Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Petition For Waiver to Allow Deployment of Intelligent Transportation System Cellular Vehicle to Everything (C-V2X) Technology in the 5.9 GHz Band	)	GN Docket No. 18-357

COMMENTS OF NOKIA

Nokia submits these Comments in support of the above-captioned Petition for Waiver (Petition) submitted by the 5G Automotive Association ("5GAA") to deploy Cellular Vehicle-to-Everything (C-V2X) technology in a 20 MHz channel located in the upper edge of the 5.850-5.925 GHz (5.9 GHz) band. Nokia believes that the public interest would be served by establishing 5G as the communication technology of choice for Intelligent Transportation Service (ITS), starting with advanced LTE capabilities. Grant of the waiver will enable near-term deployment of cutting-edge C-V2X technologies and their substantial benefits.

A global leader in mobile networks technologies, Nokia is working to improve mobile network architectures and functionalities to meet automotive industry needs with C-V2X communications technologies. Nokia was first to position MEC (multi-access edge computing) in the context of automotive safety-related use cases and, in 2015, demonstrated those in the live network of Deutsche Telekom along the motorway A9 in Germany. MEC complements network-based communications (V2N) and the direct Vehicle to Vehicle (V2V) and Vehicle to Infrastructure (V2I) communications of C-V2X (via PC5) by extending the range beyond 300-500 meters (via V2N2V and V2N2I). Nokia has continued its cutting-edge work, engaging in several projects with mobile network operators, automobile manufacturers (OEMs) and Tier-1

networks in the United States, China, Europe, and Japan to extend the use cases and architectural concepts that combine network-based and direct communication optimally.[1] By seamlessly integrating these different modes of C-V2X, Nokia focuses on improving traffic safety as well as supporting higher levels of connected and coordinated automated driving.

Nokia supports 5GAA's Petition for Waiver because the Commission's current rules restrict ITS operations in the 5.9 GHz band to those that use the DSRC standard, and thus a waiver of the rules is necessary to achieving the benefits of LTE and 5G in that spectrum band. With the recent release of LTE capabilities that allow for direct V2V communications, C-V2X is poised for near-term deployment and offers key safety benefits. As described in the Petition:

> These performance advantages, which include superior reliability over a much greater communications range, better non-line-of-sight performance, and greater resiliency, can – both individually and as a complement to in-vehicle camera and sensor-based technologies – provide vehicles and drivers with an earlier, more complete picture of the surrounding road environment.[2]

Not only will C-V2X offer immediate superior performance over DSRC, but it has an upgrade path from LTE to 5G. The 5GAA Petition lists connected and automated driving, ubiquitous access to services, and integration into smart city and intelligent transportation applications among the capabilities 5G will enable. However, the promise of 5G goes far beyond this to applications that are yet to be imagined. Unlike C-V2X, DSRC does not have a path forward for future upgrades of the type promised by 5G.

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[1] *See, e.g.,* AT&T, Ford, Nokia And Qualcomm Launch Cellular-V2x Connected Car Technology Trials Planned for the San Diego Regional Proving Ground with Support from McCain, Oct. 31, 2017, available at https://www.qualcomm.com/news/releases/2017/10/31/att-ford-nokia-and-qualcomm-launch-cellular-v2x-connected-car-technology.

[2] 5GAA Petition for Waiver, GN Docket No. 18-357, at 3 (filed Nov. 21, 2018).

Beyond the clear automotive safety benefits demonstrated in the Petition from the use of C-V2X, Nokia sees great benefits from the fact that LTE and 5G are already integrated into current and planned commercial network build-outs nationwide and also are set to be ubiquitous in transportation vehicles. C-V2X technology fits seamlessly into the connected vehicle ecosystem, which is already integrating LTE to enable various telematics services. Indeed, virtually all new vehicles are, or soon will be, equipped with cellular modem chipsets.

Ford Motor Company's recent announcement that it will equip all of its vehicles with C-V2X beginning in 2022 further evidences this trend of LTE/5G being the technology of choice for vehicle connectivity. C-V2X capabilities can be integrated in these LTE/5G chipsets, rather than reserving space for a special-purpose DSRC equipment in addition to the LTE/5G equipment, which will be in every car. The savings from such integration into an already-mass-market technology can be significant. Moreover, LTE/5G technology is what powers commercial wireless networks across the United States and throughout the world. With or without C-V2X, LTE and 5G base stations promise to line America's roadways. DSRC offers no such natural fit with the commercial networks planned to be deployed throughout the U.S.

Widespread deployment of C-V2X also will help to facilitate America's global leadership in C-V2X and the next generation of communications technologies. China, which many claim is leading the global "Race to 5G" recently adopted an allocation for C-V2X in the 5.9 GHz band. Policymakers in other regions of the world are contemplating similar actions. Grant of the Petition can facilitate the continued leadership of the U.S. in 5G communications and in ITS more generally.

Consumers are increasingly demanding connected vehicle services for the safety and multitude of other benefits they provide. A grant of 5GAA's Petition for Waiver will allow

for the near-term deployment of C-V2X, drive additional innovation and investment in all types of ITS applications, and ensure America's continued global leadership in this technology. Nokia therefore urges the Commission to grant the Petition for Waiver.

Respectfully submitted,

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