

**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

**REPLY COMMENTS OF THE NATIONAL CABLE & TELECOMMUNICATIONS  
ASSOCIATION ON THE REQUEST TO UPDATE THE U-NII-4 BAND RECORD**

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## **I. INTRODUCTION AND SUMMARY.**

From 600 megahertz to the millimeter wave bands, the Federal Communications Commission expects commercial licensees and government users to adopt more efficient band plans and technologies so the country can extract more utility from limited spectrum resources. But in responding to the Commission's *Public Notice*, supporters of dedicated short range communications (DSRC) demonstrate no understanding of modern spectrum policy and continue their long strategy of opposing commercially reasonable sharing in the 5.9 GHz band. These interests either completely oppose sharing or argue for unnecessary and technically unsupportable use restrictions that would prevent investment and preserve the band for their future use—despite the fact that they have failed to make substantial use of these frequencies for years.

Comments from Wi-Fi innovators, public interest groups, chipmakers, and network operators, conversely, confirm that the 5.9 GHz band presents the best near-term opportunity to address consumers' rapidly growing demand for Wi-Fi and other unlicensed broadband technologies. As numerous commenters explain, rechannelizing the band to provide 30 megahertz exclusively for DSRC crash-avoidance applications will protect these operations while opening the spectrum resources needed to address consumer Wi-Fi growth. The record also confirms that innovators have now produced the 802.11ac technologies needed to advance to next-generation Gigabit Wi-Fi, but only Commission action to open the 5.9 GHz band—the only band that can support this technology—will allow consumers to reap the full benefits of this important step forward.

In these reply comments, the National Cable & Telecommunications Association (NCTA) agrees with other commenters on four important points. First, only safety-of-life DSRC applications justify the extraordinary privileges DSRC interests seek in the 5.9 GHz band.

DSRC supporters plan to use licenses intended for safety uses for many commercial, non-safety applications. But they refuse to meaningfully assist the Commission to distinguish between safety and non-safety applications. The Commission should reject both efforts to blur that important line, and to claim that the entire band is somehow needed for safety applications that DSRC users intend to distribute inefficiently into many channels. The record shows that 30 megahertz of spectrum is more than adequate to accommodate DSRC safety systems.

Second, as chipmakers and other commenters confirm, DSRC supporters' claims about the costs of rechannelization are unreliable. Licensees can accomplish rechannelization with software changes and minimal additional testing. These efforts are worthwhile investments to promote efficient spectrum use, and will build on the work DSRC proponents have done to date. The Commission should therefore reject reflexive, unsupported oppositions to the rechannelization approach.

Third, the Commission has ample authority to adopt the rechannelization approach. Rechannelization is fully consistent with the Commission's broad authority over spectrum usage and with Congress's plans for vehicle-to-vehicle (V2V) safety communications. This is particularly true in light of the Spectrum Act's specific identification of the 5.9 GHz band for sharing, and broader direction to adopt sharing as a key strategy for meeting the growing need for spectrum resources. And the time to rechannelize is now, before DSRC radios are actually deployed commercially.

Fourth, the Commission's test plan can and should ensure that tests are performed efficiently and effectively. Specifically, the Commission should identify core DSRC safety services, identify the performance metrics and thresholds associated with those services, determine baseline DSRC performance, and measure each sharing proposal against that baseline.

This process will identify the sharing approaches that will be compatible with the claimed safety benefits of DSRC. The Commission should reject DSRC interests' transparent effort to slow the testing process by complaining about reasonable test elements and calling for unnecessary and unsupportable complications.

**II. ONLY SAFETY-OF-LIFE DSRC APPLICATIONS JUSTIFY EXCLUSIVE USE OF THE U-NII-4 BAND.**

DSRC proponents overwhelmingly oppose meaningful spectrum sharing based on the assertion that enabling unlicensed broadband use in the U-NII-4 band would undermine safety-of-life applications.<sup>1</sup> Accordingly, the Commission's exploration of the "reasons for differentiating between safety-of-life and non-safety-of-life [DSRC] applications" is of critical importance in this proceeding.<sup>2</sup> Although several DSRC proponents refuse to distinguish safety and non-safety DSRC applications, the record is clear that critical differences do exist. The Commission's rules should reflect those distinctions. Moreover, the Commission should not permit DSRC proponents to inefficiently disperse safety applications throughout U-NII-4 in an

