Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Revision of Part 15 of the Commission's Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band	)	ET Docket No. 13-49

COMMENTS OF THE ASSOCIATION OF GLOBAL AUTOMAKERS, INC.

The Association of Global Automakers, Inc.[1] ("Global Automakers"), through its attorneys, hereby responds to the *Public Notice*[2] issued by the Federal Communications Commission's ("FCC" or "Commission") Office of Engineering and Technology ("OET") seeking comment on the report describing the results of OET's Phase I testing on potential sharing solutions between Dedicated Short Range Communications ("DSRC") operations and Unlicensed National Information Infrastructure ("U-NII") devices in the 5850-5925 MHz ("5.9 GHz") band in furtherance of the above-referenced proceeding ("*Phase I Report*").[3] Given the importance of data-driven policymaking in areas affecting safety-of-life communications like those provided by DSRC, Global Automakers urges the Commission to continue with Phase II and Phase III testing as planned before allowing any unlicensed use of the 5.9 GHz band.

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1 The Association of Global Automakers is a trade association based in Washington, D.C. that represents the U.S. operations of international motor vehicle manufacturers, original equipment suppliers, and other automotive-related companies and trade associations.

2 *Office of Engineering and Technology Requests Comments on Phase I Testing of Prototype U-NII-4 Devices*, Public Notice, ET Docket No. 13-49, DA 18-1111 (Oct. 29, 2018).

3 FCC Office of Engineering and Technology, Laboratory Division, "Phase I Testing of Prototype U-NII-4 Devices," Report No. TR 17-1006 (Oct. 22, 2018) ("*Phase I Report*").

In conjunction with the delay in conducting the Phase I testing and production of the report,[4] there have been several important developments with respect to vehicle-to-everything ("V2X") technology and the future of the 5.9 GHz band since the adoption of the test plan. DSRC has been more fully deployed and more major commitments announced,[5] and a second V2X technology – cellular V2X ("C-V2X") – has emerged. These developments manifest robust market demand for V2X services. Indeed, in the face of an eleventh-hour request that the 5.9 GHz band be reallocated just as V2X services are being deployed,[6] the entire auto ecosystem, including

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[4] *See 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, 31 FCC Rcd 6130, 6139 (2016) (stating the Commission's expectation that all U-NII-4 testing "will be concluded and submitted no later than January 15, 2017"); *id*. at 6146 (Joint Statement of Commissioners Rosenworcel and O'Rielly) ("To speed this process along, today's Public Notice also adopts a July 30, 2016 deadline for the submission of testing equipment and commits to complete testing by January 15, 2017.").

[5] *See, e.g.*, Letter from Paul Hemmersbaugh, Chief Counsel and Policy Director, Transportation as a Service, GM to FCC Secretary Marlene H. Dortch, ET Docket No. 13-49, at 1 (July 13, 2018) (announcing GM's plans to offer vehicle-to-everything communications in a high-volume Cadillac crossover by 2023 and subsequently extend this technology to the entire Cadillac portfolio); Press Release, "Toyota and Lexus to Launch Technology to Connect Vehicles and Infrastructure in U.S. in 2021" (Apr. 16, 2018), http://corporatenews.pressroom.toyota.com/releases/toyota+and+lexus+to+launch+technology+connect+vehicles+infrastructure+in+u+s+2021.htm; Letter from Kirk. T. Steudle, Director, Michigan Department of Transportation, to Marlene H. Dortch, Secretary, FCC, ET Docket No. 13-49, at 2 (May 24, 2018) (explaining that "states, local agencies, and cities around the country . . . are actively deploying infrastructure and developing [vehicle-to-infrastructure] applications that are designed to utilize DSRC infrastructure," including deployments "in 26 states and cities in response to the American Association of State Highway Transportation Officials '[Signal Phase & Timing] Deployment Challenge'"); *see also* Foo Yun Chee, "Volkswagen a winner as EU set to favour wifi over 5G: draft," Reuters (Oct. 19, 2018), Press Release, "Toyota and Lexus to Launch Technology to Connect Vehicles and Infrastructure in U.S. in 2021" (Apr. 16, 2018), https://www.reuters.com/article/eu-autos-technology/volkswagen-a-winner-as-eu-set-to-favour-wifi-over-5g-draft-idUSKCN1MT1IT?utm_source=newsletter&utm_medium=email&utm_campaign=newsletter_axiosautonomousvehicles&stream=autonomous-vehicles (explaining that the European Commission is expected to approve and set rules for use of DSRC in vehicles).

