Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
5GAA Petition for Waiver to Allow Deployment of Cellular Vehicle-To-Everything (C-V2X) Technology in the 5.9 GHz Band	)	GN Docket No. 18-357
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REPLY COMMENTS OF THE 5G AUTOMOTIVE ASSOCIATION

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February 26, 2019

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EXECUTIVE SUMMARY

The Commission should grant the petition for waiver ("Waiver Request") filed by the 5G Automotive Association ("5GAA") to allow for the operation of Cellular Vehicle-to-Everything ("C-V2X") technology in the 5.905-5.925 GHz range of the 5.850-5.925 GHz ("5.9 GHz") band, which is allocated to the Intelligent Transportation Systems ("ITS") Radio Service. The record demonstrates that a grant will advance the public interest by expediting the widespread availability of C-V2X, enabling important safety, mobility, efficiency, and environmental benefits, providing Americans with access to the same modern safety technologies that are available in other parts of the world, and facilitating American leadership in ITS. Moreover, a grant will further, rather than undermine, the underlying purpose of the rules: to improve vehicular safety and travel.

C-V2X has emerged as the best opportunity to further the vision of ITS in the 5.9 GHz band and respond to the societal needs that Congress, the Commission, and the Department of Transportation repeatedly have identified over the better part of the past three decades. Built upon earlier efforts to develop ITS services and recent advancements in cellular technologies, the technology empowers direct communications between vehicles, between vehicles and pedestrians, cyclists and other vulnerable persons, and between vehicles and transportation infrastructure, as well as communications between vehicles and mobile networks.

The momentum for C-V2X continues to grow, both domestically and internationally. Most notably, Ford Motor Company recently announced that it plans to deploy C-V2X in all new vehicles in the United States by 2022. And at last month's Consumer Electronics Show, where numerous companies demonstrated the capabilities of this technology, C-V2X was selected as an Innovation Award Honoree in the "Vehicle Intelligence and Self-Driving Technology" category. To accelerate this momentum, the Commission must give U.S. stakeholders the ability to begin commercial deployment.

A broad and diverse set of commenters representing the technology, telecommunications, and automotive industries support a waiver grant. Indeed, nearly every automobile manufacturer on record supports the Waiver Request. Commenters largely cite three key reasons in their support: C-V2X's ability to improve safety, C-V2X's evolution path to 5G, and a desire to position America as an ITS leader.

A waiver grant is appropriate relief, despite the assertions of some commenters. The Commission has frequently granted waivers where, as here, the result is to enable new and innovative services. While some commenters question C-V2X's readiness for deployment and its ability to enable the public interest benefits identified in the Waiver Request, a closer examination of these concerns exposes their flaws. C-V2X is a proven technology, and its performance advantages, evolution path to 5G, and accelerated timeline for deployment will enable a host of services that will deliver safety and other benefits on America's roads.

Finally, to the extent that some unlicensed proponents here mount a collateral attack on the ITS allocation, these arguments are out of date. While the 5.9 GHz band may have been the best candidate for new unlicensed opportunities in 2013, the spectrum landscape has shifted

dramatically in the last six years. Today, spectrum in the 6 GHz and 3.5 GHz bands is best positioned in the near term to support the types of services described by these unlicensed proponents. The Commission thus has an opportunity to both promote vehicular safety services and provide access to new mid-band spectrum for unlicensed and similar uses in the near future.