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<sup>1</sup> See, e.g., Comments of the Alliance of Automobile Manufacturers, Association of Global Automakers, Intelligent Transportation Society of America, and Denso International America, Inc. at 5-7, ET Docket No. 13-49 (filed July 8, 2016) (AAM Comments); Comments of the Intelligent Transportation Society of America at 10, ET Docket No. 13-49 (filed July 8, 2016); Comments of OmniAir Consortium, Inc. at 1-2; Comments of Cohda Wireless at 3 (Cohda Wireless Comments); Comments of General Motors Company at 2, 5, ET Docket No. 13-49 (filed July 6, 2016); Comments of the Metropolitan Transportation Commission at 1-2; Comments of the Motor & Equipment Manufacturers Association at 2 (MEMA Comments); Comments of the Truck & Engine Manufacturers Association at 2; Comments of the Utah Department of Transportation at 3-4. Unless otherwise noted, all comment citations herein are to comments filed on July 7, 2016 in ET Docket No. 13-49.

<sup>2</sup> See *The Commission Seeks to Update and Refresh the Record in the "Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band" Proceeding*, ET Docket No. 13-49, Public Notice, FCC 16-68, at 8 (rel. June 1, 2016) (*Public Notice*).

effort to preserve the entire band for non-safety uses, when 30 megahertz of spectrum is more than sufficient for existing and future time-sensitive DSRC safety uses.

**A. The Commission’s Rules Should Reflect the Important Distinctions Between Safety and Non-Safety DSRC Spectrum Uses.**

In its *Public Notice*, the Commission sought comment on which DSRC applications should be considered “truly ... safety-of-life,” noting that it had already determined that contemplated DSRC uses such as “entertainment, social media, maps, and parking applications are not safety-related... .”<sup>3</sup> Nevertheless, many DSRC proponents have refused to assist the Commission to assess these distinctions. Toyota, for example, suggests that even mapping and parking applications are safety-related because DSRC-enabled maps might someday “include real-time road conditions,” and future DSRC parking applications could include “automated parking.”<sup>4</sup>

Only legitimate public safety uses can justify the extraordinary special subsidy of a free nationwide exclusive spectrum license.<sup>5</sup> As the record confirms, however, DSRC proponents envision numerous uses—including “advertising, social media, navigation, in-vehicle displays and electronic payments”—that have nothing at all to do with public safety and that are readily distinguishable from crash avoidance and related applications.<sup>6</sup> Importantly, the Oakland County Connected Vehicle Task Force reveals that “the most significant [DSRC-related] use

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<sup>3</sup> *See id.*

<sup>4</sup> Comments of the Toyota Motor Corporation at 19, ET Docket No. 13-49 (filed July 8, 2016).

<sup>5</sup> Comments of the National Cable & Telecommunications Association on the Request to Update the U-NII-4 Band Record at 12-16 (NCTA Comments); Comments of Open Technology Institute at New America, Public Knowledge, Engine, Common Cause, and Next Century Cities at 22-25 (Public Interest Organizations Comments); Comments of Ericsson at 4-5 (Ericsson Comments).

<sup>6</sup> Public Interest Organizations Comments at 6, 17-21; NCTA Comments at 5-12.

case is now the provision of mobile Internet services offered to non-DSRC devices which have attached themselves to a DSRC [on-board unit].”<sup>7</sup> This means that the most significant DSRC use case is to replicate the connectivity function of Wi-Fi and LTE, rather than any kind of safety operation. Refreshingly, the Oakland County Connected Vehicle Task Force acknowledges that many DSRC “services are not time critical nor are they safety-related (except in the most general possible sense when supporting such purposes as real-time navigation).”<sup>8</sup> The truth is that many of the uses that DSRC proponents have planned are already provided using commercial spectrum today, and do not need the special, preclusive privileges sought by DSRC interests.<sup>9</sup>

As both Ericsson and members of the Public Interest Spectrum Coalition explain, privileging non-safety DSRC over other technologies that can address the same needs is fundamentally inconsistent with U.S. spectrum policy.<sup>10</sup> Thus, as the Commission evaluates how best to facilitate sharing between DSRC and unlicensed uses in the U-NII-4 band, it should create rules that only provide priority and/or exclusivity for a DSRC application if it is “truly a safety-of-life use.”<sup>11</sup> Otherwise, the Commission should not require a U-NII-4 device to use the

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<sup>7</sup> Comments of Oakland County Michigan at 5, ET Docket No. 13-49 (filed July 5, 2016) (Oakland County Comments).

<sup>8</sup> *Id.* at 6.

