MEMA Comments to

Federal Communications Commission

Office of Engineering and Technology

Re: Phase I Testing of Prototype U-NII-4 Devices; Report TR 17-1006

ET Docket No. 13-49

November 28, 2018

Introduction

The Motor & Equipment Manufacturers Association (MEMA) appreciates the opportunity to offer comments to the Federal Communications Commission's (FCC) Office of Engineering and Technology (OET) regarding the report for Phase I testing to evaluate potential sharing solutions between the proposed Unlicensed National Information Infrastructure (U-NII) devices and Dedicated Short Range Communications (DSRC) operations in the 5850-5925 MHz (U-NII-4) frequency band.[1]

MEMA represents vehicle suppliers that manufacture components and systems for use in passenger cars and heavy trucks providing original equipment to new vehicles as well as aftermarket parts to service and repair vehicles.[2] 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 consumer demands.

MEMA supports the efforts of the FCC and the U.S. Department of Transportation (DOT) to test and evaluate the 5.9 GHz spectrum. A fully comprehensive approach is necessary to ensure there would be no harmful interference. While MEMA appreciates the FCC's commitment to finding the best method to deploy vehicle safety applications while working to meet demands for spectrum use, we remain concerned about endeavors that seek to share or re-channelize this spectrum. Any vehicle-to-vehicle (V2V) communication messages lost due to interference will degrade the safety benefits offered by V2V technology.

DSRC Technology

DSRC is a critical safety technology that offers secure, reliable, all-weather, and rapid transmissions enabling vehicle-to-vehicle (V2V) and vehicle-to-everything (V2X) communications. DSRC technology allows vehicles to communicate with one another (GPS location, speed, intended path, etc.) up to 10 times per second. The motor vehicle supplier industry has spent millions of dollars on research and development in reliance on the Commission's channel plan to meet the requirement for very low latency, stability, and reliability. In addition, the DOT, many state departments of transportation, and related agencies and stakeholders have all made significant research, infrastructure, and planning investments. All these endeavors are dedicated to a future that envisions a highly connected vehicle environment to enhance mobility. Through low latency communications, DSRC provides 360-degree situational awareness for all road users that no other

[1] Report TR 17-1006 released Oct. 22, 2018

[2] 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 Manufacturers Association (OESA). Suppliers are the largest employers of manufacturing jobs in the U.S, directly employing over 871,000 workers with a total employment impact of 4.2 million jobs.

sensor technology can match. The technology provides longer range information than on-vehicle sensors and can "see" around other vehicles and obstructions and do so in all weather conditions. By directly communicating with surrounding vehicles and infrastructure, it offers a degree of certainty that radar, lidar, and camera sensors cannot provide. DSRC can integrate seamlessly with other advanced driver assistance systems (ADAS) that utilize vehicle sensors and will also provide additional information for automated vehicles. For new vehicles, fully integrated systems are envisioned to enhance and augment a vehicle's overall safety system. For vehicles currently in the fleet, aftermarket DSRC devices can be retrofitted on most older vehicles, greatly increasing the technology deployment rate, and further enhancing collision avoidance and safety.

As you know, DSRC technology has moved from research and testing to market deployment. General Motors, which launched DSRC on its Cadillac CTS 2017 model year, announced in June 2018 that Cadillac crossovers will have V2X communications technology by 2023. GM's goal is to eventually expand to all the models of the Cadillac brand. This past spring, Toyota announced that DSRC will be deployed on their vehicles in 2021.

As the FCC is aware, analysis from the National Highway Traffic Safety Administration (NHTSA) determined that V2V communications will address up to 80 percent of all non-impaired light vehicle accidents savings thousands of lives. Although NHTSA's current rulemaking to establish safety standards for V2V communications has stalled, the agency continues to recognize and support preservation of the 5.9 GHz spectrum. On Oct. 24, 2018, NHTSA issued a statement [excerpt]:

> *"Preserving the 5.9 GHz band for transportation communications is essential to public safety today and in the future. The automotive industry and municipalities are already deploying V2X technology and actively utilizing all seven channels of the 5.9 GHz band. There are more than 70 active deployments of V2X communications with thousands of vehicles already on the road. This technology has the potential to improve infrastructure, safety and efficiency as the Department works to make road travel and future transportation significantly safer."*

