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1401 Constitution Avenue, N.W.  
Washington, D.C. 20230

Re: Development of a National Spectrum Strategy, Docket No. NTIA-2023-0003

### Introduction

As the nation’s leading advocate for the technological modernization of our transportation system, the Intelligent Transportation Society of America (ITS America) is grateful for the opportunity to comment on the National Telecommunications and Information Administration’s (NTIA) Request for Comments (RFC) on the “Development of a National Spectrum Strategy.”

ITS America is the only organization in the country that represents all sectors – public, private, academic, and nonprofit – to advance transportation technology. Our membership includes state and city departments of transportation, transit agencies, metropolitan planning organizations, automotive manufacturers, technology companies, engineering firms, automotive suppliers, insurance companies, and research and academic universities. Our vision is one of a better future transformed by transportation technology and innovation. Safer. Greener. Smarter. For all.

Our work accelerates the deployment of technology that saves lives, promotes sustainability, and advances more equitable transportation for all. Our members’ work focuses on connected and automated vehicle technologies, smart and digital infrastructure, sustainable technologies like electric vehicles, and other mobility technologies that support public transportation and freight. We work toward a world in which we achieve the nation’s Vision Zero goals to eliminate fatalities and serious injuries on our roadways; a world that is more sustainable, resilient, and adaptable to climate change; and a world in which communities have equitable and affordable access to transportation and critical services. Our vision aligns directly with the United States Department of Transportation’s (USDOT) goals to advance safety, climate, and equity. ITS America wholeheartedly supports USDOT’s National Roadway Safety Strategy, which represents the Department’s comprehensive approach to significantly reducing serious injuries and deaths on the nation’s highways, roads, and streets through policies promoting safer people, safer roads, safer vehicles, safer speeds, and post-crash care.<sup>1</sup>

The transportation community’s access to spectrum required for spectrum-based transportation solutions is critical to the accomplishment of this strategy. Spectrum-based transportation solutions such as vehicle-to-everything (V2X) communications will deliver significant safety,

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<sup>1</sup> Implementing the National Roadway Safety Strategy, USDOT. Available at:  
<https://www.transportation.gov/NRSS/Implementation>.

economic, and environmental benefits to the traveling public. These are solutions that are ready to be deployed by ITS America members today, given the appropriate regulatory environment and usable spectrum. These solutions will additionally deliver significant benefits for vulnerable road user safety and safer automated vehicles, amongst other benefits, if adequate spectrum is allocated for their use.

ITS America applauds NTIA's efforts to develop a national spectrum strategy (NSS) that fully addresses the needs of spectrum reliant services and missions, including, among other items, advanced transportation technologies. Transportation needs must be a component of our nation's national spectrum strategy, and NTIA is well-positioned to provide the leadership needed to ensure that these critical safety tools are deployed on American roads.

### Need for Spectrum-Based Transportation Technologies

Transportation fatality statistics in the United States represent a national tragedy. From 2011 to 2020, 350,000 people died on American roads. In 2021 alone, that number was 42,915. This represents a 10.5 percent increase compared to 2020 and is the highest percentage increase since 2007<sup>2</sup>. These numbers do not capture the millions of Americans that are injured on our roads every year, nor the estimated \$800 billion in financial costs that such crashes cost our country annually.<sup>3</sup> In addition, roadway fatalities are worse for people of color - according to research from the Governors Highway Safety Association, African Americans were killed in traffic crashes at a rate almost 25 percent higher than white people in recent years, and Black pedestrians were killed at a rate twice as high.<sup>4</sup> These numbers demonstrate the scale of the problem, but we know that this is not just a number. Each of these fatalities cause a tragic impact on the lives of the family members and friends who knew the victims. The status quo approach to transportation safety measures is insufficient, and that innovative solutions are required to address this on-going tragedy.

Spectrum-based technologies can significantly alleviate that trend. Spectrum-based safety services (such as those enabled by V2X) allow vehicles to communicate with other vehicles, infrastructure, law enforcement, and bicycle and pedestrian road users to avoid crashes and enhance safety. These technologies allow vehicles to communicate in milliseconds about critical variables such as GPS location, acceleration, predicted path, and driver controls such as steering input and braking. The National Transportation Safety Board (NTSB) has long recognized the impact these technologies could have if deployed in vehicles at scale, having first identified the potential of V2X to save lives in 1995. NTSB first recommended in 2013 that the National Highway Traffic Safety Administration (NHTSA) require V2X in new vehicles after identifying additional fatal crashes that could have been prevented by these technologies and have continued to call for the technology's requirement. They have included V2X in their top 10 most-wanted

<sup>2</sup> The Roadway Safety Problem, USDOT. Available at: <https://www.transportation.gov/NRSS/SafetyProblem>.