<sup>9</sup> See Public Interest Organizations Comments at 17-18; NCTA Comments at 5-6; Comments of Microsoft Corporation at 6-7, ET Docket No. 13-49 (filed July 8, 2016) (Microsoft Comments).

<sup>10</sup> Public Interest Organizations Comments at 21-30; NCTA Comments at 12-17; Ericsson Comments at 4-5.

<sup>11</sup> See *Public Notice* at 8 (seeking comment on how to consider “a feature or service to be ... truly a safety-of-life use”).

DSRC standard to the exclusion of other standards in order to qualify for special spectral privileges.<sup>12</sup>

**B. The Commission Should Not Reward DSRC Interests' Plans to Inefficiently Spread Purported Safety Operations Across the Band to Prevent Sharing.**

As the Commission recognizes in the *Public Notice*, the existing DSRC rules designate two 10 megahertz channels exclusively for safety-of-life applications.<sup>13</sup> Nevertheless, several DSRC proponents now describe a new scheme. They assert that, because the existing DSRC rules permit safety uses in non-safety channels, they can scatter safety-related DSRC applications on each of the 10 megahertz service channels in the band in order to claim that every channel is a safety channel. And then DSRC interests would demand the same protections the Commission would afford for channels specifically designated for public safety applications.<sup>14</sup> Thus, DSRC proponents urge the Commission to provide special protection in *every* part of the band so that they can electively place safety uses on channels to protect co-channel non-safety applications. The Commission should reject this argument, which is premised on highly inefficient spectrum use. Gaming channel assignments to guard underutilized spectrum resources is precisely what good spectrum policy seeks to avoid.

As NCTA explained in its opening comments and attached Technical Appendix, the truth is that DSRC operations require no more than 10 megahertz of spectrum for the exchange of basic safety messages (BSMs).<sup>15</sup> Indeed, even the National Highway Traffic Safety Administration (NHTSA) contemplates that DSRC operations will use BSMs only on a single 10

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<sup>12</sup> NCTA Comments at 15.

<sup>13</sup> See *Public Notice* at 5; 47 C.F.R. § 95.1511(a).

<sup>14</sup> See, e.g., AAM Comments at 7-8; Comments of Delphi Automotive at 2 (Delphi Comments).

<sup>15</sup> NCTA Comments at 4 (citing Technical Appendix at 8, 13-14).

megahertz channel.<sup>16</sup> And while DSRC proponents have also cited “safety-adjacent” vehicle-to-infrastructure (V2I) communications—including signal warnings, reduced speed warnings, weather warnings, and the like—NCTA’s analysis makes clear that an additional 10 megahertz is more than sufficient for DSRC systems to accommodate these time-sensitive messages.<sup>17</sup> Fundamentally, this is because, as members of the Public Interest Spectrum Coalition have explained, “DSRC safety-of-life transmissions are inherently narrowband.”<sup>18</sup>

In other words, DSRC interests could theoretically deploy one safety-related narrowband application on each 10 megahertz channel in the 5.9 GHz band alongside non-safety applications. DSRC proponents claim that the Commission should therefore consider every channel as a public safety channel. The Commission should not countenance this inefficient and transparently strategic behavior by requiring the same protection for all seven 10 megahertz channels in the 5.9 GHz band that would be justified if all of the channels were used exclusively for public safety. Doing so would be a gold-plated reward for inefficient spectrum use, and wholly inconsistent with almost a decade of spectrum policy intended to address skyrocketing demand for wireless services.

### **III. THE COMMISSION SHOULD PROMOTE SPECTRUM SHARING THROUGH RECHANNELIZATION.**

As NCTA explained in its opening comments, rechannelizing the U-NII-4 band strikes the right balance by protecting crash avoidance functions while also facilitating commercially viable Wi-Fi.<sup>19</sup> The record confirms this analysis. Numerous commenters, including chip

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<sup>16</sup> See Public Interest Organizations Comments at 19-20.

<sup>17</sup> NCTA Comments at 4-5 (citing Technical Appendix at 12-13).

<sup>18</sup> Public Interest Organizations Comments at 17.