[6] Letter from Rick Chessen, NCTA – The Internet & Television Association, to Marlene H. Dortch, Secretary, FCC, ET Docket No. 13-49 (Oct. 16, 2018) (proposing to reallocate the 5.9 GHz band to provide a spectrum subsidy for cable retail broadband services instead of roadway

the U.S. Department of Transportation ("DOT"), has unified in its position that the entire 5.9 GHz band – all seven channels – must be preserved for V2X auto safety services.[7] Indeed, as discussed herein, it is not clear that any party continues to support the re-channelization proposal evaluated in Phase I. The FCC should inquire as to whether there is continuing interest in re-channelization before evaluating it further, particularly in light of the possibility of multiple V2X technologies using the band.

Nevertheless, given the importance of V2X technologies to the future of transportation and the life-saving safety benefits V2X brings to our nation's roadways, it is essential that any changes to the allocation and channelization of the 5.9 GHz band to allow use of the band by U-NII devices be based on rigorous, empirical testing that has conclusively determined that U-NII operations can be conducted without interfering with V2X operations. OET's Phase I testing provided useful information about the potential for sharing between DSRC and U-NII operations in the 5.9 GHz band, particularly as regards "Detect-and-Vacate." But there is more to be done to validate either of the sharing methods identified by the Commission and provide the empirical evidence necessary

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safety just as the FCC has proposed to make 1200 MHz of spectrum available for that purpose in the adjacent 6 GHz band, as well as planned a series of auctions to support retail broadband offerings).

[7] *See* Press Release, Alliance of Automobile Manufacturers, Association of Global Automakers, The Intelligent Transportation Society of America, The 5G Automotive Association, The American Association of State Highway and Transportation Officials, American Trucking Associations and The Motor & Equipment Manufacturers Association, "Multi-stakeholder Statement on Preserving the 5.9 GHz Band" (Oct. 24, 2018), https://autoalliance.org/2018/10/24/multi-stakeholder-statement-preserving-5-9ghz-band/ (explaining that the auto industry is "on the cusp of a major breakthrough in vehicle connectivity and safety innovations" and that "[t]he entire 5.9 GHz band is needed to achieve the full benefit of these communication technologies in the years to come"); Press Release, National Highway Traffic Safety Administration, "Statement on Safety Value of 5.9 GHz Spectrum" (Oct. 24, 2018) (explaining that "[t]he automotive industry and municipalities are already deploying V2X technology and actively utilizing all seven channels of the 5.9 GHz band and, accordingly, "[p]reserving the 5.9 GHz band for transportation communications is essential to public safety today and in the future").

to support sharing. OET should proceed with Phases II and III of testing pursuant to the agreed test plan with DOT and the National Highway Traffic Safety Administration ("NHTSA"). While Phase I bench testing in controlled laboratory conditions was useful, only the real-world testing planned for Phases II and III can provide the data necessary to determine if sharing is viable. As the FCC well knows, planning for Phase II – long postponed by delays in the Phase I testing and release of the test report – is already underway.

Regarding the terms of the next phase of testing, the Phase I report provides insights on technical changes that should be implemented to ensure the most useful results. Specifically:

- With respect to detect-and-vacate, OET should conduct testing using DSRC power levels and propagation characteristics that better approximate real-world conditions, and must establish a standard for channel-move time that outperforms the 798 milliseconds seen in Phase I testing.
- With respect to re-channelization, to the extent the FCC identifies a stakeholder that continues to support it and that further evaluation is needed, OET should proceed with field testing to ensure that the Commission's proposed re-channelization will effectively accommodate V2X safety communications in the upper 30 MHz of the 5.9 GHz band and result in a sharing environment for the rest of the band that does not interfere with V2X communications.
- With respect to both proposals, OET should conduct on-board blocking tests and evaluate sharing between DSRC and higher power U-NII-4 devices.

