Volvo Group North America

July 7, 2016

Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street, SW
Washington, D.C. 20554

Re: ET Docket No. 13-49

Dear Secretary Dortch:

Volvo Group North America respectfully submits its comments on the Federal Communications Commission's ("FCC's") Public Notice titled *The Commission Seeks to Update and Refresh the Record in the "Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band" Proceeding,* FCC 16-68, dated June 1, 2016 ("Public Notice"). The Public Notice invites input on potential sharing solutions between proposed U-NII devices and Dedicated Short Range Communications ("DSRC") operations in the 5.850-5.925 GHz band ("5.9 GHz band").

The Volvo Group understands the technical challenges associated with the potential sharing solutions for Dedicated Short Range Communications (DSRC) operations in the 5.9 GHz Band, and applauds the extensive effort being taken by the U.S. Federal Communications Commission, U.S. Department of Transportation, and other entities to address them. The FCC Public Notice puts into place a framework to evaluate whether unlicensed users operating in the 5.9 GHz band is possible without causing harmful interference to incumbent licensees, and in particular to the DSRC systems – important for the wide-scale adoption and deployment of V2X-based services in the future.

The Volvo Group is one of the world's leading manufacturers of trucks, buses, construction equipment and marine and industrial engines. The Group also provides complete solutions for financing and service. The Volvo Group, which employs about 100,000 people, has production facilities in 18 countries and sells its products in more than 190 markets. In 2015, the Volvo Group's sales amounted to about $37 billion. The Volvo Group is a publicly-held company headquartered in Gothenburg, Sweden. Volvo shares are listed on Nasdaq Stockholm. In the United States, the Volvo Group employs more than 11,000 people and manufactures its products in six U.S. states.

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Volvo Group activities to support development of ITS

Vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communications (collectively known as V2X) have received much attention during the last decade worldwide since V2X enables new types of services in the fields of active safety, fuel efficiency, and to enable higher levels of automated driving. V2X technologies using the 5.9 GHz frequency band are referred to as cooperative intelligent transport systems (C-ITS) in Europe, and connected vehicle technology in the U.S. A minimum set of protocols for supporting initial deployment of C-ITS have been developed, approved, and published. Volvo is contributing actively to the ongoing development of C-ITS standards within the European Telecommunications Standards Institute (ETSI) and the Society of Automotive Engineers (SAE), and follows the work within the European Committee for Standardization (CEN) and the International Organization for Standardization (ISO).

Volvo Group is 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 April 2016, Volvo demonstrated three V2I safety applications – curve speed warning, red light violation warning, and reduced speed zone warning - using data from the infrastructure to increase driver awareness of the approaching hazard. Along with the largest light duty automobile manufacturers in the world, Volvo Group is the sole heavy-duty truck manufacturer involved in this important DOT partnership. The consortium is also 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.

In the area of freight transportation, novel intelligent automated solutions will be enabled and made safer by V2X technologies. Real-time connectivity allows vehicles to become connected to one other, to the infrastructure, and to other parts of the transportation network, thereby enhancing awareness of the surroundings. In addition to what drivers can immediately see around them, and what vehicle sensors can detect, all parts of the transportation system will increasingly be able to exchange information to improve decision-making. 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 these technologies will not only improve safety by avoiding collisions, but also by reducing congestion and improving traffic flow, while also reducing environmental impacts.

In April 2016, Volvo also participated in the EU Truck Platooning Challenge[1] by running an electronically coupled convoy of three trucks (i.e., as a Cooperative Adaptive Cruise Control (CACC) string) from Gothenburg, Sweden to Rotterdam, Netherlands. Higher levels of automated driving such as CACC and platooning can reduce CO2 emissions, reduce fuel consumption, and increase productivity through reduced traffic congestion and more efficient use of the transportation system. In the U.S., the Volvo Group has worked collaboratively with the University of California at Berkeley, Caltrans, and LA Metro in a project funded by the U.S.

[1] https://www.eutruckplatooning.com/

Federal Highway Administration. This project demonstrated a three truck platoon with V2V technology and level 1 automated driving at the June 2016 ITS America annual meeting in San Jose, CA. Additional demonstrations of the technology will follow.

Volvo Group Comments

The Volvo Group fully supports the joint comments submitted by the Alliance of Automobile Manufacturers, Alliance of Global Automakers, Intelligent Transportation Society of America, as well as the Truck and Engine Manufacturers Association. We would like to take this opportunity to stress some important points responsive to the request for comments.

In the intervening years since the 5.9GHz spectrum was set aside for the purpose of V2X communication, the light duty and heavy-duty automotive industries have worked through several challenges with standardization and outreach to the stakeholders from the public sector. Meanwhile, other industries, especially those engaged in telecommunications, have launched a campaign to utilize a portion of the 5.9GHz band that had been set aside by the FCC exclusively for ITS and traffic safety purposes. In recent years, several reports have been published in Europe and in the U.S. outlining the challenges associated with sharing the 5.9 GHz frequency band with other wireless technologies, and offering high level recommendations for action. Volvo Group has reviewed and provided comments to several of these reports; those comments do not differ substantially from the points we are submitting herewith.

- It is envisioned that there will be a multitude of V2X services concurrently active. These include V2I applications such as green light optimal speed advisory (GLOSA), road works warning (RWW), and in-vehicle signage (IVS); and V2V applications such as electronic emergency brake light (EEBL), slow moving vehicle, stationary vehicle, and emergency vehicle approaching. Channel reallocation without evaluating the effectiveness and reliability of any interference mitigation techniques could compromise the performance of these concurrent V2X services.

- We have concerns with the proposed re-channelization concept that would require the entire DSRC system to be redesigned. Lumping DSRC channels without any guard bands poses significant risk in terms of in-band, adjacent, and spurious channel interferences, thereby restricting the number of “reliable” channels available for safety applications. The proposed test procedures and methodologies need to be refined, and substantial testing will be needed to ensure that the anticipated use cases for the DSRC technology are not compromised as a result of the proposed spectrum reallocation.

- We believe that vehicle automation has significant potential to improve transportation efficiency and reduce the environmental load of transportation. It also has the potential to increase road capacity with limited investment in road construction. In several applications (traffic) safety is likely to be improved, and in scenarios involving dangerous or hazardous environments, work- related health and safety are likely to improve.

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Keeping this in mind, we envision the need to use multiple channels in the 5.9 GHz frequency band to enable safety with higher levels of automated driving.

- As an example, enabling Level-1 automated driving such as Cooperative Adaptive Cruise Control (CACC), also known as partial platooning, will require transmitting vehicle speed, acceleration and other vehicle-specific information to ensure safe and smooth operation of the CACC string, not currently present in the Basic Safety Message (BSM) (as defined in the SAE J2945/1). One can envision that in a Level-2 automated driving application of platooning, which includes steering control, the level of "electronic coupling" will be tighter and require additional message elements to ensure safety during different platoon maneuvers. The requirements and standards for these message sets are currently being established, and relying on Channel 172 (reserved for BSM broadcasting) alone will degrade the communication channel as a result of channel congestion. In other words, such applications will likely require using more than one DSRC channel concurrently and switching between them. For the reasons cited above, channel re-allocation would negatively impact the performance. Therefore, analyzing and quantifying the interference potential introduced to DSRC receivers from unlicensed transmitters operating simultaneously in the 5.850-5.925 GHz band is essential.

The Volvo Group appreciates the opportunity to submit these comments, and looks forward to working with the FCC 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 DSRC band.

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