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Mr. Ryan Posten
Associate Administrator
National Highway Traffic Safety Administration (NHTSA)
U.S. Department of Transportation
1200 New Jersey Ave, SE
Washington, DC 20003

Reference: Docket No. NHTSA-2016-0126 (NHTSA Notice of Proposed Rulemaking on Federal Motor Vehicle Safety Standards; V2V Communications)

Dear Mr. Posten:

The Intelligent Transportation Society of America (ITS America) respectfully submits these comments to NHTSA in response to its proposed standard for Vehicle-to-Vehicle (V2V) communications.[1] ITS America views the release of the proposed standard as an important first step forward, and we commend NHTSA for the effort.

ITS America is the nation's largest advocacy group dedicated to advancing the deployment of Intelligent Transportation Systems ("ITS"). We seek to grow our economy and improve our quality of life through innovative technologies that enhance mobility, safety, security, privacy, sustainability and accessibility of our transportation system, as well as promote research, development and deployment of advanced vehicle technology, connectivity, integrated mobility and smart communities.

ITS America membership is unique in that it is composed of state and city public agencies, private companies, research institutions and academia, and includes automakers, telecommunications, traditional IT and emerging technology, consumer apps and industrial electronics, road, transit and other transportation infrastructure operators and the research community focused on bringing new technology from the laboratory to our roads, cars, buses and trucks. Our values are optimism in the transformative power of technology to solve our hardest problems and faith in sharing, collaboration, and partnerships. ITS America understands that technology is able to solve many problems, but also recognizes that business, public institutions and even the public must adjust to new realities of connectivity and the Internet of Things (IoT). We understand the potential for automated and connected vehicles to save thousands of lives and are cognizant that any such new vehicle technologies must be safe and secure in all circumstances.

Background

ITS America has been at the center of the development of Dedicated Short Range Communications (DSRC)-enabled Connected Vehicles. In 1997, ITS America petitioned the Federal Communications Commission (FCC) to allocate the 5.9 GHz Band to DSRC. Since that time, ITS America has played a key role in facilitating the development and deployment of DSRC equipment, services and applications, in partnership with the U.S. Department of Transportation (US DOT), state departments of transportation (state DOTs), and its many private sector, academic and other members. From 2000 to 2003, ITS America, its members, US DOT, and others worked with the Commission to develop the appropriate licensing and service rules for DSRC in the 5.9 GHz Band, culminating in the release of a Report and Order adopting these rules in 2004. Furthermore, ITS America petitioned the FCC to change its DSRC rules to create separate designations for vehicle-to-vehicle communications and longer range "public safety" service in 2006.[2]

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[1] Notice of Proposed Rulemaking, *Federal Motor Vehicle Safety Standards; V2V Communications*, 82 Fed. Reg. 3854 (Jan. 12, 2017) ("NPRM").
[2] See generally, Amendment of the Commission's Rules Regarding Dedicated Short-Range Communication Services in the 5.850-5.925 GHz Band (5.9 GHz Band); Amendment of Parts 2 and 90 of the Commission's Rules to Allocate the 5.850-5.925 GHz Band to the Mobile Service for Dedicated Short Range Communications of Intelligent Transportation Services, Report and Order, FCC 03-324, WT Docket No. 01-90, ET Docket No. 98-95, RM-9096, 19 FCC Rcd 2458 (2004)

Significantly reducing traffic safety deaths requires multiple strategies—better enforcement of traffic laws, improved driver education, and public outreach—designed to instill safety consciousness into the driving culture. However, technological improvements to road infrastructure and vehicle also can dramatically decrease fatalities and injuries. Preliminary 2016 data from the National Safety Council estimates that as many as 40,000 people died in motor vehicle crashes last year. That marks a 6% increase over 2015, the most dramatic two-year escalation since 1964.[3] Automotive safety technologies of the past focused on crashworthiness of vehicles or occupant protection—protecting drivers and passengers after a crash. New technology has evolved to the point where crashes can be prevented in the first place. The advancements represented by DSRC are especially timely and important; as there is significant risk we may see an unprecedented long term increase in traffic fatalities and injuries.