I. OET MUST CONDUCT FURTHER TESTING OF THE DETECT-AND-VACATE METHOD THAT USES REALISTIC ASSUMPTIONS ABOUT DSRC OPERATIONS AND TESTS CHANNEL-MOVE TIME UNDER A SPECIFIC STANDARD.

The results of the Phase I testing indicate that detect-and-vacate may be a feasible option for sharing the 5.9 GHz band. However, future testing is necessary to empirically validate or disprove this initial finding. The next phase of testing should evaluate U-NII device detect-and-vacate capabilities in environments where DSRC power levels and propagation characteristics better approximate real-world conditions. In addition, Phase II testing should evaluate U-NII device channel-move time against a set standard that is more stringent than the range observed in Phase I.

First, the next phase of testing should evaluate DSRC under conditions that more closely approximate how DSRC operates in the real world. OET's Phase I test report states that "all of the prototype U-NII-4 devices tested would be capable of detecting [a] DSRC signal at a distance of 300 meters."[8] However, this statement "assum[es] a DSRC transmission at the maximum permissible EIRP level of 33 dBm along a 300-meter unobstructed line-of-sight propagation path."[9] In practice, DRSC devices operate in vehicles with radiated power below 20 dBm, and the SAE J2945/1 technical standard governing DSRC operations is based on a radiated power level of 15 dBm. Moreover, free space propagation and line-of-sight between U-NII-4 and DSRC devices are idealistic assumptions. In the real world, multipath propagation, fading and shadowing of radiofrequency signals, and the mobility of on-board DSRC devices could potentially make it more challenging to detect DSRC transmissions at a distance of 300 meters, reducing the range for detection by U-NII-4 devices that operate in compliance with IEEE 801.11ac technical standards.

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8 Phase I Report at 94.

9 *Id.*

Although the *Phase I Report* states that the 300-meter detection distance theoretically should be possible with a "significant margin (~30 dB) to account for additional signal attenuation associated with multipath and/or signal obstructions,"[10] the real-world field testing planned for test Phases II and III is necessary to validate this hypothesis.

Second, the next phase of testing must evaluate U-NII-4 detect-and-vacate capabilities against a standard for channel-move time that ensures the performance of DSRC safety communications. During Phase I testing, "[t]he average channel-move time varied from 9.7 ms to 798.0 ms."[11] Although "[n]o attempt was made to examine the observed variance in channel move time," the testing revealed that, "[o]n average, higher DSRC signal power (present in U-NII-4 DSRC detector path) corresponded with shorter channel-move times."[12] It is essential that OET establish a standard channel-move time that is certain to protect DSRC safety communications, and evaluate channel-move time against that standard through future field tests where DSRC operations are conducted at the lower power levels that are more characteristic of real-world DSRC transmissions. The channel-move time observed in Phase 1 testing of 798.0 ms is too high to ensure the performance of DSRC safety communications.

II. OET SHOULD PROCEED WITH REAL-WORLD FIELD TESTING IN PHASES II AND III AS AGREED WITH DOT AND NHTSA TO FURTHER EVALUATE RE-CHANNELIZATION, PROVIDED A STAKEHOLDER IS IDENTIFIED THAT CONTINUES TO SUPPORT THIS OPTION.

In addition to the detect-and-vacate method for sharing the 5.9 GHz band, Phase I testing evaluated the re-channelization interference mitigation strategy. However, a primary proponent of the re-channelization was Qualcomm, which now is a vocal supporter of C-V2X technology.

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10 *Id*.

11 *Id*. at 18.

12 *Id*.

Indeed, Qualcomm is a founding member of the 5G Automotive Association ("5GAA"),[13] which has stated its support for preservation of the entire 5.9 GHz band for V2X auto-safety services.[14] This change of position raises a question as to whether any stakeholder of record continues to support the re-channelization proposal. To the extent no stakeholder does, the FCC should not devote further resources to evaluating this option.

