Advocating Band Reallocation Provide Conflicting and Inaccurate Assessments of Global V2X Spectrum Harmonization

In an effort to support their claims regarding the adequacy of the 30 MHz of interference susceptible spectrum remaining for V2X, Commenters supporting the band reallocation cite to spectrum utilization in other countries. These arguments are factually erroneous but also ignore the unique characteristics of the U.S marketplace for V2X and the need for U.S. leadership in this important emerging market.

**NCTA:** “Reserving 30 megahertz of ITS spectrum is consistent with what Europe has set aside for automotive safety. The Commission rightly notes that “several countries have provided for ITS applications in spectrum blocks that are similarly sized to or even smaller than” what the Commission proposes to reserve here. Europe, for example, “has provided a harmonized 30-megahertz channel (5.875-5.905 GHz) for ITS-based’’ safety applications.”

**New America:** “Globally, 30 megahertz is understood to be sufficient for auto safety services.”

“The European Union has had 30 megahertz allocated for ITS safety channels for many years and more recently determined that 30 megahertz can accommodate the critical safety signaling applications of both CV2X and DSRC. More recently, EU regulators concluded that 30 MHz is all that is required for real-time auto safety operations even if DSRC and C-V2X deployments coexist in the same spectrum band.”

**R Street:** “Europe (50 MHz, 5.875–5.925 GHz)” “For everyone else, there is an average of just over 50 MHz of spectrum allocated for vehicle safety in the 5.9 GHz band.” “Adopting this

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76 Comments of the New America Open Technology Institute, ET Docket No. 19-138, at 4 (filed Mar. 9, 2020).
77 Id. at 15.
proposal would also more closely harmonize the 5.9 GHz band with what other countries have done—allowing automakers around the world to build a single safety system compatible across multiple countries, rather than building separate systems that each utilize different frequencies depending on the country.”\textsuperscript{78}

\textbf{Utah Center for Growth:} “The choice before the Commission is not between saving lives or not saving them. The Commission already recognizes that, even if connected vehicle technologies are to remain in the band, they do not need the full 75 MHz to operate. A much smaller allocation has already proved ample in other countries, so reducing the allocation to 30 MHz is, if anything, still too generous to ITS uses.”\textsuperscript{79}

\textbf{ITS America Response:} As ITS America observed in its Comments, instead of taking away spectrum from transportation safety, Europe is moving in the opposite direction. There is no global “understanding” that 30 MHz is sufficient spectrum for V2X. Indeed, much like any service the unique geographic and population characteristics of the U.S. vitiates any comparison with other nations. In the European Union, the Electronic Communications Committee approved increasing the spectrum dedicated to transportation safety communications from 30 MHz to 50 MHz in the 5.9 GHz Band. Additionally, while many NPRM supporters have cited this 30 MHz number as a reason to decrease our own allocation, other supporters filed comments citing the correct 50 MHz allocation. NPRM supporters’ position on this is inconsistent, but uniformly read as support for the abdication of national leadership in this global field.

\textsuperscript{78} Comments of R Street Institute, ET Docket No. 19-138, at 6-7 (filed Mar. 9, 2020).
\textsuperscript{79} Comments of the Center for Growth and Opportunity at Utah State University, ET Docket No. 19-138, at 2 (filed Mar. 9, 2020).
D. Commenters Advocating Band Reallocation Misstate C-V2X Proponents’ Position on Bandwidth Requirements/Ability of Safety Technologies to Function Without Spectrum

Commenters in support of band reallocation misstate the views of those seeking to deploy C-V2X technology in the 5.9 GHz Band.

**NCTA:** “[A] s cellular vehicle-to-everything (C-V2X) advocates have agreed, the 30 megahertz the Commission proposes would be more than sufficient to deliver the subset of safety messages that cannot use existing licensed LTE bands or other spectrum.”

**ITS America Answer:** In fact, C-V2X proponents have noted that 30 MHz is not sufficient for C-V2X operations:

**Qualcomm:** “Beyond the minimum of 20 MHz required to support C-V2X basic safety applications in the upper portion of the 5.9 GHz band, at least another 40 MHz of spectrum (ideally 55 MHz) is needed for advanced 5G NR C-V2X roadway safety applications.”

**Ford:** “the proposed spectrum allocation for CV2X is insufficient and that a minimum of additional 40 MHz in the 5.9 GHz band will be needed soon for advanced ITS applications.”

They list safety features such as sensor sharing, which provides “data about surrounding objects, such as obstacles, other road participants, etc. that may not be visible from the vantage point of a single station,” and vulnerable road user detection as two key safety features that will require a minimum of 60 MHz of spectrum.