As NHTSA cites in the above captioned Notice of Proposed Rulemaking (NPRM), DSRC-based V2V technology represents is a large set of voluntary consensus standards—everything from standards for communications, to security and privacy, to V2V applications. (This set of standards often is described under the moniker Wireless Access for Vehicular Environments (WAVE), but is by no means limited exclusively to this). DSRC represents nearly a decade of architecture, standards, technology development, and testing by industry and the research community. DSRC represents set of open standards supported most of the major automakers, with General Motors already beginning deployment this year.[4]

As of March 2016, public and private entities have built and have also deployed DSRC Vehicle-to-Infrastructure (V2I) sites utilizing the same DSRC based architecture and standards in multiple locations in numerous states: Alaska, Arizona, California, Colorado, Delaware, Florida, Indiana, Louisiana, Maine, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, Nevada, Nebraska, North Dakota, Ohio, Oregon, Pennsylvania, South Carolina, Virginia, Utah, Washington, and Wyoming. Licensed public safety entities deploying V2I include state, county and city transportation agencies, port and bridge authorities, and transit agencies in collaboration with non-public safety organizations including research and technology development facilities, fleet telematics services, IoT cloud service providers.[5] The vision for the use of the "Intelligent Transportation Service" (ITS) DSRC is one interoperable standard for all vehicles and all traffic control systems enables industry to focus on new application development without worrying about basic interoperability. One standard drives economies of scale and scope, and lowers the cost of Intelligent Transportation Systems for all technology providers and public agencies that are spending taxpayer money. Intelligent transportation systems is a critical step in renewing and modernizing our aged transportation infrastructure and building smart communities.

DSRC for crash avoidance avoids past problems that have plagued the development of other transportation technologies, such as the proliferation of multiple, un-interoperable tolling standards across the country. Engineers developed DSRC to be a platform that meets four requirements: (1) low latency and the ability to function at highway speeds in difficult road conditions; (2) interoperability across vehicles (V2V), mobile devices, and traffic control systems (V2I)—altogether vehicle-to-X (V2X); (3) "expandability" to allow for multiple V2X applications to be provisioned on one or many app service platforms; and (4) security and privacy, or the ability to establish secure connections between vehicles that might encounter each other, while maintaining the privacy of the drivers.

Interoperability and Establishing Pathways for New Technology and Applications

We believe that NHTSA is correct in establishing a motor vehicle safety standard now. We also believe that as far as interoperability is concerned, DSRC-based standards and technology are currently the most technically mature and widely accepted "cooperative" short range approach for crash avoidance and vehicle automation. First and most broadly, the technology has a large ecosystem of technology suppliers, transportation authorities and infrastructure operators, and automakers that support it, which greatly removes barriers, speeds product to market and lowers risks to integration and deployment. Furthermore, DSRC has established a basic level of interoperability based upon FCC technical and service rules and standards established in Institute of Electrical and Electronics Engineers (IEEE), Society of Automotive Engineers (SAE) and other voluntary consensus standards bodies. The FCC had the

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3 "NSC Motor Vehicle Fatality Estimates," National Safety Council, February 15, 2016
4 "V2V Safety Technology Now Standard on Cadillac CTS Sedans" https://www.gm.com/mol/m-2017-mar-0309-v2v.html, accessed 4/12/17
5 Query from FCC Universal Licensing System, http://wireless.fcc.gov/uls/ accessed 4/12/17

foresight to layout the blueprint for the foundations for V2V when it allocated the spectrum in October 1999, established technical and service rules in 2004, and amended its rules in 2006 to provide special FCC priority and protection for V2V.