To the extent the FCC determines further study of this option is warranted, the re-channelization proposal is inherently flawed, as it could require relocating the existing channels used for safety communications to the upper 30 MHz of the 5.9 GHz band and re-channelizing the four existing 10-MHz DSRC channels in the lower 45 MHz of the band into two 20-MHz shared channels.[15] Because such a proposal "[a]t its heart . . . favors the expansion of commercial Wi-Fi to the detriment of safety-of-life DSRC,"[16] Global Automakers continues to oppose the Re-Channelization approach. As Global Automakers explained in previous comments, changing the band plan in the manner envisioned by the Re-Channelization sharing method would require automakers to "discard decades of costly research and go back to the drawing board to redesign DSRC to be compatible with a re-channelized band," thereby delaying or limiting "the deployment of applications and equipment that have great potential to improve road safety and provide other important benefits."[17] Such a redesign would require DSRC equipment manufacturers and

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13 *See* 5GAA, "About Us: Bridging the automotive and ICT industries," http://5gaa.org/about-us.

14 *See* note 7, *supra*.

15 *See Phase I Report* at 15.

16 Comments of the Alliance of Automobile Manufacturers, Association of Global Automakers, Intelligent Transportation Society of America, and DENSO International America, Inc, ET Docket No. 13-49, at 26-27 (filed July 7, 2016).

17 *Id*. at v.

providers to undertake "expensive and time-consuming testing" and would require "modifications of widely accepted industry standards – all of which would come at significant cost and unreasonably delay the roll-out of DSRC."[18]

In addition to the tremendous cost and delay that would result from the re-channelization interference mitigation approach, if the safety communication channels were relocated to the upper 30 MHz of the band without a guard band, "many potentially life-saving applications could be lost or greatly reduced."[19] Organizing the band in this way "could eliminate or crowd out important [vehicle-to-infrastructure], [vehicle-to-pedestrian], and [vehicle-to-everything ("V2X")] uses from the . . . DSRC-exclusive 'safety channels,'"[20] particularly given the emergence of new V2X technologies such as C-V2X that may in the future gain access to the 5.9 GHz band and need to use the already-congested upper-30-MHz safety channels.

Notwithstanding the detrimental impact that the Re-Channelization method would have on V2X development and deployment, substantial additional testing would be necessary to validate the Re-Channelization method. Given the inherent difficulties of deploying DSRC systems in the lower 40 MHz if sharing is completed on a packet-by-packet basis as the Commission envisions, OET should proceed with the Phase II and III field testing in large-scale environments to ensure the performance of packet-by-packet detection and prioritization. In addition, because "[t]he devices available for [the Re-Channelization] test effort did not provide for DSRC operation on channels other than the basic safety message channel,"[21] significant testing will also be needed to

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18 *Id*.

19 *Id*.

20 *Id*. at 27.

21 *Phase I Report* at 16.

ensure that the re-channelization proposal is feasible in the entire lower 40 MHz of the 5.9 GHz band that U-NII-4 devices would be authorized to use.

Even after substantial OET testing and industry investment to develop and produce equipment that is consistent with the new channelization plan, there remains the risk that some U-NII-4 devices will be unable to detect DSRC transmissions in the lower 40 MHz of the 5.9 GHz or execute the required enhanced distributed channel access ("EDCA") protocol. Accordingly, it is imperative to proceed with Phases II and III if the FCC is to continue its consideration of the Re-Channelization proposal.

III. OET SHOULD REVISE ITS TESTING PROCEDURES UNDER EITHER SHARING METHOD.

Finally, OET should ensure that future testing of either sharing method includes appropriate parameters and tests to provide necessary empirical support. In addition to using DSRC devices that emit at power levels that are consistent with real-world operations, OET should ensure that testing is conducted to ensure that U-NII-4 devices operating at higher power levels (up to 35 dBm) are compatible with the sharing scheme. OET also should perform DSRC onboard unit blocking tests to assess the effectiveness of DSRC radio.

CONCLUSION

Global Automakers urges the FCC to proceed with Phases II and III of testing, as per the test plan agreed to with the DOT and NHTSA. Such testing should be expeditiously conducted in a manner that is consistent with the comments provided herein to inform data-driven decision-making about the future of the 5.9 GHz band.

Respectfully Submitted,

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