<sup>19</sup> NCTA Comments at 20.

designers, software developers, ISPs, and public interest organizations, support rechannelization because it would create dedicated channels that offer the best protection for DSRC’s safety-of-life functions while still facilitating sharing that can support next generation Gigabit Wi-Fi and other transformative unlicensed applications.<sup>20</sup> Indeed, while the Oakland County Connected Vehicle Task Force comments indicate a preference not to share the band at all, even this DSRC proponent has acknowledged that rechannelization is superior to the detect-and-avoid approach.<sup>21</sup>

Rechannelization is superior for safety-related services because, as Broadcom explains, “separating DSRC safety-of-life channels from other channels is optimal from a planning and implementation perspective.”<sup>22</sup> Designating dedicated safety channels ensures protection for DSRC safety uses while enabling the 160 megahertz-wide channel needed for the next generation of unlicensed Wi-Fi operations—a benefit the detect-and-avoid approach effectively forecloses.<sup>23</sup>

Although several DSRC proponents object that rechannelization will be costlier than a detect-and-avoid approach, they vastly overstate the impact that rechannelization will have on existing deployment efforts. In a curiously oft-repeated phrase, many DSRC supporters argue

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<sup>20</sup> *See, e.g.*, Comments of the Computing Technology Industry Association (CompTIA) at 3, ET Docket No. 13-49 (filed July 8, 2016); Comments of the Dynamic Spectrum Alliance at 1-2; Public Interest Organizations Comments at 30; Comments of Broadcom Ltd. at 10, ET Docket No. 13-49 (filed July 8, 2016) (Broadcom Comments); Comments of Qualcomm Incorporated on Public Notice Seeking to Refresh the Record at 3, ET Docket No. 13-49 (filed July 8, 2016) (Qualcomm Comments); Comments of the Wireless Internet Service Providers Association at 3 (WISPA Comments).

<sup>21</sup> Oakland County Comments at 4.

<sup>22</sup> Broadcom Comments at 10.

<sup>23</sup> *See, e.g.*, Qualcomm Comments at 5, 11-12.

that rechannelization would “nullify the investments” they have made as they work toward deployment.<sup>24</sup> But none of those commenters offer any evidence or explanation for why that must be so.

In contrast, as chipmakers Broadcom and Qualcomm confirm, rechannelization “can be implemented without any changes to DSRC hardware: a software modification is all that is required.”<sup>25</sup> In fact, the documentation for LocoMate, a DSRC on board unit produced by Arada Systems, indicates that the device supports multichannel synchronization across the 5.9 GHz band, and both 10 megahertz and 20 megahertz channelization.<sup>26</sup> Thus, DSRC operators using these devices can move BSM applications from channel 172 to the upper portion of the band in a matter of minutes.

Nor would rechannelization require a major reworking of DSRC standards or significant re-testing. As Qualcomm explains, “the current SAE J2945/1 DSRC standard, which covers on-board requirements for V2V safety, can be readily revised to support a safety channel in the upper portion of the DSRC band.”<sup>27</sup> Indeed, because the propagation characteristics of channel 172 and the new frequencies are “nearly identical,” a revised standard would require only “minimal” performance verification to confirm that the safety channel is operating properly in

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<sup>24</sup> MEMA Comments at 4 (rechannelization “would nullify the investments already made” in DSRC); Comments of Panasonic Corporation of North America at 4 (same); Cohda Wireless Comments at 2 (same); Comments of ABQ RIDE, City of Albuquerque Transit Department at 2, ET Docket No. 13-49 (filed July 6, 2016) (same).

<sup>25</sup> Broadcom Comments at 10; *see also* Qualcomm Comments at 9 (“Movement of the 10 MHz-wide safety-of-life channel to the upper portion of the band and implementation of 20 MHz channelization in the lower, shared portion of the band can be achieved through software changes and be carried out quickly.”).

<sup>26</sup> Arada Systems, *Data Sheet: LocoMate OBU*, [http://www.aradasystems.com/pdfs/Arada\\_locomate\\_datasheet\\_DDCv1.02.pdf](http://www.aradasystems.com/pdfs/Arada_locomate_datasheet_DDCv1.02.pdf).

<sup>27</sup> Qualcomm Comments at 9-10.

the upper portion of the band and to verify that the results of performance and application testing hold in the new band.<sup>28</sup>

These “minimal” additional costs are reasonable investments to ensure that the Commission’s rules enable efficient use of the nation’s finite spectrum resources. Moreover, DSRC proponents and the Department of Transportation (DoT) can further minimize the need for additional testing by making existing results available to the Commission. As Cisco points out, for example, the Commission will be better able to interpret its test results if DSRC interests and DoT make available additional information about the testing that they have already completed.<sup>29</sup> How can it be, after repeated requests for these results over many years,<sup>30</sup> that DSRC interests continue to refuse to put test results on the public record?