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5GAA: “To realize the full potential of C-V2X, the Commission must allocate—in addition to the 20 MHz it already is proposing—at least another 40 MHz for advanced C-V2X Direct services.”83

IPI: “It is widely anticipated that 5G networks will have the requisite responsiveness and bandwidth to effectively handle safety-critical connected vehicle use cases, particularly when paired with the increasingly capable onboard systems automakers and technology providers are developing. And these networks are already being deployed by some providers, and all U.S. national wireless carriers have announced 5G deployments.”84

ITS America Response: 5GAA noted “the NPRM is conflating commercial spectrum used for 5G network services with the type of dedicated spectrum required for 5G-based advanced C-V2X Direct, and is suggesting that the existence of the former obviates the need for the latter.”85 “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.”86 “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.”87

86 Id.
87 Id.
NCTA: “[W]ithout the Commission’s action in this proceeding, no company could deploy C-V2X anywhere in the 5.9 GHz band.”

ITS America Response: The FCC can allow C-V2X in the 5.9 GHz Band without reallocating a majority of the band for unlicensed devices. The FCC should amend the NPRM to remove its proposal giving away the majority of spectrum available for transportation safety.

E. Commenters Advocating Band Reallocation Disregard V2X’s Unique Contribution to Transportation Safety

Commenters that support band reallocation also erroneously argue that other systems and technologies can replace the unique benefits of 5.9 GHz Band V2X.

Microsoft: “[S]ome of the applications first envisioned for ITS have been replaced by other technological innovation. For example, AI and in-vehicle radar are allowing cars themselves to make autonomous decisions; machine vision is creating smart traffic systems without waiting for all vehicles to be upgraded for ITS; and LTE, and soon 5G, installed by vehicle manufactures, provide updated maps and traffic, service and repair monitoring, and other information service.”

New America: “It is widely anticipated that 5G networks will have the requisite responsiveness and bandwidth to effectively handle safety-critical connected vehicle use cases, particularly when paired with the increasingly capable onboard systems automakers and technology providers are developing. And these networks are already being deployed by some providers, and all U.S. national wireless carriers have announced 5G deployments.”

**Free State Foundation**: “[A]utomotive manufacturers are deploying innovative safety solutions that address the goals of the Intelligent Transportation System (ITS) via other technical means. These include on-board cameras, sonar, light detection and ranging (LiDAR), and sensors that utilize different frequency bands as well as unlicensed spectrum.”\(^90\)

**ITS America Response**: V2X technologies enable applications that cannot be performed by non-connected automated vehicles, such as communicating with vehicles that are out of line-of-sight, providing road hazard warnings from roadside infrastructure, and allowing automated vehicles to coordinate actions rather than making decisions individually. V2X complements sensors by providing information that is more precise, over longer ranges, and in non-line-of-sight conditions.\(^91\)

**F. Commenters Advocating Band Reallocation Rely on Flawed, Incomplete, and Inaccurate Economic Analysis**

The Commenters in support of band reallocation also rely upon a flawed economic analysis to argue an inaccurate assessment of the economic benefits of V2X in the 5.9 GHz Band.

**NCTA**: “The annual economic contribution of unlicensed technologies to the U.S. economy is huge – approximately $499 billion in 2018 alone.”\(^92\)

**TechFreedom**: “A 2018 study by the RAND Corporation found that the current value of the band, employed for ITS purposes, is a mere $6.2 million. Whereas the market value of the band if used for Wi-Fi purposes is between $82.2 billion to $189.9 billion. Considering these

\(^{91}\) Vehicle-to-Vehicle Communications: Readiness for V2V Technology for Application, NHTSA, at 287 (Aug. 2014)
estimates, the FCC’s compromise accommodates both transportation safety and spectral efficiency interests.”

**ITS America Response:** The RAND study claimed that opening up the 5.9 GHz Band to unlicensed devices would provide $189.9 billion in benefits but failed to consider the economic effects of retaining the 5.9 GHz Band for transportation safety. Additionally, it did not consider whether the value of reallocating the 5.9 GHz Band to unlicensed devices would be reduced if other spectrum is provided for unlicensed devices, such as the spectrum newly available in the 6 GHz Band. While the grand total of spectrum available to unlicensed devices produces $499 billion annually, USDOT has found that traffic incidents account for $800 billion in costs annually, and comparatively to Wi-Fi, the much smaller amount of spectrum allocated to transportation safety is estimated by NHTSA to reduce the instances and severity of these traffic incidents by 80 percent.

