



---

**Motor & Equipment Manufacturers Association**  
**Comments to the**  
**National Highway Traffic Safety Administration on**  
**Notice of Proposed Rulemaking; Federal Motor Vehicle Safety Standard;**  
**Vehicle-to-Vehicle Communications**  
**Docket No. NHTSA-2016-0126**  
**April 12, 2017**

---

## **Introduction**

The Motor & Equipment Manufacturers Association (MEMA) represents 1,000 vehicle suppliers that manufacture and remanufacture components and systems for use in passenger cars and heavy trucks providing original equipment (OE) to new vehicles as well as aftermarket parts to service, maintain and repair over 260 million vehicles on the road today.<sup>1</sup> Our members lead the way in developing advanced, transformative technologies that enable safer, smarter and more efficient vehicles, all within a rapidly growing global marketplace with increased regulatory and customer demands.

Vehicle suppliers are the largest manufacturing sector in the United States directly employing over 871,000 Americans in all 50 states plus the District of Columbia. Together with indirect and employment-induced jobs, the total employment impact of the motor vehicle parts manufacturing industry is 4.26 million jobs. Nearly \$435 billion in economic contribution to the U.S. GDP is generated by the motor vehicle parts manufacturers and its supported activity. In total, motor vehicle parts suppliers contribute more than 77 percent of the value in today's vehicles.<sup>2</sup>

MEMA provides these comments to the National Highway Traffic Safety Administration (NHTSA) in consideration of its proposed rule to mandate vehicle-to-vehicle (V2V) communications in new vehicles. Representing a wide range of suppliers of original equipment and aftermarket technologies for both light and heavy vehicles, MEMA can provide broad input to NHTSA on V2V communications. MEMA anticipates that several members will also provide individual comments specific to their expertise and experiences with the technology.

---

<sup>1</sup> MEMA represents its members through four divisions: Automotive Aftermarket Suppliers Association (AASA); Heavy Duty Manufacturers Association (HDMA); Motor & Equipment Remanufacturers Association (MERA); and, Original Equipment Suppliers Association (OESA).

<sup>2</sup> ["Driving the Future: The Economic Impact of the Motor Vehicle Parts Manufacturing Industry on the United States,"](#) MEMA and Boston Consulting Group, January 2017.

---

## **Suppliers Are Prepared for a Connected Vehicle Environment**

Our members lead the way in developing and deploying a wide range of advanced, transformative technologies like advanced driver assistance systems (ADAS), vehicle-to-vehicle (V2V) communications, autonomous vehicle systems and other critical safety innovations, each with the goal of saving lives. Suppliers are invested in and prepared for a connected vehicle environment. There are technological and policy building blocks needed to achieve the collective goals; this proposed rule is critical to moving forward.

Over the past several years, suppliers of both light and heavy vehicle components and systems have been – and continue to be – very actively engaged in multiple cooperative activities. They have provided significant resources towards academic and industry research projects, and government-industry joint endeavors. This includes, but is not limited to, the Crash Avoidance Metrics Partnership (CAMP), the U.S. Department of Transportation’s (U.S. DOT) Intelligent Transportation Systems Joint Program Office (ITS-JPO), various safety pilot driver clinics and academic research projects and the NHTSA Connected Vehicles Safety Pilot Project. Suppliers are also key participants and collaborators in various standards development activities, such as the SAE J2735 “Dedicated Short Range Communications (DSRC) Message Set Dictionary.”

MEMA member companies have dedicated considerable financial, products, materials and personnel resources to support these research and development projects within their companies, within their own supply chain and, of course, with their vehicle manufacturer customers and government partners. Many suppliers are engaged in agreements with various federal and state agencies for research, testing and deployment.

---

## **Commercial Vehicle V2V Must Remain a Priority**

MEMA applauds the research and development work that NHTSA and its other U.S. DOT agency partners have put toward making V2V communications a reality for light passenger vehicles. Still, to rapidly achieve the U.S. DOT’s goal of a fully connected vehicle environment, adding commercial vehicles (Classes 3-8) to the V2V/V2X environment is critical. Therefore, the work being done on large truck V2V must remain a top priority for NHTSA to help ensure the advancement of automated safety technologies and future autonomous applications for these vehicles. Because MEMA also represents heavy vehicle suppliers, we urge the agency to complete its research work and decide on next steps for V2V for heavy vehicles as soon as possible. This activity should occur in quick succession to the light vehicle V2V rulemaking to ensure the implementation and deployment of the light/heavy vehicle programs occur simultaneously to help deliver the maximum possible safety benefit. This timing is even more critical as the number of fatalities and injuries from crashes involving large trucks increases.<sup>3</sup>