<sup>3</sup> Comments of U.S. Department of Transportation, ET Docket No. 19-138, at page 8 (filed Mar. 13, 2020).

<sup>4</sup> An Analysis of Traffic Fatalities by Race and Ethnicity, Governors Highway Safety Association. Available at: <https://www.ghsa.org/sites/default/files/2021-06/An%20Analysis%20of%20Traffic%20Fatalities%20by%20Race%20and%20Ethnicity.pdf>

technologies in vehicles as well, demonstrating their support for this solution.<sup>5</sup> It is critical that the United States adopt an NSS that provides sufficient spectrum for basic and advanced V2X applications, which will require the allocation of additional mid-band spectrum to accommodate the advanced V2X applications detailed below. The NSS must also ensure the availability of spectrum in a timely manner free of the regulatory uncertainty that has already inhibited deployment.

Given the public benefit that these technologies are poised to provide, Federal leadership is crucial in ensuring that a spectrum environment is provided which allows for widespread deployment. Many V2X technologies require dedicated mid-band spectrum, as they need low-latency, interference-free communications to provide instant alerts to avert crashes and coordinate vehicle activity. The availability of this spectrum is a key factor in the planning, development, and deployment of these technologies, as both public and private sector deployers need confidence that the spectrum that underpins the functionality of their intended deployments will remain available and suitable for their purposes.

Requirements for planning V2X deployments in either infrastructure or vehicles that rely on the use of spectrum are significantly different than those for consumer electronics. This includes the timeline for development, due to the high degree of reliability to which transportation technologies providing safety to the traveling public must adhere, as well as production and deployment. Vehicle production timelines typically require at least a three-year design window, and deployment of V2X roadside units (RSUs) are often governed by long-term transportation planning and budgeting, not to mention various regulatory requirements such as environmental permitting.

Given the barrier that these production times represent when planning for the deployment of V2X technologies in vehicles, regulatory uncertainty related to spectrum availability represents a significant threat to V2X deployment. Automakers are hesitant to include these devices in their vehicles if spectrum availability is threatened, and transportation infrastructure planners are hesitant to invest in roadside units without both automaker commitment and spectrum reliability. These concerns are well-founded, given the Federal Communications Commission's (FCC) recent actions to take away 45 MHz in the 5.9 GHz band from the 75 MHz that had previously been reserved for these technologies. This reallocation was carried out over the vocal opposition of USDOT, the NTSB, and commenters representing state departments of transportation (DOTs), automakers, suppliers, infrastructure providers, equipment manufacturers and developers, telecommunications carriers, and other public and private stakeholders. In fact, in the comment period accompanying that proceeding, over 85 percent of comments were opposed to the FCC's proposed reallocation.<sup>6</sup> Still, the FCC moved ahead with their decision to reallocate this spectrum for use by unlicensed devices. We believe that the "home court" advantage of

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<sup>5</sup>US Department of Transportation's Vehicle-To-Everything (V2x) Communications Summit: Preparing for V2x Deployment, NTSB. Available at: <https://www.nts.gov/Advocacy/Activities/Pages/Graham20220825.aspx>.

<sup>6</sup> FCC Proposal on Use of the 5.9 GHz Band Comment Synopsis, ITS America. Available at: <https://live-its-america.pantheonsite.io/wp-content/uploads/2020/03/FCC-5.9-GHz-Proposal-Comment-Synopsis.pdf>.

incumbent interests before the FCC played a disproportionate role in this decision. The NSS must establish mechanisms against this tendency and must not favor such incumbent interests at the expense of new life-saving technologies and the public and private interests promoting them.

This was a particularly jarring moment for V2X advocates, as the FCC acted in direct opposition to the repeated requests of USDOT and other federal transportation safety partners. While stakeholders are eager to utilize the remaining 30 MHz available for these technologies in the 5.9 GHz band, there remains a distinct concern about the role of transportation needs in the FCC's spectrum planning. Given their role as the representative of federal interests in spectrum planning, NTIA is well-positioned to resolve that concern. ITS America encourages NTIA to ensure that the perspectives of federal partners such as USDOT and NTSB are included in conversations with the FCC about spectrum planning, including spectrum pipeline considerations, long-term spectrum strategy, and potential inclusion of transportation perspectives on the FCC's spectrum advisory council.

