



February 25, 2019

Docket Management Facility
U.S. Department of Transportation
New Jersey Avenue SE, West Building Ground Floor, Room W12-140
Washington, D.C. 20590-0001

Re: US DOT Request for Comments: V2X Communications (ID: DOT-OST-2018-0210)

Volvo Group North America (VGNA) respectfully submits comments on the U.S. Department of Transportation's (US DOT's) Comments on V2X Communications (V2X RFC), published on December 26, 2018.

- VGNA supports **preserving the 5.9 GHz band for V2X communications solely for automotive safety applications.**
- VGNA has concerns that introducing Cellular V2X ("C-V2X") or any technology that is not able to share a channel with Dedicated Short-Range Communication ("DSRC") will negatively impact today's predominantly DSRC-based V2X initiatives.
- Because the C-V2X protocol is relatively new, VGNA recommends that US DOT conduct additional testing of the C-V2X technology in the 5.9 GHz band for short-range safety applications to provide clarity on the subject of interference, performance, and spectral inefficiencies resulting from added services in separate, multiple channels.
- C-V2X is not designed to be compatible or interoperable with DSRC. Added equipment and associated development needed to accommodate non-interoperable



communication systems will delay and add to the costs of ongoing and imminent V2X deployments across the nation.

- VGNA supports the recent European Union (EU) decision to harmonize to Cooperative Intelligent Transportation System (C-ITS) standards that include ITS-G5 for V2X communication for all EU member states. ITS-G5 entails using DSRC in the 5.9 GHz band. Harmonization of spectrum allocated for V2X technologies will ensure end-users receive the benefits of economies of scale and continued safety benefits. With this decision, the EU has harmonized with the US in reserving the 5.9 GHz band solely for DSRC operation and protecting the band for V2X safety technology.
- Given the significant concerns noted below and the need for a full process to properly address these matters, the US DOT should consider opposing any channel modifications for introducing C-V2X (or any technology that is not able to share a channel with DSRC), and continue to work with FCC to test and understand shared operation in the 5.9 GHz band.
- Introduction of non-interoperable standards has the potential to stall ongoing efforts undertaken by the different V2X technology stakeholders (automakers, Federal, State, and regional public agencies) and deprive society of meaningful benefits from any V2X technology *today*.

Volvo Group activities to develop connectivity and automated transport solutions

The Volvo Group is one of the world's leading manufacturers of trucks, buses, construction equipment and marine and industrial engines. Volvo Group develops, manufactures, and sells heavy-duty trucks, buses and motor coaches and their powertrains in the U.S. under the brand names of Volvo Trucks, Mack Trucks, Volvo Bus, Nova Bus, and Prevost. The Volvo Group has been manufacturing in the U.S. since 1900 and directly employs nearly 15,000 Americans. We indirectly employ tens of thousands more Americans through our



supply chain. Our major facilities are in North Carolina, Pennsylvania, Virginia, Maryland, and New York. We have invested nearly \$2 billion in our nine manufacturing facilities since 2002 and spend more than \$250 million in R&D in the U.S. every year.

Vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communications (collectively known as V2X) have received worldwide attention during the last decade because V2X enables new services in the fields of active safety, fuel efficiency, and higher levels of automated driving. V2X technologies are referred to as cooperative intelligent transport systems (C-ITS) in Europe, and connected vehicle technologies in the U.S. Protocols for supporting initial deployment of C-ITS have been developed, approved and published. Volvo Group is contributing actively to the further development of protocols through ETSI and SAE, and follows similar work within CEN/ISO.

Real-time connectivity allows vehicles to interact with other vehicles, with the infrastructure, and with other parts of the transportation network, thereby enhancing awareness of the vehicle's surroundings. In addition to what drivers can immediately see around them, and what vehicle sensors can detect, all parts of the transport system will increasingly be able to exchange information to increase situational awareness and improve human and machine decisions. Thus, connectivity can improve road safety by detecting and acting on risks beyond the capability of the driver based on his direct line of sight. Deployment of connected technologies will improve safety by avoiding collisions, reducing congestion and improving traffic flow, while also reducing environmental impacts.