In addition to the information Cisco has requested, parties should provide the results of any testing they have conducted to gauge DSRC self-interference in the top three DSRC channels. For example, DSRC proponents claim that they have already planned safety-of-life applications for these channels.<sup>31</sup> If this is so, then the DSRC proponents surely have extensively studied the potential for interference between and within these channels under both low and high DSRC utilization scenarios, especially given automakers’ apparent plans for

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<sup>28</sup> *Id.*

<sup>29</sup> *See* Further Comments of Cisco Systems, Inc. at 6-7, ET Docket No. 13-49 (filed July 8, 2016).

<sup>30</sup> *See, e.g., DSRC Coexistence Tiger Team Action Item List – August 2014*, Doc. No. IEEE 802.11-14/1060r0 (Aug. 2014), <https://mentor.ieee.org/802.11/dcn/14/11-14-1060-00-0reg-dsrc-coex-tt-action-item-list-july-aug.doc>; Letter from Rick Chessen, Senior Vice President, Law and Regulatory Policy, NCTA, to Marlene H. Dortch, Secretary, FCC at 2 & Attachment, ET Docket No. 13-49 (filed March 30, 2015).

<sup>31</sup> *See, e.g.,* Delphi Comments at 5; AAM Comments at 10-11.

intensive commercial use of this spectrum.<sup>32</sup> Why have they not released this information? Have automakers unreasonably failed to conduct the kind of interference testing that they insist is critical in the Wi-Fi context? Or they have concluded that their devices are far less susceptible to interference than they claim?

Some DSRC proponents may object that they have assumed only high power uses on channel 184, but certainly even this test data will still be highly instructive. In particular, if testing has shown that DSRC self-interference does not undermine safety applications under heavy safety and non-safety channel utilization at high power levels, one can expect that self-interference will be no more significant if non-safety applications are moved to other channels, and power levels are reduced, even as some safety applications are added to the band. On the other hand, if DSRC proponents have not completed their testing, then rechannelization will not, in fact, require significant new testing beyond what is already needed, since DSRC proponents surely do not intend to deploy safety-of-life services without rigorous testing. Similarly, they should include any studies that assess potential interference from incumbent operations, including FSS and Radar.

Finally, DSRC interests have also failed to address several relevant studies that collectively suggest that DSRC technology may be in need of significant further refinement and testing regardless of the sharing proposal the Commission adopts. Among other concerns, these studies have indicated:

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<sup>32</sup> See NCTA Comments at 5-12; Oakland County Comments at 5.

- That DSRC may be seriously impaired by DSRC self-interference when two radios are installed in a single car,<sup>33</sup> notwithstanding NHTSA's determination that multiple DSRC radios will be necessary for real-world applications;<sup>34</sup>
- That GPS performance is often insufficiently reliable to properly identify the location of vehicles, especially in urban areas;<sup>35</sup>
- That the real-world BSM error rate routinely rises well above 10%;<sup>36</sup>
- That DSRC technology often fails to properly classify vehicle locations (even excluding data when a turn signal is active—the very situation where blind-spot and lane-change warnings would be most useful);<sup>37</sup> and
- That consumer acceptance of many DSRC features has been, at best, tepid.<sup>38</sup>

DSRC proponents cannot, therefore, claim that rechannelization creates an unreasonable need for more testing. More analysis is plainly required with or without rechannelization.

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<sup>33</sup> Danijela Cabric et al., COGNITIVE RECONFIGURABLE EMBEDDED SYSTEMS LAB, ELECTRICAL ENGINEERING DEPARTMENT, UNIVERSITY OF CALIFORNIA, *DSRC Standards Testing: 5MHz Band-Plan Analysis, Clustered System Architecture and Communication in Emergency Scenarios*, Final Report for Contract 65A0292 with the California Dep't of Transp., Federal Report No. CA11-1228 at 4, 10-11 (Dec. 12, 2011), [http://www.dot.ca.gov/research/researchreports/reports/2011/task\\_1228-tsm.pdf](http://www.dot.ca.gov/research/researchreports/reports/2011/task_1228-tsm.pdf).

<sup>34</sup> John Harding et al., NAT'L HIGHWAY TRAFFIC & SAFETY ADMIN., *Vehicle-to-Vehicle Communications: Readiness of V2V Technology for Application*, at 67 (Aug. 2014).