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In the Matter of 5GAA Petition for Waiver to Allow Deployment of Cellular Vehicle-To-Everything (C-V2X) Technology in the 5.9 GHz Band	))))))	GN Docket No. 18-357

To: Office of Engineering and Technology and Wireless Telecommunications Bureau

REPLY COMMENTS OF THE 5G AUTOMOTIVE ASSOCIATION

The 5G Automotive Association ("5GAA"),[1] by its attorneys, hereby replies to the comments submitted in response to the *Public Notice*[2] issued by the Office of Engineering and Technology and Wireless Telecommunications Bureau seeking comment on 5GAA's petition for waiver of the rules of the Federal Communications Commission ("Commission") to allow for the operation of Cellular Vehicle-to-Everything ("C-V2X") technology in the 5.905-5.925 GHz range of the 5.850-5.925 GHz ("5.9 GHz") band, which is allocated to the Intelligent Transportation Systems ("ITS") Radio Service.[3]

[1] 5GAA is a global cross-industry association of companies working to develop end-to-end connectivity solutions for intelligent transportation, future mobility systems, and smart cities. Created in 2016 by eight founding members, 5GAA's membership continues to expand rapidly. Today, over 100 companies – including many of the world's major automotive, technology, and telecommunications companies – count themselves as members of 5GAA. See Appendix A for a complete list of 5GAA members.

[2] *Office of Engineering and Technology and Wireless Telecommunications Bureau Seek Comment on 5GAA Petition for Waiver to Allow Deployment of Cellular Vehicle-to-Everything (C-V2X) Technology in the 5.9 GHz Band*, Public Notice, DA 18-1231 (rel. Dec. 6, 2018).

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

Last month, Ford Motor Company announced that it will deploy C-V2X in all of its vehicles in the United States by 2022.[4] By granting this waiver, the Commission can remove the most significant regulatory roadblock that stands in the way of Ford and other stakeholders deploying C-V2X and – in doing so – dramatically improving safety on America's roads.

I. INTRODUCTION

For decades, Congress, the U.S. Department of Transportation ("DOT"), and the Commission have acknowledged the life-saving and societal benefits enabled by ITS services. These services, which incorporate communications technology into vehicles, transportation infrastructure, and other devices, can enable important safety, mobility, traffic efficiency, and environmental benefits on America's roads. Even with recent advancements in automotive safety technology, the need for ITS services persists. Indeed, the DOT and the National Highway Traffic Safety Administration ("NHTSA") – the nation's expert agency in traffic safety – repeatedly have stressed in recent years the importance of ITS services in the 5.9 GHz band for improving safety.[5]

Today, C-V2X has emerged as the best opportunity to further the vision of ITS in the 5.9 GHz band and respond to the societal needs that Congress, the Commission, the DOT, and NHTSA repeatedly have identified over the better part of the past three decades. Built upon earlier efforts to develop ITS services and recent advancements in cellular technologies, C-V2X

[4] Don Butler, *How 'Talking' and 'Listening' Vehicles Could Make Roads Safer, Cities Better*, Medium (Jan. 7, 2019), https://medium.com/@ford/how-talking-and-listening-vehicles-could-make-roads-safer-cities-better-f215c68f376f.

[5] *See, e.g.*, Notice of Request for Comments: V2X Communications, 83 Fed. Reg. 66338, 66338 (Dec. 26, 2018) ("Request for Comments V2X Communications") (expressing the DOT's "view that [vehicle-to-everything] technologies have the potential for significant safety and mobility benefits, both on their own and as complementary technologies when combined with in-vehicle sensors supporting the integration of automated vehicles and other innovative applications such as platooning"); Federal Motor Vehicle Safety Standards; V2V Communications, 82 Fed. Reg. 3854, 3855 (Jan. 12, 2017) ("Federal Motor Vehicle Safety Standards") ("The agency believes that [vehicle-to-vehicle communications have] the potential to revolutionize motor vehicle safety.").

represents an evolution in connected vehicle technology and the first step towards leveraging 5G to increase safety and to maximize the myriad other benefits of connected vehicles on America's roads. Already incorporated into technical standards, C-V2X empowers direct communications between vehicles, between vehicles and pedestrians, cyclists and other vulnerable persons, and between vehicles and transportation infrastructure, as well as communications between vehicles and mobile networks.

