Before the

Federal Communications Commission

Washington, D.C. 20554

In the Matter of	)	
	)	
Petition for Waiver to Allow Deployment of	)	GN Docket 18-357
Intelligent Transportation System Cellular	)	
Vehicle to Everything (C-V2X) Technology	)	

COMMENTS OF IEEE 802

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I. Introduction

IEEE 802 LAN/MAN Standards Committee (LMSC) is pleased to provide comments in the above-captioned proceeding.

IEEE 802 LMSC is a leading consensus-based industry standards body, producing standards for wireless networking devices, including wireless local area networks ("WLANs"), wireless specialty networks ("WSNs"), wireless metropolitan area networks ("Wireless MANs"), and wireless regional area networks ("WRANs"). We appreciate the opportunity to provide these comments to the Commission.

IEEE 802 is a committee of the IEEE Standards Association and Technical Activities, two of the Major Organizational Units of the Institute of Electrical and Electronics Engineers (IEEE). IEEE has about 420,000 members in about 190 countries and supports the needs and interests of

engineers and scientists broadly. In submitting this document, IEEE 802 acknowledges and respects that other components of IEEE Organizational Units may have perspectives that differ from, or compete with, those of IEEE 802. Therefore, this submission should not be construed as representing the views of IEEE as a whole.[1]

II. Inconsistency of 5G Automotive Association (5GAA) AA waiver request and U-NII-4 sharing proposals under evaluation today by the FCC and USDOT

The U-NII-4 proceeding has been active since 2013[2]. During the course of the proceeding, two sharing proposals were brought forward for comment[3]. At this point a multi-phase test plan is actively being executed by the FCC and USDOT. Phase I results are now available, and Phases II and III are being planned. As pointed out in the Phase I Testing Report[4], both sharing proposals depend explicitly on U-NII-4 devices detecting the presence of Dedicated Short Range Communications (DSRC activity in the band. According to FCC licensing rules[5] , an Intelligent Transportation System (ITS) device in the 5.9 GHz band must follow the DSRC protocol. As the U-NII-4 proceeding has progressed, it is working toward formalizing these two sharing proposals.

If non-DSRC ITS protocols are allowed to use the 5.9 GHz band, they will not be detected by U-NII-4 devices implementing either of the two sharing approaches. Modifying the sharing approaches to add a capability to detect multiple non-DSRC ITS protocols[6] would at a minimum increase the complexity of the sharing approaches, and the effectiveness of any such detection is unknown. If the Commission removes the regulatory requirement that ITS devices follow the

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[1] This document solely represents the views of the IEEE 802 LAN/MAN Standards Committee and does not necessarily represent a position of either the IEEE, the IEEE Standards Association or IEEE Technical Activities.

[2] The "Unlicensed National Information Infrastructure (U-NII) Devices in The 5 GHz Band" Proceeding, ET Docket No. 13-49, https://www.fcc.gov/ecfs/search/filings?proceedings_name=13-49&sort=date_disseminated,DESC

[3] *The Commission Seeks to Update and Refresh the Record in the "Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band" Proceeding*, Public Notice, ET Docket No. 13-49, *31 FCC Rcd 6130* (2016).

[4] *Phase I Testing of Prototype U-NII-4 Devices*, Report TR 17-1006, FCC OET, October 22, 2018, page 17: "Test results show that the prototype U-NII-4 devices were able to detect a co-channel DSRC signal and implement post detection steps as claimed by the submitters"

[5] See FCC Part 90, Subpart M and Part 95, Subpart L

[6] We note that the waiver request indicates C-V2X proponents intend to deploy multiple protocols from both 4G and 5G 3GPP standards.

DSRC standard, presumably there would be additional non-DSRC protocols introduced in the 5.9 GHz band over time, and it is not known how approved and installed U-NII-4 devices could detect them or how long it would take to develop robust detection schemes among these different protocols.

In the 2016 FCC Public Notice, the re-channelization sharing proposal is defined such that the upper 30 MHz "designated for safety-related communications would remain exclusive to DSRC and the remaining spectrum would be shared between the DSRC service channels and unlicensed devices."[3] The 5GAA waiver request would instead prohibit DSRC operation in 20 MHz of the upper 30 MHz, leaving just 10 MHz for critical DSRC safety and control applications. Vehicle safety would be compromised. The waiver request is therefore fundamentally incompatible with the re-channelization sharing proposal. In the waiver request, 5GAA does not address what would happen to current and future DSRC operations in the 30 MHz (5895 - 5925 MHz), either under the current DSRC band plan or under the re-channelization sharing proposal.

Furthermore, the waiver request states that "5GAA plans to file a complementary petition for rulemaking in the near future" (page 2) to accommodate additional 5G V2X applications that "will need to access much more spectrum in the 5.9 GHz band plan than the 20 MHz that are the subject of this Waiver Request" (page 22). As 5GAA seeks to expand non-DSRC protocols to more and more of the 5.9 GHz band, the conflicts with U-NII-4 sharing, under both sharing proposals, grow deeper and deeper. The Commission should reject the waiver request due to its conflicts with the U-NII-4 spectrum sharing proceeding.