---

<sup>3</sup> Traffic Safety Facts 2015 Data, “Large Trucks,” NHTSA, DOT HS 812 373, Feb. 2017

---

## **MEMA V2V NPRM Comments Overview**

MEMA supports NHTSA's proposed rule to issue Federal Motor Vehicle Safety Standard (FMVSS) No. 150 establishing that V2V communication capability be required on all new light vehicles to allow the exchange of standardized Basic Safety Message (BSMs) with surrounding vehicles. Utilizing the 5.9 GHz spectrum, dedicated short-range communication (DSRC) device technology allows suppliers and original equipment manufacturers (OEMs or vehicle manufacturers) to integrate highly accurate operational and position information directly from surrounding vehicles. This technology can "see" beyond what can be detected by existing radar, vision, and LIDAR sensors, even in inclement weather conditions. In addition, non-line-of-sight communication is possible if multi-path transmissions occur. This can be especially beneficial in urban environments. The inherent low latency of the proposed direct V2V system allows the adoption of collision warning applications – something not possible with cellular tower-based communication methods.

MEMA also believes that although potential V2V technology alternatives may become available at some undefined point in the future, deployment of a 5.9 GHz, DSRC V2V system is critical to achieve the next level of vehicle safety enhancements necessary to reduce fatalities on U.S. roadways today. This technology is well understood and has been rigorously tested in real-world conditions by our vehicle supplier members and their OEM customers. It is specifically designed to communicate only with other relatively close-range vehicles and thus elegantly eliminates the problems that potential longer range technologies have with too much information from distant vehicles.

---

## **A Mandate is Necessary for a Successful V2V Communications Deployment**

MEMA agrees with NHTSA's conclusion that a mandate is the best method to guarantee that a critical mass of equipped vehicles is achieved within the American fleet. By specifying the related standards and establishing a security certificate infrastructure, a mandate ensures that all OEM vehicles are interoperable and meet minimum system performance standards.

V2V communications information can be used to augment current ADAS technologies, which use radar, camera and LIDAR sensors.<sup>4</sup> Basically, V2V offers a way to seamlessly integrate with other vehicle sensors, expanding the threat-sensing range around the vehicle. By adding a longer-range capability to "see" around obstacles than are provided by existing vehicle sensors, potential threats can be identified earlier, thus allowing greater warning time and improved vehicle safety. There is also the potential for aftermarket DSRC devices installed in existing vehicles to help bridge and accelerate the market saturation rate of DSRC-equipped vehicles in the nation's fleet.

---

<sup>4</sup> In 2015, [MEMA commissioned a study](#) to evaluate an ADAS roadmap and the anticipated costs-benefits. Collectively, that study showed that ADAS features could save almost 10,000 lives by preventing 2.3 million accidents and approximately \$251 billion in costs to society annually in the United States. Compounded with V2X, the safety benefits of both groups of technologies are significant.

### *Mandate Versus an “If-equipped” Standard*

MEMA supports the requirement that all new vehicles be equipped with V2V technology. For V2V to be effective sooner and more rapidly realize the safety benefits, maximum fleet penetration is necessary by implementing a NHTSA mandate and future state and private (i.e. insurance company) efforts to incentivize aftermarket installations. An “if-equipped” standard will not result in a high enough level of fleet penetration to make the system useful.

### *Data Fusion Potential*

MEMA supports the view that other V2V systems will offer significant data fusion opportunities when installed in conjunction with existing and future radar, vision, and LIDAR-based safety systems. Both warning-only and active safety systems typically rely on a confidence level assessment that a safety threat is valid (i.e. it really is a vehicle or object stopped in the roadway ahead of your vehicle). V2V technology offers an excellent method to corroborate threats detected by these vehicle-based safety systems. Since this can happen sooner than with a vehicle-based system alone, the confidence level will be higher and a warning or active response can occur earlier - resulting in significantly improved vehicle safety. In addition, although V2V is not a replacement for on-vehicle safety systems, it does offer a cost-effective method to equip vehicles with safety warning technology.

### *V2V Enhances Automated Driving Functionality*

Although several high-profile automated vehicle technology developers have publicly stated that V2V is not necessary for successful automated driving, most industry experts believe that V2V systems and the additional information they provide will be beneficial and complement existing sensors and technologies, including those used for automated driving. DSRC also can receive information on some types of threats that cannot be detected by existing sensors.