Unfortunately, Commission rules today prevent the widespread implementation of C-V2X technology in the United States. The current rules for the 5.9 GHz band – adopted well before the development of C-V2X – restrict ITS operations to those that use the Dedicated Short Range Communications ("DSRC") standard. To expedite the availability of C-V2X, 5GAA sought a blanket waiver footnote NG 160 to Section 2.106 of the Commission's rules, subject to certain conditions, to allow for the deployment of C-V2X in the 5.905-5.925 GHz portion of the 5.9 GHz band.

In its Waiver Request, 5GAA demonstrated that good cause exists for grant of the waiver. First, 5GAA demonstrated that the waiver advances the public interest by expediting the widespread availability of C-V2X, enabling important safety, mobility, efficiency and environmental benefits and providing Americans with access to the same modern safety technologies that are available in other parts of the world. Second, 5GAA demonstrated that a waiver would advance, rather than undermine, the underlying purpose of the rules: to improve vehicular safety and travel.

Since the filing of the Waiver Request, the momentum for C-V2X has grown. Most notably, Ford Motor Company announced at last month's Consumer Electronics Show ("CES") that it plans to deploy C-V2X in every single new vehicle in the United States by 2022. At CES,

C-V2X was also selected as an Innovation Award Honoree in the "Vehicle Intelligence and Self-Driving Technology" category, and numerous 5GAA member companies demonstrated their C-V2X capabilities.

This momentum for C-V2X is reflected in the record, where a broad and diverse set of commenters support a waiver grant. Perhaps most notably, nearly every automobile manufacturer on record supports the Waiver Request. Commenters largely cite three key reasons in their support: C-V2X's ability to improve safety, C-V2X's evolution path to 5G, and a desire to position America as an ITS leader.

A waiver grant is appropriate relief, despite the assertions of some commenters. Indeed, the Commission has frequently granted waivers where, as here, the result is to enable new and innovative services. While some commenters question C-V2X's readiness for deployment and its ability to enable the public interest benefits identified in the Waiver Request, a closer examination of these concerns exposes their flaws. C-V2X is a proven technology, and its performance advantages, evolution path to 5G, and accelerated timeline for deployment will enable a host of services that will deliver safety and other benefits on America's roads that otherwise would not be achieved.

Finally, to the extent that some unlicensed proponents here mount a collateral attack on the ITS allocation, these arguments are out of date. While the 5.9 GHz band may have been the best candidate for new unlicensed opportunities in 2013, the spectrum landscape has shifted dramatically in the last six years. Today, spectrum in the 5.925-7.125 GHz ("6 GHz") and 3.550-3.700 GHz ("3.5 GHz") bands is best positioned in the near term to support the types of services described by these unlicensed proponents. The Commission thus is able to both promote vehicular safety services and provide access to new mid-band spectrum for unlicensed

and similar uses in the near future. Objections to the Waiver Request based on C-V2X's effect on future unlicensed operations in the band should thus be summarily dismissed, and the Commission should grant the Waiver Request.

II. C-V2X IS MOVING FORWARD RAPIDLY, AND WAIVER GRANT WOULD ACCELERATE THIS MOMENTUM IN AMERICA

Stakeholders from the automotive, telecommunications, and technology industries are actively working to advance the development and deployment of C-V2X. Even since the filing of the Waiver Request, this momentum for C-V2X – both in America and abroad – has grown at a rapid pace. A grant would accelerate this momentum by unleashing additional investment and innovation.

Ford's recent announcement that it will deploy C-V2X in all new vehicles in the United States by 2022 is clearly the most notable new development.[6] As America's second largest automotive manufacturer, Ford's announcement represents a watershed moment in the deployment of ITS services in the United States. Ford will become the first automaker in the world to deploy an ITS technology that leverages the 5.9 GHz band in *all* of its vehicles sold in America. In announcing its decision, Ford stated its belief that "cellular vehicle-to-everything is the technology with the most potential to allow the cars and cities of the future to communicate quickly, safety, and securely."[7]

Ford is not the only stakeholder interested in C-V2X. American road operators also are actively exploring this technology. Last month, for example, the city of Las Vegas and the Regional Transportation Commission of Southern Nevada announced trials in Las Vegas to

[6] Butler, *supra* note 4.