While collaboration between the FCC and USDOT appears to have increased throughout the work being done on outstanding waivers for the deployment of cellular vehicle-to-everything (C-V2X) technologies, NTIA is ideally-situated to serve as a convener in these discussions as additional characteristics of the national spectrum strategy related to transportation solutions are developed, particularly as it relates to the transportation industry's longstanding concerns about spectrum needs and harmful interference that the FCC will be addressing in a second Report and Order related to the 5.9 GHz band. NTIA's leadership in ensuring a stable regulatory environment for the deployment of V2X technologies would be enormously impactful on the success of these initiatives to address the nation's societal goals of reducing crashes and saving lives.

### Pillar 1: Transportation Spectrum Needs

As stated above, the 30 MHz currently reserved for V2X communications in the 5.9 GHz band is poised to offer significant benefit to the traveling public. An ITS America working group identified<sup>7</sup> the numerous V2X message types and applications that are likely to be deployed in a limited 30 MHz environment, including applications dependent on the following types of messages: basic safety (BSM), intersection mapping (MAP), signal phase and timing (SPaT), traveler information (TIM), road safety (RSM), signal request (SRM), signal status (SSM), GNSS correction messages (RTCM), and probe vehicle data (PVD). These types of messages support a broad set of vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) applications, including: forward collision warning, pre-crash sensing, emergency vehicle warning and signal preemption, and infrastructure-to-vehicle warning messages.

The same working group also identified numerous V2X message types and applications that are unlikely to be deployed in a limited 30 MHz environment due to spectrum requirements,

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<sup>7</sup> The Future of V2X: 30 MHz Application Map, ITS America. Available at: <https://itsa.org/wp-content/uploads/2021/01/ITS-America-30-MHz-Application-Map-1-27-21.pdf>.

including applications dependent on collective perception messages (CPM), maneuver coordination messages (MCM), and personal safety messages (PSM). These types of messages support a broad set of advanced V2I, V2V, and vehicle-to-pedestrian (V2P) applications, including: intersection collision warnings, intersection movement assist, cooperative adaptive cruise control, and numerous pedestrian safety applications. Notably, these message types support important advanced V2X applications that are necessary to fully realize the potential transportation safety benefits of V2X technologies. These message types are vital to allow vehicles to communicate information gained from vehicle-based sensors, such as radar and lidar, to other vehicles; to provide cooperative operation among automated vehicles; and to support numerous applications intended to protect vulnerable road users such as pedestrians and bicyclists. While cooperative automation applications promise to unlock the full potential of mixed or fully autonomous vehicle fleets on American roads, the advanced V2P applications are critically important for reversing the continued trend of increasing fatalities for pedestrians and cyclists.<sup>8</sup> Furthermore, vehicle-to-grid and vehicle-to-network capabilities for electric vehicles will be made possible through additional dedicated spectrum, allowing further capabilities to the focus of the Administration’s ambitious and necessary electrification goals.

The automotive and surface transportation industries in the United States have spent over twenty years developing cooperative awareness technology in the form of short-range data communications between vehicles, and between vehicles and road infrastructure. The evolution of this technology into a comprehensive radio frequency (RF) ecosystem on American roads was envisioned by the early developers as a platform which would ultimately give rise to a wide range of applications that would produce enormous productivity benefits for the American economy, in terms of improved road safety, reduced congestion, and efficiencies in terms of energy consumption and emissions.

A key ingredient of this ecosystem is dedicated RF spectrum. But the FCC’s December 2020 spectrum reallocation has left insufficient bandwidth in the ITS band to support cooperative perception. The concept of cooperative perception, in the form of sensor data sharing messages (SDSM), requires substantially more bandwidth than is currently available.

In its decision, the FCC argued against the need for additional spectrum to support cooperative perception, stating as justification that: *Given the significant advances that have been made in automotive connectivity using a variety of means in different spectrum bands outside of 5.9 GHz, an ever-greater portion of the overall valuable spectrum resource is being used to support automotive-related functions, including those related to safety*<sup>9</sup>.

The FCC did not actually specify what it meant by “automotive connectivity,” nor did it identify to which bands outside of the ITS spectrum it was referring. But it appears that this statement refers to automotive radar bands and that the term “automotive connectivity” refers to *one-way*

<sup>8</sup> Early Estimate of Motor Vehicle Traffic Fatalities for the First 9 Months (January–September) of 2022, NHTSA. Available at: <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813406>.