### *Aftermarket Certification Standards*

MEMA agrees that aftermarket device equipment should be certified to the same level required for OEM-installed V2V equipment to maintain the overall performance levels of the fleet. This certification should occur prior to the granting or assigning of security certificates for an aftermarket device model. For similar reasons, aftermarket installations should be done by certified device installers to maintain the same minimum NHTSA performance requirements required for OE installations, ensuring that vehicle parameters have been properly loaded. The certifications – both of aftermarket products and installers - would be handled by the accredited certification body – assumed to be the members of the Certification Operating Council (COC). The importance of maintaining a high minimum-performance standard for both OE and aftermarket installations cannot be overstated and certification will be a critical part of this process.

---

## **Performance Requirements and Data Transmission**

### *Minimum Navigational Positioning Accuracy Requirements for V2V Global Navigation Satellite System (GNSS) Receivers*

V2V is a cooperative safety system that relies on accuracy of the hardware systems and the performance of safety software applications on both the host and target vehicles, and it will be necessary to establish minimum performance standards for positional accuracy. The GNSS (e.g. GPS systems) receivers available today exhibit a wide range of location accuracy performance with many that are not accurate enough for effective V2V systems. MEMA agrees that NHTSA should establish minimum location performance parameters. However, MEMA is concerned that the current proposal (the Longitude and Latitude within 1.5m of actual position at Horizontal Dilution of Precision (HDOP) <5 and 1 sigma absolute error along with within 3m of actual position for elevation) will be too difficult to meet – at least initially. In addition, well-defined testing requirements to measure this performance will be needed. It is likely that existing GNSS technologies will not be accurate enough initially for all applications so one possible solution would be a gradual tightening of the location requirement. This could be implemented using the existing positional accuracy data field in the BSM. Different classes of approval or certification grades could be granted based on GNSS location performance.

### *Minimum Performance Standards are Necessary for V2V Safety Applications*

Given that V2V is a cooperative safety system, relying on accuracy of the hardware systems and safety software applications on both the host and target vehicles, it will be necessary to establish – in the future – minimum performance standards for individual critical applications such as: Intersection Management Assist (IMA); Left Turn Assist Warning (LTA); Emergency Electronic Brake Light Warning (EEBL); Obstructed Stopped Vehicle Ahead Warning (OSVA); Do Not Pass Warning (DNPW); and, Forward Collision Warning (FCW). This is especially true on the transmitting side of the system. But, on the receiving side, each OEM and supplier should be free to manage the received information as they see fit. Therefore, MEMA recommends that NHTSA focus on minimum performance standards for the transmit side and leave the receiving side up to the OEMs and their suppliers based on the design of the individual system.

### *Channel 172 is an Appropriate Choice for Continuous BSM Transmission*

MEMA supports Channel 172 as the choice for BSM transmission, since this has been the intended use of the channel. Also, all system design, testing, and deployments are based on this channel.

### *Data Transmission Rates*

MEMA and its members are open to congestion mitigation methods including on-the-fly changes to data transmission rates depending on traffic.

### *BSM Minimum Transmission Performance Standards*

MEMA supports NHTSA's assessment that performance-based BSM transmission requirements are an appropriate way to ensure that fielded systems meet a minimum performance level. As previously stated, due to the cooperative nature of V2V communications, all systems must be held to a minimum performance standard so that warning errors are minimized and the overall system operates effectively.

### *Allowable Delay Before Transmitting a BSM Upon Startup*

MEMA is concerned that 2 seconds to begin BSM transmission after putting the vehicle in gear (and at least 4 seconds after starting, or 6 seconds overall), may not be enough time for system initialization due to slow satellite signal acquisition even in a "clear skies" testing environment. MEMA recommends that NHTSA revise the proposed regulatory text<sup>5</sup> for § 571.150 as follows (proposed change in bold underlined italics):

*S5.2 Initialization time.* A DSRC device must begin transmitting the BSM within 2 seconds after the V2V device power is initiated ***and receiving robust GNSS data.***

### *A Minimum Transmission Range of 300 Meters is Appropriate*

MEMA agrees that 300 meters is a reasonable minimum range based on both the analysis of safety applications needs and system field testing. While most fielded V2V systems will have longer ranges, setting 300 meters as the minimum is a reasonable compromise between desired performance and establishing reasonable and achievable testing requirements.

### *A Maximum Transmission Range Requirement is Not Needed*

In real-world environments, various conditions can affect both minimum and maximum transmission ranges such as line-of-sight, obstructions, moving vehicles, etc. While establishing a minimum range test requirement under controlled conditions makes sense and ensures that underperforming systems do not make it into the field, establishing a maximum range does not. Further, maximum range is naturally limited by the Federal Communications Commission (FCC) limits on the maximum transmission power of the radio as well as real world environmental conditions. In addition, maximum range testing requires much longer test environments and introduces difficulties in test repeatability. For these reasons, MEMA asks NHTSA to not require a maximum transmission range.