III. V2X evolution under waiver is contrary to the public good; IEEE 802.11 NGV offers a seamless evolution path

The 5GAA waiver cites evolution in V2X technology as a rationale for allowing the introduction of technologies that are incompatible with DSRC into the 5.9 GHz band. The concept of evolution to incompatible technologies stands in stark contrast to the vision being realized

today in the IEEE 802.11 Next Generation V2X (NGV) amendment under development in the IEEE 802.11 Working Group.

As the waiver request makes clear, the only way to introduce incompatible technologies is by band fragmentation. 5GAA seeks an initial fragmentation in this waiver request and indicates it will seek a further fragmentation for "much more spectrum in the 5.9 GHz band" in the near future via a rulemaking petition.

By contrast, the IEEE 802.11 NGV amendment currently under development (IEEE P802.11bd) will be compatible with DSRC. The scope of the NGV amendment includes the following key requirements:

> This amendment shall provide interoperability, coexistence, backward compatibility, and fairness with deployed OCB (Outside the Context of a BSS) devices.[7]

The term "OCB" was introduced in the amendment IEEE Std 802.11p, which specified "Wireless Access in Vehicular Environments" and was later incorporated into IEEE Std 802.11. The OCB specifications with IEEE Std 802.11 continue to support DSRC-compatible operation.

NGV devices will be capable of communicating interoperable with DSRC devices. NGV devices will also be capable of fair coexistence with DSRC devices in the same channel, and therefore NGV can be introduced with no band fragmentation. The Society of Automotive Engineers (SAE) DSRC Technical Committee recently communicated to the IEEE 802.11 NGV Task Group to say that the combination of a capability for interoperability and fair same-channel co-existence "form the basis for a seamless evolution strategy from IEEE 802.11p [DSRC] to IEEE 802.11 NGV and beyond."[8]

[7] " Project Authorization Request P802.11bd ("Enhancements for Next Generation V2X"), approved 5 December 2018, which can be found at https://development.standards.ieee.org/get-file/P802.11bd.pdf?t=99204200003.

[8] SAE DSRC Technical Committee, "Response to IEEE 802.11 Next Generation V2X Study Group (NGV SG) Liaison Request", November 28, 2018; IEEE 802.11 document 11-18-2097/r0

The IEEE 802.11 NGV amendment scope also requires that it provide for both improved communication performance (rate and sensitivity), as promised by C-V2X, and for support of new use cases such as localization.

Technology evolution is a means to an end, for improved performance and new use cases, not an end in itself. Evolution in the ad hoc V2X domain is inherently more difficult than in traditional wireless domains like cellular, due to the unmanaged and direct communication between devices (with no base station to mediate across generations) and to the relatively long lifetimes of on-board and roadside units. If not implemented thoughtfully, evolution can increase costs (e.g. by requiring investment in multiple incompatible technologies), decrease benefits (e.g. by duplicating services in fragmented spectrum), and provide a disincentive to automakers and road authorities to deploy V2X. The concept of evolution promoted by the 5GAA waiver request suffers from these disadvantages. By contrast, we think that the approach to evolution underway in the IEEE P802.11bd NGV amendment increases the incentive to deploy DSRC today and IEEE P802.11 NGV in the future: it protects the value of DSRC investments through interoperability and fair, same-channel coexistence, it does not require investment in multiple incompatible technologies, and it does not diminish the value of the spectrum by fragmentation for duplicated services.

The concept of evolution represented by the 5GAA waiver request is contrary to the public good and is a further reason to reject the petition.

IV. This is a 5GAA request for a rule change.

The waiver request asks to have DSRC devices prohibited from operating in the upper 20 MHz of the 5.9 GHz band, including presumably a requirement for devices already using that spectrum to vacate. This is not a proper waiver request; on the contrary, it is clearly a request for a rule change. Considering that core FCC licensing rules for this band, in place since 2003, require that ITS devices follow the DSRC protocol, it would require a rule change to have those devices vacate a portion of the band.

This is not a small consideration. As stated on 24 October 2018 in the National Highway Traffic Safety Administration statement on the safety value of the 5.9 GHz spectrum[9], there are more than 70 deployments using all seven DSRC channels in thousands of vehicles on the road today. Deployments in New York, Florida, and California alone represent more than 10,000 licensed DSRC devices[10], each of which is actively using the upper 20 MHz of the 5.9 GHz band. These incumbent DSRC devices would be prohibited from using that spectrum under the waiver request. Furthermore, Channel 184 (the upper 10 MHz of the band) carries a special FCC designation "for public safety applications involving safety of life and property[11]". To force these devices to now vacate the spectrum they are using would clearly be a vehicle safety concern. A waiver can be used to relieve a party from the requirement to satisfy certain rules but cannot be used to deprive licensed users of the right to continue operating with the rules under which they were deployed.

The "waiver request" is actually a request for rulemaking, and it should be rejected as a waiver.

V. Conclusion

Considering the points mentioned above, we therefore ask the Commission to dismiss the 5GAA request for waiver without prejudice.

Regards,

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[9] U.S. Department of Transportation's National Highway Traffic Safety Administration issues statement on safety value of 5.9 GHz spectrum, https://www.nhtsa.gov/press-releases/us-department-transportations-national-highway-traffic-safety-administration-issues

[10] US DoT Connected Vehicle Pilot Deployment Program https://www.its.dot.gov/pilots/

[11] FCC Part 90.377