<sup>35</sup> F. Ahmed-Zaid et al., CRASH AVOIDANCE METRICS PARTNERSHIP, *Vehicle-to-Vehicle Safety System and Vehicle Build for Safety Pilot (V2V-SP), Final Report, Volume 2 of 2: Performance Testing*, at 11-24 (Apr. 10, 2014) (draft report pending DoT publication review), <https://www.regulations.gov/contentStreamer?documentId=NHTSA-2014-0022-0043&attachmentNumber=1&disposition=attachment&contentType=pdf>. The CAMP report cited by AAM appears to have been derived from this report, but does not include a number of its more troubling findings.

<sup>36</sup> *Id.* at 9-10.

<sup>37</sup> *Id.* at 25-28.

<sup>38</sup> Scott Stevens, U.S. DEP'T OF TRANSP., Research and Innovative Technology Administration, Volpe National Transportation Systems Center, Advanced Vehicle Technology Division (RVT-92), *Preliminary Analysis of the Driver Subjective Data for Integrated Light Vehicles* (July 2013), <https://www.regulations.gov/contentStreamer?documentId=NHTSA-2014-0022-0035&attachmentNumber=1&disposition=attachment&contentType=pdf>.

Automotive companies may claim that these issues are best addressed by DoT. But because DSRC interests argue that the Commission should grant their technology special status over all other technologies because of its safety performance, responding to multiple studies calling claimed performance into question is relevant to Commission decision making. If another decade goes by and this spectrum continues to lie fallow, it will be the Commission, not the DoT, that will take responsibility for this failure of national spectrum policy.

#### **IV. THE COMMISSION HAS AMPLE AUTHORITY TO ADOPT THE RECHANNELIZATION APPROACH.**

DSRC proponents imply that Congress's support for intelligent transportation systems (ITS) requires the Commission to consider only the detect-and-avoid sharing approach.<sup>39</sup> For example, according to the auto manufacturers, Congress's "expectations and directions" somehow prevent the Commission from adopting rechannelization because doing so "would effectively reallocate most of the spectrum that had been previously allocated for DSRC."<sup>40</sup> That argument ignores the Commission's broad authority over spectrum policy and Congress's commitment to sharing, and misrepresents the impact of rechannelization.

The Communications Act gives the Commission extensive authority to allocate spectrum, and to grant and modify spectrum licenses in the public interest. Congress delegated to the Commission rulemaking authority over devices capable of producing radio frequency interference<sup>41</sup> and the power to "[a]ssign bands of frequencies to the various classes of stations" and "[p]rescribe the nature of the service to be rendered" in those bands.<sup>42</sup> And that authority

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<sup>39</sup> See AAM Comments at 46.

<sup>40</sup> *Id.*

<sup>41</sup> 47 U.S.C. § 302a(a).

<sup>42</sup> *Id.* § 303(b), (c).

includes the discretion to change the rules governing the use of a particular spectrum band. For example, section 316 grants the Commission the power to modify any license when the Commission decides a modification is in the public interest, convenience, or necessity.<sup>43</sup>

None of the statutes cited by DSRC proponents limit this authority. Indeed, the Intermodal Surface Transportation Efficiency Act of 1991 places no requirements on the Commission at all.<sup>44</sup> The Transportation Equity Act for the 21st Century (TEA-21) similarly places no restrictions on the Commission's authority to allocate spectrum in the public interest.<sup>45</sup> Rather, TEA-21 merely instructs the Commission to consider, by the end of 1999, the "spectrum needs for the operation of intelligent transportation systems, including spectrum for the dedicated short-range vehicle-to-wayside wireless standard."<sup>46</sup> No one disagrees that the Commission met that requirement. Nor does anyone disagree that Congress saw promise in DSRC safety applications more than a decade ago when it passed this law. But neither of these statutes come close to a congressional "direction" that the Commission must adopt any particular approach to sharing in the 5.9 GHz band.

Far from being prohibited, rechannelization is fully consistent with Congress's plans for V2V safety communications, particularly in light of the Spectrum Act's identification of sharing as a key strategy for meeting the growing need for spectrum resources.<sup>47</sup> In establishing and

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<sup>43</sup> *Id.* § 316.

<sup>44</sup> Intermodal Surface Transportation Efficiency Act of 1991, Pub. L. No. 102-240, 105 Stat. 1914 (1991).

<sup>45</sup> Transportation Equity Act for the 21st Century, Pub. L. No. 105-178, § 5206(f), 112 Stat. 107, 457 (1998).