### *FIPS 140 Validation May Present Unnecessary Burdens*

In the NPRM, NHTSA proposes "that V2V equipment be 'hardened' against intrusion (FIPS-140 Level 3) by entities attempting to steal its security credentials."<sup>6</sup> The agency also indicated it "expects that regulatory text in any final rule would include

---

<sup>5</sup> 82 Fed Reg at 4013

<sup>6</sup> 82 Fed Reg at 3857

a provision requiring that V2V devices have a minimum-security protection of FIPS-140 Level 3 for storage of cryptographic certificate, key, and other sensitive data.”<sup>7</sup>

Obtaining FIPS 140 validation requires a rigorous testing process by an accredited testing laboratory. The results are then reviewed by the National Institute of Standards and Technology (NIST) which issues a FIPS 140 validation certificate.

MEMA believes this requirement may be burdensome and cause product delays if NHTSA requires FIPS validation to be reviewed by NIST. Instead, NHTSA should specify the elements deemed necessary in ISO/IEC 19790:2012, and allow accredited labs both inside and outside of the U.S. to provide validation against the ISO 19790 standard.<sup>8</sup> NHTSA should not require validation by NIST. Doing so will more fully support a global supply chain and encourage international harmonization of requirements.

Additionally, another concern with FIPS 140 Level 3 is that users must be individually be known to the ECU. This could be problematic for diagnostics purposes (e.g. repair technicians) and may not be feasible. Again, MEMA urges NHTSA to select only the needed elements from the ISO/IEC 19790 standard.

---

### **“Alternatives” to DSRC Should be Interoperable**

In the NPRM, NHTSA indicates that the mandate “could also be satisfied using non-DSRC technologies that meet certain performance and interoperability standards.”<sup>9</sup> While non-DSRC alternatives may exist at some point in the future, 5.9 GHz DSRC-based V2V is the only technology that fulfills the low latency requirement required by safety warning systems. Requiring all V2V systems to be interoperable with 5.9 GHz DSRC systems is therefore critical. In the final rule, NHTSA should make it clear that any V2V communication system must ensure interoperability with DSRC and DSRC transmission of the BSM in Channel 172. Evolution of the 802.11 standard will occur and should be allowed only as long as it remains backwards-compatible.

---

### **Retaining the 5.9 GHz Spectrum is Critical**

MEMA does not support sharing of the 5.9 GHz spectrum, which the vehicle industry has dubbed the “Vehicle Safety Spectrum.” All previously proposed “sharing” mechanisms will result in some lost BSM transmissions that will impact vehicle safety.

---

<sup>7</sup> 82 Fed Reg at 3917

<sup>8</sup> On Aug. 12, 2015, NIST sought public comments ([80 FR 48295](#)) on using International Organization for Standardization/International Electrotechnical Commission (ISO/IEC) standards (e.g. ISO/IEC 19790:2012) for cryptographic algorithm and cryptographic module testing, conformance, and validation activities, currently specified by Federal Information Processing Standard (FIPS) 140-2. As noted in the NIST Request for Information, “the National Technology Transfer and Advancement Act (NTTAA), Public Law 104-113, directs federal agencies to adopt voluntary consensus standards wherever possible.”

<sup>9</sup> 82 Fed Reg at 3857

### *Sharing the Spectrum with Unlicensed Devices*

As NHTSA is aware, the Federal Communications Commission (FCC) opened a proposal in 2016 about the “potential sharing solutions” on the use of U-NII devices in or near the 5.9 GHz spectrum. MEMA’s comments urged the FCC to preserve the 5.9 GHz band and its channelization as designed for DSRC.<sup>10</sup> Development of DSRC safety and mobility applications has been under way for well over a decade. MEMA underscored that V2X technologies have undergone rigorous years of research and validation. Fundamental industry standards have been developed to a common framework to assure reliability and establish protocols. From proof of concept to production – V2V communications are not only ready now but are integrated into in-production vehicles, such as the Cadillac CTS launched last year. Also, several states have worked with their federal and industry partners and invested heavily in V2I deployments and roadside equipment installations (e.g. Arizona, California, Colorado, Florida, Michigan, Utah). DSRC-based technology is not only critical to vehicle safety now, but also is a significant and necessary step to enabling automated vehicles in the future.