<sup>9</sup> <https://docs.fcc.gov/public/attachments/DOC-367827A1.pdf>, p.21, para 46.

connectivity between a vehicle and the objects around detected by radar. But it is precisely the *sharing* of this data through cooperative perception messages that requires additional spectrum and results in significant safety benefits.

At this juncture, the only spectrum band in which cooperative perception can operate, and inter-operate between all OEMs and infrastructure owner operators, remains the 5.9 GHz band, and the consensus among ITS America's members remains that the narrowed band cannot support this. Cooperative perception is now increasingly recognized as a critical capability for a well-defined range of advanced driver assistance systems (ADAS), various levels of autonomous driving, cooperative cruise control ("platooning") and other capabilities that the automotive and transportation industries can deliver provided that the required spectrum is available.

Given the recent advances in technology deployment and standardization of cooperative messaging, more than ever it is now possible to realize the enormous economic benefits originally envisioned, and so any national spectrum strategy must take into account the need for dedicated spectrum to support cooperative perception and the other benefits that have been limited by the recent reallocation of spectrum in the 5.9 GHz band. While 30 MHz will allow for some day one use cases, V2X stakeholders have provided technical analysis of the additional spectrum needed for advanced transportation applications, including ITS America's 30 MHz Application Map<sup>10</sup> and the 5G Automotive Association's (5GAA) study of spectrum needs for safety related intelligent transportation systems day 1 and advanced use cases.<sup>11</sup> ITS America would encourage NTIA to consider these reports when planning the current and upcoming needs of transportation users for spectrum allocations.

Additionally, beyond V2X, new transportation modes such as advanced air mobility (AAM) will require spectrum, and there will be a need to coordinate this in the context of the existing mobility ecosystem and in conjunction with ground transportation needs. American pursuit of AAM and Unmanned Aerial Systems (UAS) technology is critical to our global competitiveness and standing among our peers in emerging transportation technology markets, as China and Germany are already leading in this space. Furthermore, the transportation sector looks forward to working with our colleagues in the broadband sector and other parallel fields to help identify best practices around spectrum use for digital infrastructure, which promises to deliver additional safety and efficiency benefits to the traveling public. We are confident that NTIA will be an important partner in that discussion.

## Pillar 2: Long Term Spectrum Planning

NTIA must avoid a silo approach to planning and spectrum decision-making and instead fully utilize its' convening role to represent the diverse perspectives of federal spectrum users, such as

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<sup>10</sup> The Future of V2X: 30 MHz Application Map, ITS America.

<sup>11</sup> Study of spectrum needs for safety related intelligent transportation systems day 1 and advanced use cases, 5GAA. Available at:  
[https://5gaa.org/content/uploads/2021/10/5GAA\\_Day1\\_and\\_adv\\_Use\\_Cases\\_Spectrum\\_Needs\\_Study\\_V2.0.pdf](https://5gaa.org/content/uploads/2021/10/5GAA_Day1_and_adv_Use_Cases_Spectrum_Needs_Study_V2.0.pdf)

USDOT. As evidenced in the discussion above, there is a great need for collaboration and planning across industries and agencies, including interagency task forces where appropriate. The need for long term spectrum planning that includes transportation objectives is particularly apparent, as the recent spectrum reallocation and regulatory uncertainty around the 5.9 GHz band represents a failure in long-term spectrum planning.

USDOT previously estimated that the minimum funding required for the transition required as a result of the reallocation of the 5.9 GHz band would amount to \$645 million, which is the cost that state and local departments of transportation would likely be required to pay just to transition connected roadway infrastructure out of the 45 MHz of spectrum that had been reallocated and to the new technology standards applied by the FCC.<sup>12</sup> This effectively eliminated a series of investments by state and local departments of transportation intended to increase safety at a time when their funding had already been limited by COVID 19-related revenue decreases. Ultimately, every dollar spent on V2X devices by infrastructure owner operators was spent in the interest of improving transportation safety and efficiency – the main priority of the impacted agencies. This decision set these agencies back both financially and in efforts to utilize these technologies to improve safety in their communities, effectively compromising safety system planning that relied on the spectrum that had previously been allocated. NTIA has a responsibility to address mechanisms to ensure that multimodal transportation spectrum needs are included in the nation’s long-term spectrum strategy to prevent this situation in the future.