<sup>46</sup> *Id.*

<sup>47</sup> Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. No. 112-96, § 6701, 126 Stat. 156, 245 (2012).

funding various ITS programs, Congress's focus has always been safety, not the commercial, non-safety applications DSRC interests now seek to protect.<sup>48</sup> As described in section III, rechannelization offers full protection for those critical time-sensitive safety functions.<sup>49</sup> By concentrating those functions in dedicated channels at the top of the band, the rechannelization approach ensures protection for safety-of-life applications while also enabling commercially viable sharing with non-safety DSRC in the rest of the band consistent with the goals of the Spectrum Act.

The detect-and-avoid approach as described by automotive interests, on the other hand, is an extreme restriction that makes sharing practically impossible. There is no reason to think Congress intended to effectively prohibit sharing when critical safety functions can be fully protected.<sup>50</sup> In short, Congress has in no way limited the Commission's authority to select the sharing approach that best promotes the many public interests under consideration in this proceeding.

**V. TESTING SHOULD FOCUS ON SHARING'S IMPACT ON CORE CRASH AVOIDANCE AND SAFETY-OF-LIFE FUNCTIONS.**

There is no doubt that the Commission must proceed carefully as it tests the various sharing approaches advanced by parties in this proceeding. The Commission faces the

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<sup>48</sup> See, e.g., Transportation Equity Act for the 21st Century, Pub. L. No. 105-178, § 5207(b)(2), 112 Stat. 107, 458 (1998) (instructing the Secretary of Transportation to “focus on crash-avoidance”).

<sup>49</sup> See *supra* section III; see also Qualcomm Comments at 3; WISPA Comments at 4-5; Broadcom Comments at 5.

<sup>50</sup> See Michael Calabrese, THE OPEN TECHNOLOGY INSTITUTE AT NEW AMERICA, *Spectrum Silos to Gigabit Wi-Fi—Sharing the 5.9 GHz ‘Car Band’*, at 35 (Jan. 2016), <https://goo.gl/Ry8M09> (explaining the barriers to sharing created by the detect-and-avoid approach); WISPA Comments at 5; Broadcom Comments at 3. See also Microsoft Comments at 9 (discussing impact on the U-NII-3 band).

challenge—but also the opportunity—of establishing a sharing framework for the 5.9 GHz band that unlocks greater wireless broadband Internet capacity while simultaneously making spectrum available for DSRC safety-of-life applications. As it does so, however, the Commission must ensure that testing does not devolve into a battle of unverifiable engineering assumptions and abstract technical results.

The Alliance of Automobile Manufacturers, Association of Global Automakers, Intelligent Transportation Society of America, and Denso International America, Inc. (collectively AAM) assert that OET must address no fewer than 18 new inquiries and new testing proposals—spanning nearly five pages—before moving ahead with testing.<sup>51</sup> Most of these requests, however, needlessly overcomplicate the Commission’s efforts and appear to be delay tactics. For example, AAM calls for the Commission to separately evaluate each of the possible Wi-Fi channel sizes and their in-band and out-of-band emissions into each of the seven DSRC channels, the two rechannelized 20 megahertz DSRC channels, and, puzzlingly, the 5 megahertz guard band between U-NII-3 and U-NII-4.<sup>52</sup> Similarly, AAM recommends several questions about purely hypothetical scenarios, such as the interference potential of operating using non-standard channel bandwidths and other technologies that have not yet been developed or even suggested in the Commission’s record, let alone deployed.<sup>53</sup> And, finally, AAM asks the Commission to conduct numerous additional tests for the purpose of comparing the various proposals on a wide variety of metrics.<sup>54</sup>

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<sup>51</sup> AAM Comments at 62-67.

<sup>52</sup> *Id.* at 62-63.

<sup>53</sup> *Id.* at 63-67.

<sup>54</sup> *Id.*

While some of these suggestions identify issues that may be relevant to successful sharing, the vast majority of AAM's proposed testing approach would add an astronomical amount of new complexity and interminably prolong the testing process, all to yield data that is either not relevant or not necessary to the Commission's decision. The Commission should not adopt AAM's proposals. Instead, the Commission can ensure its testing is both robust and expeditious by focusing on realistic U-NII-4 operations and measuring their effects on the real-world performance of the DSRC BSM.