Many other industry stakeholders also urged the FCC to not permit spectrum sharing to avoid any interference with the BSM. Just recently, General Motors submitted an *ex parte* notice to the FCC docket; MEMA recommends that NHTSA review that notice.<sup>11</sup> The GM letter states, “... due to the low latency of DSRC they [CAMP testers] have incurred up to a 90 percent error rate with cross channel interference.” Also, a “coexistence study” from the Electronics Communications Committee (ECC) of the European Conference of Postal and Telecommunications Administrations (CEPT) released earlier this year showed that *if* spectrum is shared, especially in urban environments, it is expected that there would be a significant reduction in communication range and dropped BSMs.<sup>12</sup>

Any call for re-channelization of the 5.9 GHz band would significantly interrupt the future of safer mobility, hinder developments in transportation safety and result in massive financial losses to the vehicle industry, government agencies, technical standards development organizations, academia, and scores of research entities.

### *Spectrum Sharing and Opportunity Costs*

To move beyond the current safety paradigm of first surface detection using radar, lidar, cameras, etc., a 5.9 GHz DSRC radio-based V2V system is needed. The 5.9 GHz spectrum is a low-cost solution that has excellent propagation characteristics and the ability to penetrate structures and other vehicles. V2V technology extends the range of a vehicle’s “knowledge” of the vehicles surrounding it thereby allowing

---

<sup>10</sup> Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band, ET Docket No. 13–49; FCC 16–68, MEMA comments, filed July 7, 2016.

<sup>11</sup> Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band, ET Docket No. 13–49; FCC 16–68, [General Motors, ex parte notice](#), filed Mar. 21, 2017.

<sup>12</sup> [“RLAN / ITS coexistence study”](#) Revision 1 to Doc. CPG(16)30, Jan. 4, 2017

more time for warnings and accident avoidance. Thus, the true cost of giving up this spectrum or limiting its use will be the lost opportunity to save additional lives. Furthermore, the radio spectrum 5.9 GHz DSRC is available for free. A cellular-based system may not offer the same free access or the low latency required for collision avoidance applications. For DSRC-based V2V communications to be deployed and successful, it must utilize the entire safety spectrum dedicated to Intelligent Transportation Systems. The technology is ready and the timing is ripe to do so today.

---

## **Other Security Items**

### *DSRC Device End-Of-Life (EOL) Security*

EOL security poses an interesting problem, but MEMA does not agree with the idea that EOL devices be added to the certificate revocation list (CRL) (i.e. misbehavior list) as the growing list will quickly overwhelm the entire system (Ex: If all the security certificates from every retired or totaled vehicle is added to the CRL, the finite memory on each remaining vehicle system will be filled). Given that risk, it seems more appropriate to do nothing. If a post-EOL device is hacked and used to emulate a genuine device, it will rapidly be added to the CRL anyway.

### *Misbehavior Detection*

MEMA is concerned that the current misbehavior detection may overload on-vehicle V2V communication ECUs. Further research is required, and NHTSA needs to establish better detection rules to create an effective detection system that does not overload onboard V2V communication ECUs.

### *Receiving-Side Security Standards*

On the receiving side, each OEM and supplier should be free to manage plausibility checks and security validations as applicable to the vehicle and driving environment. MEMA recommends that NHTSA focus on minimum security standards for the transmit side and leave the receiving side up to the OEMs and their suppliers based on the design of the individual system.

---

## **Compliance Phase-in Schedule**

MEMA agrees with NHTSA's proposed two-year lead time after final rulemaking followed by a three-year phase-in schedule. It is important to note, however, that MEMA urges NHTSA to ensure that work on misbehavior detection, the COC certification process, and the Security Certificate Management System (SCMS) is completed early on during the two-year lead time and well before the beginning of the phase in period to enable OEMs and suppliers to meet this phase-in schedule.

## **Conclusion**

In 2015, U.S. vehicle crashes claimed 35,092 lives and resulted in over 2.4 million injuries. Preliminary data for 2016 shows that those figures are on the rise. The time to address our nation's critical vehicle safety needs is now. The DSRC technologies for V2V communications offer significant safety benefits and, per the agency's own estimates, can address upwards of 80 percent of unimpaired crash scenarios. More importantly, these technologies are needed to allow automated vehicles to reach their full potential.

Suppliers are ready and able to support deployment of this technology to the U.S. fleet. MEMA strongly urges NHTSA to work promptly to finalize this rule and require V2V communications on new light vehicles. Any significant changes or delays to implementing this rule impact not only vehicle and supplier production decisions, but also (and more importantly) the safety of roadway users.

MEMA appreciates NHTSA's consideration of our comments to the NPRM. For questions, please do not hesitate to contact MEMA's Chief Technology Officer [Brian Daugherty](#) at (248) 430-5966 or Senior Director of Regulatory Affairs [Leigh Merino](#) at (202) 312-9249.

# # #