However, ITS America also believes that the proposed standard should be performance-based and flexible enough to incorporate future technologies -- technologies that have not had the level of standardization, testing or validation that DSRC has had to date. Even though there has been an explosion of infotainment connectivity in vehicles, we are in the early days of highly automated vehicle systems (SAE Levels of Automation for On-Road Vehicles – J3016 levels 4 and 5) that rely upon multiple sensors, data, and safety critical communications. Just as in today's telecommunications marketplace where broadband internet access can be delivered by a whole host of different technologies (e.g., wired broadband such as fiber, copper, and coaxial cable; licensed wireless such as 4G; and unlicensed short range wireless such as Wi-Fi, Bluetooth etc.), we look forward to a future where there is abundant options to support V2X safety.

We urge NHTSA to move carefully to ensure that any standard is flexible enough to allow other wireless technologies to be incorporated under the federal standard as long as they can demonstrate a minimal combined performance for interoperability, security, and privacy. We commit to working with USDOT and others to establish pathways for future wireless technologies such as future 5G to support V2X communications.

ITS America recognizes that V2X solutions must be market driven. We agree with NHTSA that requirements for particular V2V applications beyond interoperability and security are best left outside of scope of the rulemaking to allow industry to further innovate. Having NHTSA involved, however, in the development of a federal standard will help resolve the last of remaining technology and standards issues as they become salient (e.g., spectrum, network and application interoperability, ongoing security and privacy, etc.). Reducing such uncertainties lowers investment risk, encourages further research and deployment of V2X applications, and bolsters consumer confidence. To this end, ITS America believes NHTSA should define interoperability more broadly in reference to not just future V2V technologies, but to DSRC itself.

We disagree with NHTSA that V2V capability should only be limited to only one channel within the DSRC band. The DSRC band was designed for multi-channel operation to allow application developers flexibility on how to leverage spectrum resources to minimize interference risk and manage channel capacity without compromising on interoperability. ITS America agrees with NHTSA that devices participating in the V2V information environment need to exchange safety information, but urges that choice of channels should be left to industry within the constraints of the current FCC technical and service rules.

NHTSA is mistaken when it states that "FCC has specified that BSM [Basic Safety Message] transmissions and reception will occur on channel 172." [6] FCC has never set requirements related to the Basic Safety Message standard, nor has anyone petitioned the FCC to do so. ITS America agrees that the FCC, not NHTSA or US DOT, has the authority to determine the commercial use of spectrum." However, "commercial use" of DSRC spectrum is not defined in the FCC's ITS/DSRC technical and service rules. Although FCC has authority to define "commercial use," it has never chosen to define the term in reference to DSRC. FCC regulations define DSRC service as systems that "use radio techniques to transfer data over short distances between roadside and mobile units, between mobile units, and between portable and mobile units to perform operations related to the improvement of traffic flow, traffic safety, and other intelligent transportation service applications in a variety of environments." [7] Indeed, "commercial use" of DSRC spectrum for the provision of telecommunications services is not permitted by Section 90.373 of the FCC's Rules. However, like most Part 90 spectrum, DSRC spectrum may be licensed to commercial entities for the provision of DSRC services.

NHTSA is also mistaken in its "expectation" that non-safety critical services will occur on other channels besides 172. [8] On other channels, FCC rules do *not* prohibit V2V or safety-of-life services, and even applies a service priority framework to address. The FCC created V2V channel (channel 172) *exclusively* for "safety-of-life"

6 NPRM, https://www.federalregister.gov/d/2016-31059/p-539
7 FCC Report and Order 03-324 (rel. February 10, 2004)
8 NPRM, https://www.federalregister.gov/d/2016-31059/p-543

services, as defined from the priority framework that was developed and codified in the 2004 technical and service rules. V2V is further defined as "accident avoidance and mitigation and safety of life and property applications."[9] ITS America supported the petition to the FCC to designate an exclusive V2V channel in 2005, and the V2V channel was created by the FCC to prevent other critical applications from competing for resources with vehicle-based crash avoidance applications in at least one channel within band.[10] Other channels besides 172 could be used for V2V platooning, and some early applications exist for "safety-of-life" priority services on other channels, such as pedestrian safety or intersection safety applications.