The Commission can best address automakers' asserted concerns by simply testing whether a given sharing approach *works*, instead of seeking to generate reams of comparative data on every possible variant of each. To do so, the Commission should:

1. Identify core DSRC safety services, such as the BSM, which:
  - Are the subject of concrete, documented deployment plans by automakers or others;
  - Will have direct safety-of-life benefits;
  - Are time-sensitive; and
  - Will not be replicated by other collision-avoidance technologies and are therefore DSRC-specific.
2. Identify DSRC performance metrics for these services and corresponding thresholds, based on empirical research, to determine the necessary values for these metrics needed to yield significant safety benefits.
3. Measure the baseline performance of each identified DSRC core safety service, according to the metrics identified above, under the current DSRC channelization plan in the absence of U-NII-4 operations. The Commission should assume realistic traffic environments and maximum utilization of non-safety DSRC services such as wireless Internet access in every DSRC channel.<sup>55</sup> Because DSRC interests evidently seek to use DSRC, in the absence of sharing, as a substitute for Wi-Fi in the 5.9 GHz

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<sup>55</sup> See Oakland County Comments at 5 (“We believe that the most significant [DSRC-related] use case is now the provision of mobile Internet services offered to non-DSRC devices which have attached themselves to a DSRC OBU.”).

band,<sup>56</sup> and concede that this will be a primary use of DSRC technology,<sup>57</sup> any testing should assume non-safety DSRC traffic levels at least as high as assumed U-NII-4 traffic.

4. For each sharing proposal, measure the same DSRC core safety performance metrics as under the baseline testing described above, assuming:
  - The same levels of safety and non-safety DSRC traffic as assumed under the baseline testing;
  - That U-NII-4 devices will use the 802.11ac protocol;
  - Reasonable U-NII-4 traffic levels and received U-NII-4 power levels at the DSRC receiver taking into account real-world power levels, separation distances, number of U-NII-4 transmitters, and propagation environment; and
  - Under proposals to separate DSRC safety and non-safety channels, non-safety DSRC traffic will be confined to the proposed non-safety portion of the band to accurately reflect the rechannelization proposal. Safety messages will be appropriately prioritized within the safety-only portion of the band.
5. Determine whether each sharing proposal adequately protects DSRC operations by comparing the baseline and measured DSRC performance metrics to the identified DSRC performance benchmark previously established for each value.

This process will identify which sharing approaches will be compatible with the claimed safety benefits of DSRC. From among the approaches that pass this battery of tests, the Commission should then select the sharing approach that maximizes the use of U-NII devices in the band and, thus, allow for the most efficient overall spectrum use. Adopting the efficient testing methodology described above will help ensure that the Commission can make time and resources available to fully evaluate the potential of each sharing proposal under consideration.

The Commission also should select other testing parameters to reflect real-world conditions. For example, contrary to AAM's suggestion,<sup>58</sup> the Commission should in no case use a signal generator as a substitute for an 802.11 compliant device when a functional 802.11

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<sup>56</sup> *Id.*

<sup>57</sup> *Id.*

<sup>58</sup> AAM Comments at 64.

device is available. Because a signal generator will not incorporate the robust coexistence features of an 802.11 device, tests derived from a signal generator will reflect far greater impact on DSRC than would ever occur in the real world. If the Commission nonetheless does rely on a signal generator for these purposes, it should take into account the fact that any results would substantially overstate any observable interference.

Finally, although DSRC proponents claim that a number of safety-related DSRC services are in the planning stages, it appears that BSM is the only DSRC service that meets the four criteria above for core DSRC safety services that must be tested—and it is the only service that DoT is considering in its pending rulemaking. Importantly, not one commenter has pointed to a completed standard for any other safety service. In response to the Commission’s request for key DSRC performance standards, for example, AAM provided only performance standards for services that rely on BSM, as described in the SAE J2945/1 standard.<sup>59</sup>

This lack of development confirms that, not only is BSM the only DSRC technology that should be tested, it is also the only DSRC technology that *can* be tested. Without a final standard or established performance metrics, it will be impossible to accurately gauge the baseline performance of these hypothetical services, let alone their performance under the various sharing techniques that have been proposed.

## **VI. CONCLUSION.**

NCTA strongly supports the Commission’s work to identify a sharing solution that promotes the continued success of Wi-Fi and other unlicensed broadband uses and protects DSRC crash-avoidance technologies as they continue their development. The record demonstrates that rechannelization represents both the best protection for critical safety-of-life

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<sup>59</sup> *Id.* at 59-60.

DSRC applications and the only realistic option to enable unlicensed broadband in the U-NII-4 band. With such a balanced approach available, the Commission should (1) clearly state that the Commission rule will not grant special privileges to non-safety DSRC services, (2) reject calls to abandon sharing altogether or to restrict testing to detect-and-avoid sharing approaches that would result in sharing in name only, and (3) adopt a practical and real-world testing plan so all parties can get to work.

Respectfully submitted,



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