The Volvo Group is confident that connectivity and automated driving will provide for cleaner and safer communities. The Group has engaged in many flagship projects, both globally and in the U.S. Volvo Group has been a member of an automotive consortium funded by the U.S. Department of Transportation (DOT) to pre-competitively assess, design, develop, and demonstrate advanced prototype vehicle-to-infrastructure (V2I) applications to enhance safety at intersections, on an approaching curve, and at work zones



with lane closures. In 2016 and 2017, Volvo Group demonstrated three V2I safety applications that use infrastructure data to alert drivers of approaching hazards. The three applications are curve speed warning, red light violation warning, and reduced speed zone warning. The Volvo Group is the sole heavy-duty truck manufacturer in this important DOT partnership, which involves the largest light duty automobile manufacturers in the world. The consortium has also been investigating other V2I applications to provide real-time traffic information, remote monitoring, and communication between vehicles that can be used to reduce vehicle congestion and emissions.

We continue preparing for deployment of trucks with greater V2X capabilities that support higher levels of Automated Driver Assistance Systems. We know these technologies will be part of our future; exact timing depends on many things, including regulations, infrastructure, safety standards, and market demand. Furthermore, increasing momentum around technology policies and deployment guidelines is needed for wide-scale deployment. With this in mind below are our comments.

Volvo Group North America comments to DOT on V2X Communications

VGNA would like to take this opportunity to stress some important points responsive to the request for comments.

- DSRC has the potential to enhance situational awareness and can greatly enhance vehicle safety. Automation based on radar/lidar/camera systems can be enhanced by the added information gained from DSRC V2X connectivity.
- The rate of DSRC technology development (e.g., affordable chipsets, portable communication kits, etc.) and deployment (e.g., efforts undertaken by Federal, State, and many regional public agencies) has tremendously increased over the last few years. Harmful communication interferences or any disruptive channel reassignments could significantly disrupt the ongoing deployments and innovations within the currently established Federal Communications Commission's (FCC) framework. This could

impact the Day 1 and Day 1.5 applications that are being developed and tested today because automakers and public agencies will likely feel pressure to add cost to their systems to support multiple incompatible technologies. Accommodating all three technologies at the same time, namely, DSRC, C-V2X, and Next Generation V2X (NGV), will increase deployment costs and complexities by a factor of three for all V2X stakeholders.

- Keeping in mind the many ongoing DSRC-based initiatives across the nation, if FCC/DOT were to allow other V2X technologies to operate in the 5.9 GHz band, rules should be structured to support device **interoperability, including backward compatibility, so that safety data can freely be exchanged among V2X-equipped vehicles**, regardless of which V2X communications technology is on each vehicle. With multiple incompatible protocols, interoperability between devices will be compromised, thereby marginalizing the societal benefits of V2X technology.
- We agree with NHTSA that the entire band should be protected, and that no decision on re-allocating any portion of the band should be made until the entire 3-phase test plan is completed¹. Avoiding drastic modifications to the 5.9 GHz band will foster the evolution of V2X technologies that are both spectrally efficient (no duplicated services) and cost efficient (no need to invest in multiple technologies).
- The current band allocation (FCC regulations, SAE J2945/0 standard) provides considerable flexibility to allocate spectrum for applications in a local area based on local conditions. Applications can utilize all seven channels. Disruptive changes to the current 5.9 GHz channel allocation would compress DSRC applications into fewer channels, resulting in reduced performance or fewer applications supported, or both.
- We encourage the FCC and US DOT to work together toward completing the 3-phase test plan.

¹ <https://www.nhtsa.gov/press-releases/us-department-transportations-national-highway-traffic-safety-administration-issues>



- VGNA is encouraged by the work being done by the IEEE 802 LAN/MAN Standards Committee² to produce a Next Generation V2X (NGV) standard to provide a seamless evolution path for DSRC that guarantees device interoperability, same-channel coexistence, and backward compatibility. This will stimulate further near-term investments in DSRC by ensuring that those investments will be protected and enhanced in the years to come. NGV has the potential to enhance the value of investments in DSRC today, while non-interoperable technologies such as C-V2X put investments in any V2X technology at risk.

Volvo Group North America appreciates the opportunity to submit these comments, and looks forward to working with the US DOT and other government agencies, as well as industry partners and other stakeholders, in the development of safe and reliable practices associated with the application of the 5.9GHz V2X band.

Please do not hesitate to contact us if additional information is needed.

² See comments of IEEE 802 LAN/MAN Standards Committee submitted to this docket dated January 17 2019.