NHTSA makes a mistake, however, in addressing only channel 172 as a proposed safety standard. Narrowly defining V2V capability to a single channel in a single band is inconsistent with the agency goal of creating a performance standard that forges a pathway toward defining interoperability both within DSRC, but also beyond DSRC in reference to potential future wireless technologies. As NHTSA seeks to understand the potential safety benefits of DSRC beyond the two V2V applications it addresses in its cost benefit analysis, ITS America believes that agency should not too narrowly define DSRC channel use lest it unintentionally excludes future V2V services.

The Role of a Federal Motor Vehicle Safety Standard in Deployment of V2V

We agree with NHTSA that the market will not achieve sufficient coverage absent near universal commitment on the part of automakers to make V2V a capability in all vehicles. A mandate in particular addresses the "Chicken and Egg" conundrum—a value proposition problem involving a product (or service) in two separate economic sectors that is dependent on the market penetration in the other. Automakers (and for that matter even V2X aftermarket device manufacturers) have no incentive to equip with V2V if there is no commitment from others to equip.

Traditional vehicle safety technologies (e.g., airbags, seat belts, electronic stability control, etc.), protect drivers the minute they drive their new car off the dealership lot. In order for drivers to benefit from V2V, however, there needs to be a critical mass of other V2V-equipped vehicles. Making V2V a requirement for all new cars will ensure a minimum number of vehicles will be deployed in a short period of time to kickstart deployment and create a positive feedback loop to grow the safety benefits of the technology. The utility of V2V communications, like any networked service, is a function of the number of users that are equipped to communicate, and the value of the service itself. According to Metcalfe's Law, the value of a telecommunications network is proportional to the square of total number of connected nodes. Metcalf's law is suited for evaluating networks with a fixed number of always connected nodes (i.e. nodes that connected all times with a relatively fixed topology). As a result of this, the square of the market adoption percentage can used to quantify V2V utility to accommodate the V2V ad-hoc network topology. This aligns with the observation that the chance for two V2V-equipped vehicles to encounter each other is roughly the square of V2V in-vehicle equipage penetration.

ITS America believes a Federal Motor Vehicle Safety Standard will also drive deployment of V2V in existing vehicles, building upon deployment in new vehicles. With the establishment of a larger V2X application ecosystem by the auto industry and traffic technology providers, ITS America foresees DSRC growth in dashboard automotive aftermarket and consumer electronics categories of devices that will likely fill the gap between V2V equipage in new vehicles that comply with a potential future NHTSA FMVSS and existing vehicles that are excluded from this standard.

ITS America has forecasted the growth of aftermarket and consumer electronics given a V2V motor vehicle standard. Our forecast shows that by 2029—seven years after the projected phase-in of the light vehicle V2V rule, 60% of all vehicles, or a cumulative 146 million cars, will have DSRC/V2X equipment. Adoption of aftermarket/consumer electronics DSRC/V2X devices for existing vehicles are forecast to outpace factory installed DSRC for new cars for by 2027.[11]

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[9] Amendment of the Commission's Rules Regarding Dedicated Short-Range Communication Services in the 5.850-5.925 GHz Band (5.9 GHz) Amendment of Parts 2 and 90 of the Commission's Rules to Allocate the 5.850-5.925 GHz Band to the Mobile Service for Dedicated Short Range Communications of Intelligent Transportation Services FCC Memorandum Opinion and Order 06-110 (rel. July 26, 2006)
[10] Recommended Practices for DSRC Licensing and Spectrum Management A Guide for Management, Regulation, Deployment, and Administration for a Connected Vehicle Environment Final Report — December 2015 Federal Highway Administration FHWA-JPO-16-267
[11] The Impact of a Vehicle-to-Vehicle Communications Rulemaking on Growth in the DSRC Automotive Aftermarket A Market Adoption Model and Forecast for Dedicated Short Range Communications (DSRC) for Light and Heavy Vehicle Categories - Final Report — October 15, 2016