Furthermore, the 5.9 GHz Band allocation for transportation communications promotes U.S. leadership and competitiveness in global markets. Many countries have allocated significant spectrum from the 5.9 GHz Band for V2X communications, including Canada (75 MHz), Mexico (75 MHz), Australia (70 MHz), South Korea (70 MHz), and Singapore (50 MHz). In the European Union, the Electronic Communications Committee recently approved increasing the spectrum dedicated to transportation safety communications from 30 MHz to 50 MHz in the 5.9 GHz Band. The European Union also provides an additional 20 MHz for non- safety applications. Japan currently dedicates 10 MHz of spectrum exclusively for transportation safety communications, including V2V, and 80 MHz for infrastructure-to-vehicle communications, including safe driving support and electronic toll collection, though there is testing to explore including additional V2X technologies in this 80 MHz band. China allocated 20 MHz of the 5.9 GHz Band for the deployment of C-V2X technology in October 2018, and continues to include V2X deployment as a significant aspect of their national transportation planning.<sup>13</sup>

The U.S. has led the world in creating V2X technologies and in developing the standards that enable and support V2X technologies. Indeed, the U.S. was the world's model for advanced transportation technologies and many of the spectrum allocations noted above were responsive to the FCC’s leadership in 1999 in allocating 75 MHz of spectrum. Lack of regulatory certainty

<sup>12</sup> Comments of U.S. Department of Transportation, ET Docket No. 19-138 (filed Mar. 13, 2020)

<sup>13</sup> C-V2X Policies and Regulations in China, 5GAA. Available at: [https://5gaa.org/content/uploads/2022/10/Report\\_C-V2X-policies-and-regulations-in-China.pdf](https://5gaa.org/content/uploads/2022/10/Report_C-V2X-policies-and-regulations-in-China.pdf)

around spectrum availability for V2X threatens to cede American leadership as countries around the world are building out their V2X networks. There is no doubt that further uncertainty will undercut the public and private investments that have been made in the United States, stifle further innovation, and challenge American global competitiveness. This approach is in direct conflict with efforts underway in other parts of the world. At precisely the same time that other countries are reiterating their commitment to V2X technologies and, in many cases, looking to increase the amount of spectrum that is available to support V2X technologies, the recent reduction in transportation spectrum all but ensures that these technologies would not realize their full potential in the United States. This threat is not abstract – vehicles can reach their full safety potential in neighboring countries, but then must downgrade their protections when they enter the United States. By ensuring that the current spectrum allocation for V2X is given the proper protections needed for successful deployment and by identifying additional mid-band spectrum for V2X communications, the NSS could reverse this trend and reestablish the United States as the global leader in this space.

### Pillar 3: Spectrum Access and Management through Technology Development

Spectrum sharing is a valuable tool in generally ensuring the efficient use of a scarce national resource. Safety-of-life applications in the 5.9 GHz band must be provided exclusive use of spectrum to avoid possibility of (1) lack of capacity due to shared usage or (2) interference to operations, while commercial transportation communications would be better suited for shared spectrum operations in other spectrum. There is a history of consideration of spectrum sharing mechanisms between V2X licensees and unlicensed users. Previously, the FCC had agreed with USDOT to undertake three phases of testing to determine whether spectrum could be safely shared between V2X technologies and unlicensed devices. The first phase of this testing began in October 2016 and the FCC released its Phase I Testing Report, and sought comments on the report, in October 2018. The second and third phase have not been completed.<sup>14</sup> While the designation of the remaining 30 MHz has been settled by recent FCC activity, NTIA should consider working with the FCC and C-V2X deployers to see if spectrum sharing is appropriate for transportation use in other spectrum bands.

### Conclusion

ITS America is grateful for the opportunity to comment on this effort and is eager to work with NTIA during the coming months as it considers comments and develops this national spectrum strategy. We are additionally grateful for the leadership that NTIA provides in spectrum decision-making and coordination between federal stakeholders and the FCC, as we believe that NTIA is perfectly-positioned to help mediate those deliberations. We encourage NTIA to consider the public safety benefits that can be provided to the traveling public through spectrum-based transportation solutions such as V2X, as well as the economic and commercial benefits that these technologies can additionally provide. We look forward to continuing to support the

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<sup>14</sup> Comments of the Intelligent Transportation Society of America, ET Docket No. 19-138, at 7 (filed Mar. 9, 2020).



work of NTIA, USDOT, the FCC, and other regulatory partners as we work to develop a regulatory landscape for the next generation of transportation safety solutions that will deliver a transportation network that is safer, greener, and smarter for all. If you have any questions, please contact ITS America's Vice President of Public Policy and Regulatory Affairs, Timothy Drake, at [tdrake@itsa.org](mailto:tdrake@itsa.org).

Sincerely,  
Laura Chace



President and CEO  
ITS America