MEMA remains concerned that the safety benefits of DSRC could be compromised if other devices either used or "shared" the channels in that band of the spectrum. MEMA believes that any sharing protocol must work around current and planned deployments of DSRC applications. Furthermore, thorough testing must be done to determine that such a protocol would be safe before implementation. Sharing of the 5.9 GHz band should only be considered on a "not-to-interfere-with-DSRC" basis and must positively demonstrate that any unlicensed sharing of the band will not impede the safety functions of DSRC. In addition, any sharing should not require re-channelization. Re-channelization of the 5.9 GHz band would essentially nullify the decades of research and development and diminish the investments already made by stakeholders under the current channelization. This will not only impact vehicle suppliers and vehicle manufacturers, but also governments, municipalities, and other transportation industry stakeholders. More importantly, re-channelization would set future traffic safety gains back by several years as other technologies would need to be developed, tested, validated, and deployed.

Review of the TR 17-1006 Test Report

MEMA understands that the goals of these Phase I laboratory tests were quite limited. However, some may incorrectly interpret these results as justification for spectrum sharing or re-channelization when, in fact, significant additional testing is required before making any conclusions. Many issues regarding spectrum sharing or re-channelization were not addressed with the performed tests. MEMA recommends that the FCC, DOT, and the Department of Commerce (DOC) continue and complete the 3-Phase Test Plan regarding spectrum sharing technology. Basing any decision on a partially completed test plan would be a mistake.

By its very design, the detect-and-vacate method resulted in at least some interference which will reduce the effectiveness of V2V safety systems. This was demonstrated by the Phase I testing.

Because of the highly variable, spread out, multi-nodal, and mobile nature of real-world V2V communications, it is unclear how readily these laboratory box test results correlate to actual use cases. Essentially, devices were placed inside a sealed radio frequency (RF) enclosure and tested. Significantly more testing will need to be completed in both laboratory and real-world environments. Real-world testing is also required to establish the validity of the laboratory testing methods.

While not specifically part of the tests, MEMA has significant concerns about the widely varying channel move times cited in the test results (0.3 ms to 798 ms). What parameters within the sample U-NII-4 systems resulted in such high variability? Further testing is obviously required, since minimizing channel vacate times would be the centerpiece of any channel sharing scenario. The overriding goal should be "not-to-interfere-with-DSRC" rather than delaying switching to maintain the interfering U-NII-4 device's communication channel. The report authors mention these issues multiple times and call for the establishment of a "minimum vacate time." In fact, a very low value "maximum allowable time to vacate" requirement would be needed for interfering U-NII-4 transmissions since the goal is to minimize the impact on DSRC safety transmissions.

Future testing also needs to include scenarios covering when a channel is already in use by a DSRC V2V system and the interfering U-NII-4 system comes into range.

Additional testing is also required for more realistic scenarios in which many V2V and interfering devices are in operation. It is unclear how additional devices – either DSRC devices or interfering U-NII-4 devices – will impact the results, especially from a RF noise standpoint.

Future studies will also need to examine the effects of wait time after a channel is vacated. Clearly, a long wait time is desired to reduce the safety impact, but this needs to be further studied and quantified.

Conclusion

MEMA appreciates the FCC's commitment to finding the best method to deploy vehicle safety applications while working to meet demands for spectrum use. Existing DSRC technology has been developed and is operational using a reserved band of the spectrum operating with specific channelization. Suppliers are the developers and producers of DSRC devices for their vehicle manufacturer customers. DSRC is now being deployed as a commitment to safety by several of the largest vehicle manufacturers in the United States. While the industry is ready and poised for greater deployment, regulatory uncertainty – such as waiting for the NHTSA regulation and the FCC decision on sharing – is hindering decision-making by vehicle manufacturers to push forward and deploy V2V DSRC in their products.

The first phase of FCC's study is quite limited in scope and therefore does not address many of the questions regarding the efficacy of detect-and-vacate or re-channelization. Since any lost V2V Basic Safety Messages could result in a collision, significant additional studies will be required to evaluate these spectrum sharing methods. Therefore, MEMA recommends that the FCC, DOT, and DOC continue and complete the 3-Phase Test Plan regarding spectrum sharing technology. In the interim, MEMA continues to urge the FCC to preserve the 5.9 GHz spectrum designation and channelization features as they exist today for DSRC, which is a critical vehicle safety technology.

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