The technology and growth path for V2V and V2I for existing vehicles or infrastructure, following a NHTSA V2V mandate is notable. With new V2V equipped vehicles on our nation's roadways, road agencies could then invest more in safety and traffic management V2I, and portable and aftermarket device manufacturers can begin adding V2X features in their navigation GPSs, fleet dispatch systems, dashboard and rear-view safety cams, and mobile phones. A critical mass of equipped light vehicles would also create ready market for V2X and would spur OEM and aftermarket adoption among others, such as commercial heavy vehicles fleets and vulnerable road users. Vulnerable populations benefiting from V2X through portable devices would likely include pedestrians, motorcyclists, bicyclists and other types of road users that to date have few options to protect themselves from devastating crashes.

For this reason, ITS America believes that NHTSA has underestimated the benefits of V2V capability and the final positive safety impact of the rule. The agency's estimation does not take into consideration the growth in V2V aftermarket devices, vehicle-to-pedestrian or vehicle to infrastructure, none of which are captured in the agency's cost-benefit analysis.

Furthermore, ITS America believes NHTSA underestimates benefits related to future vehicle automation. Long term, with autonomous vehicles, there will be a fundamental need for cars to talk to each other, especially as more and more highly automated vehicles are introduced and intermingle in traffic and at intersections. Opportunities such as V2V platooning would improve fuel efficiency, reduce congestion and improve passenger and freight movement. The integration of V2V would improve the performance of crash sensing and driving automation -- adding data that checks the results of other sensors, creating an additional layer of safety and security. In challenging environments such as hazardous weather conditions, V2V may play a complementary role where other sensors may go blind or have diminished capacity—potentially expanding the operational design of an highly automated vehicles.

Although ITS America understands that intangible costs need to be factored into any regulatory decisions, addressing Wi-Fi use in the ITS/DSRC band as an opportunity cost of this proposed motor vehicle safety standard is ineffective. Opportunity costs are the costs incurred due to the need to divert expenditures (legal services, audits etc) to regulatory compliance. Spectrum is not, however, a regulatory compliance cost. The only case where spectrum might be a compliance cost may be if the FCC changes the technical and service rules and forces automakers to redesign and redeploy the technology to comply with regulatory changes.

ITS America and others have encouraged the FCC to consider these opportunity costs in its filings to the FCC. However, "spectrum opportunity" cost beyond compliance costs lead agencies down the rabbit hole. For any agency (even at the state and local agencies) that sought to use any part of DSRC would need to conduct an "opportunity cost" evaluation of alternative uses of spectrum before proceeding with any policy, suggesting that the no one can rely upon the FCC's authority and original decision to allocate the use of the band for ITS/DSRC.

Finally and most critically, putting likely preventable fatalities lost in vehicle crashes next to economic benefits of WiFi is very problematic. Suggesting WiFi use of DSRC spectrum is a foregone opportunity implies there may be acceptable lower level of safety can be sustained so long as broadband can be expanded. This kind of analysis is not consistent with the mission of US DOT and NHTSA to advocate and promote traffic safety.

Overall, ITS America believes that any regulation should not impose unnecessary costs or burden industry. ITS America supports controlling regulatory costs and that every proposal for an agency regulation must be carefully scrutinized. ITSA will work to help the administration address costs where necessary, and will also support new measures that capture benefits of the rule are beyond those cited in the proposed rulemaking.

Conclusion

ITS America believes that the proposed standard as an important first step forward and we are looking forward assisting the agency address issues in establishing a framework for cooperative vehicle and infrastructure safety.

Sincerely,

/s/ Steven Bayless

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