V. The Commission Must Protect Incumbent Licensees

The Commenters demonstrate that there are existing incumbent systems operating in the 5.9 GHz Band throughout the nation that are providing critical traffic safety communications. Most of these licenses are issued as Public Safety licenses under service code “IQ” and are held and operated by Public Safety eligibles. The record further establishes that incumbent non-

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95 See generally, 47 C.F.R. § 90.373.
public safety licensees operating under service code “QQ” also provide critical life-saving V2X services.\(^{96}\)

In its NPRM, the FCC requested Comments on the impact of its proposal on these incumbent licensees and the manner in which it could accomplish either the proposed reduction in, or elimination, of the available bandwidth currently serving these critical safety systems.\(^{97}\) As noted above, many Commenters opposed the Commission’s proposal to reallocate the lower 45 MHz of the band to unlicensed devices, noting the severe harm that such a decision would inflict both on existing incumbent licensees as well as on further deployment of V2X. Commenters further noted that should the FCC nevertheless pursue its proposal to reallocate the lower band segment it must protect the incumbent licensees by ensuring that any mandated transition is designed to avoid disruption to existing operations.\(^{98}\) A few Commenters that would directly benefit from the forced relocation of incumbent systems urge the Commission to make little or no provision for the incumbent licensees, asking for a hasty and unfunded rebanding.\(^{99}\)

ITS America agrees with the majority of Commenters that should the FCC continue to pursue the NPRM’s band reallocation proposal, it must protect incumbent licensees consistent with its statutory obligations and with the past thirty years of FCC precedent. An abrupt unfunded transition to the new band plan would punish licensees who invested their resources, often public monies, in promoting traffic safety and is both bad policy and bad law. As discussed

\(^{96}\) 47 C.F.R. § 90.371(a).
\(^{98}\) Comments of the Alliance for Automotive Innovation, ET Docket No. 19-138, at 29 (filed Mar. 9, 2020) (“But if the Commission ends up moving forward with the NPRM’s proposal, it must ensure the spectrum allocated for V2X is free from harmful interference”).
above, the FCC’s enabling statute itself requires that the Commission protect safety of life and property. 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 NCTA. The Commission owes an even greater obligation to those licensees it has itself licensed as public safety. In this respect, ITS America is doubtful that the Commission even has the legal authority necessary to require an unfunded relocation of public safety licensees under Section 1 of the Act.

Since auction authority was granted to the Commission in 1993 (Omnibus Budget Reconciliation Act), the FCC consistently has ensured that incumbent licensees that were displaced as a result of a spectrum reallocation were entitled, at a minimum, to receive the reasonable costs of relocation. In the 800 MHz proceeding, the FCC required that Nextel pay for “all channel changes necessary to implement the reconfiguration.” Additionally, Nextel was required to “ensure that relocated licensees receive at least comparable facilities when they change channels.” 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 any product deployments in the band would not cause any harmful interference. UTAM additionally assessed and collected clearing fees in order to pay for the cost of the relocation from product manufacturers for use of the band. The FCC adopted a proposal by FirstNet to provide grants

100 Id. at 39.
102 Id.
to narrowband incumbents to relocate out of the portion of the 700 MHz band allocated for FirstNet operations. The FCC, notably, stated that absent a relocation mechanism, incumbents would continue to operate in the band. FirstNet used funds allocated to it by Congress to fund grants to relocate incumbents. Most recently, in its C-Band proceeding, the FCC has approved not only the reimbursement of reasonable costs for the relocating satellite and earth station licensees but also the payment of up to an additional $9.7 billion for the acceleration of band clearing by the incumbents. The D.C. Circuit Court of Appeals has upheld the FCC’s authority to require new entrants to pay the relocation costs of incumbent licensees, noting that “the Commission’s consistent policy has been to prevent new spectrum users from leaving displaced incumbents with a sum of money too small to allow them to resume their operations at a new location.”

The policy that dislocated incumbent public safety licensees receive fair reimbursement also has been embraced by Congress. For example, in the 2012 Spectrum Act, Congress required that proceeds from the auction of spectrum in the T-Band would be available to provide grants to cover relocation costs of public safety entities from the T-Band. Additionally, the Commercial Spectrum Enhancement Act established a Spectrum Relocation Fund to pay relocation costs of federal agencies relating to the auction of spectrum in the CBRS band (3550-3650 MHz).

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relocation fund has been allotted from auction proceeds to reimburse costs associated with the relocation of broadcast television licensees following the incentive auction.\textsuperscript{109}

Incumbent licensees are currently conducting important testing and analysis of V2X technologies at 57 operational projects across 30 states with 15,506 devices and covering 6,182 infrastructure components.\textsuperscript{110} Additionally, organizations have invested significant time and funding in developing and deploying on-board units for use in truck platooning. These vital V2X deployments must be provided the opportunity to continue without interference from unlicensed devices. Current infrastructure deployments include both short-term and long-term demonstration, implementation, and use projects that are expected to operate through the end of their current licenses and beyond. USDOT estimates that federal, state, and local governments alone have invested more than $2 billion in public funding, much of that investment would be lost should the FCC continue with its proposal. Additionally, USDOT has estimated that the proposal will cost the transportation industry over $500 million just for operational sites to “rip and replace” V2X deployments.\textsuperscript{111}

Should the Commission proceed with the NPRM’s proposal, consistent with statutory mandate and precedent, the Commission must accord incumbent licensees due process and reasonable compensation. The process adopted must contemplate a transition period that enables incumbent licensees to protect the safety of their transportation networks. In this respect, absent the incentive of acceleration payments, ITS America proposes that incumbent licensees be

permitted to continue their existing operations on a primary basis until the end of their current license terms or until January 1, 2026, whichever is later.

In addition, the Commission should enable the reimbursement of expenses incurred by these 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 technologies.\(^{112}\) To enable this reimbursement, the Commission should select and authorize a third party clearinghouse 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 WISPs and other service providers that will benefit from the availability of this spectrum for their commercial operations.

The Clearinghouse, in turn, must advance to Incumbent licensees sufficient funds to cover all reasonable costs of securing comparable facilities. The Clearinghouse should be empowered to also negotiate the acceleration of band clearing through incentive payments.

VI. The FCC Should Review and Approve the Backlog of License Applications

By Public Notice\(^ {113}\) the FCC announced a freeze on accepting and processing applications for new or expanded facilities in the 5.9 GHz Band except for such facilities as are limited to operation on a single channel.\(^ {114}\) This freeze has been applied to applications that were pending for as much as three months prior to the date of the Public Notice. The application


\(^{114}\) *Id.* at 12334.
freeze has stalled the processing of almost 500 applications proposing to add new facilities to improve transportation safety at facilities throughout the nation. The FCC has not acted consistently in applying the freeze retroactively. For example, the FCC implemented a filing freeze in the 900 MHz Band that only applied to new applications.\textsuperscript{115} In this case, the retroactive freeze has frustrated the efforts of public safety licensees to enhance transportation safety. Even should such authority to impose a retroactive licensing freeze exist, in this case application to public safety licensees appears once again to run afoul of the fundamental requirements of Section 1 of the Communications Act.

For example, in October 2019 alone, states and cities across the country filed 433 applications with the FCC to amend DSRC link locations and all remain pending. The State of Michigan filed 109 applications to amend DSRC deployments across the state\textsuperscript{116} and the State of Florida filed 277 applications to bolster its public safety operations.\textsuperscript{117} The applications filed with the FCC will increase the number of deployed Roadside Units operating in the 5.9 GHz Band and will lead to increased traffic safety. Between September 2019 and March 2020, the State of Georgia filed 124 applications that remain pending to provide motorist and vehicle information related to the running of red-lights by automobiles and the optimum travel speed through congested intersections to increase travel efficiency. In addition, the State of Georgia is prepared to file an additional 214 applications with the FCC to increase information collection related to the running of red-lights and travel through congested intersections, but is unable to file the applications due to the freeze imposed by the FCC.

\textsuperscript{116} See e.g., State of Michigan, FCC Form 601, ULS File No. 0008748426 (filed Oct. 16, 2019).
\textsuperscript{117} See e.g., State of Florida, FCC Form 601, ULS File No. 0008827377 (filed Oct. 8, 2019).
In total, the State of Michigan has 147 license applications pending at the FCC and has an additional 204 applications that are ready for submission to the FCC, but cannot be filed due to the freeze. The majority of the pending applications are for roadside units that, when approved, will be used to increase traffic safety. The FCC’s retroactive application freeze is harmful to public safety.

The Commission should lift the freeze and immediately process the hundreds of license applications that were submitted to the FCC prior to December 19, 2019.

VII. Conclusion

Comments received by the Commission on the NPRM reflect that much public and private sector effort has been devoted to the development and deployment of lifesaving transportation systems in the 5.9 GHz Band. The record shows that the band reallocation proposed in the NPRM would be destructive of those efforts, would deter the deployment of advanced systems, and would immediately harm transportation and public safety. For the reasons stated above, ITS America and the majority of Commenters urge the Commission to withdraw its proposal to reallocate 45 MHz of the 5.9 GHz Band to U-NII-4 devices and in its stead support the continued testing of band sharing between V2X and U-NII devices.

Respectfully Submitted,

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