[7] *Id.*

demonstrate a range of C-V2X technology use cases.[8] These trials came on the heels of a similar announcement by the Colorado Department of Transportation that it will deploy C-V2X along a traffic-intensive corridor used by travelers to get to popular mountain destinations.[9]

C-V2X is also winning industry accolades. C-V2X was selected as an Innovation Award Honoree in the "Vehicle Intelligence and Self-Driving Technology" category at CES.[10] The investment, innovation, and collaboration in C-V2X by the automotive, telecommunications, and technology industries could further be seen on the CES show floor. Audi, Ducati, Ford, and Qualcomm demonstrated safe and efficient automated driving using C-V2X peer-to-peer communications.[11] And in a cooperative intersection use case, C-V2X helped drivers and vehicles safely and efficiently negotiate a non-signalized intersection through the sharing of vehicle intentions.[12] Transportation solution providers, Derq and McCain,[13] and bike manufacturer, Trek Bicycle, also showed how C-V2X can improve safety for pedestrians and

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[8] Press Release, Qualcomm, *Qualcomm Teams With the City of Las Vegas, Regional Transportation Commission of Southern Nevada and Commsignia to Implement C-V2X Vehicle Communications Technologies in Las Vegas* (Jan. 7, 2019), https://www.qualcomm.com/news/releases/2019/01/07/-qualcomm-teams-city-las-vegas-regional-transportation-commission-southern.

[9] *See* Sue Marek, *Colorado Will Be First With C-V2X Vehicle Deployment*, SDxCentral (June 5, 2018), https://www.sdxcentral.com/articles/news/colorado-will-be-first-with-c-v2x-vehicle-deployment/2018/06.

[10] *See* Carlos Gonzalez, *Could 5G Be The Missing Puzzle Piece for Self-Driving Cars?*, MachineDesign (Jan. 24, 2019), https://www.machinedesign.com/motion-control/could-5g-be-missing-puzzle-piece-self-driving-cars.

[11] *See* Comments of Qualcomm, Inc., GN Docket No. 18-357, at 9 (filed Feb. 8, 2019) ("Qualcomm Comments"). Unless otherwise noted, all references to Comments in this reply are to those filed in GN Docket No. 18-357.

[12] *Id.* at 9-10.

[13] Press Release, Derq, *Derq Demonstrates AI-Based Road Safety Applications With Qualcomm Technologies Using C-V2X Technology at CES* (Jan. 7, 2019), http://en.derq.com/press-coverage/-2019/1/8/derq-demonstrates-ai-based-road-safety-applications-using-c-v2x-technology-at-ces; Press Release, McCain, *McCain to Participate in Qualcomm Cellular-V2X Connected Vehicle Demonstrations at CES* (Jan. 9, 2018), https://www.mccain-inc.com/334-mccain-to-participate-in-qualcomm-cellular-v2x-connected-vehicle-demonstrations-at-ces.

cyclists.[14] And 5GAA members Ericsson, HARMAN International, Savari, Inc., Bosch and Veniam, Wistron NeWeb Corporation, and Continental also showcased C-V2X's capabilities.[15]

Regulators in other parts of the world are also embracing C-V2X. As mentioned in the Waiver Request, the Chinese Ministry of Industry and Information Technology already has allocated spectrum for C-V2X.[16] More recently, the Victorian Government in Australia awarded a $3.5 million grant to telecom provider Telestra and Lexus Australia to conduct a two-year field trial of C-V2X technology.[17]

C-V2X is gaining momentum in the marketplace and among regulators. To accelerate this momentum, the Commission must give U.S. stakeholders the ability to begin commercial deployment of C-V2X. In the absence of a waiver grant, the Commission risks needlessly slowing the pace of investment in and deployment of C-V2X and delaying the resulting benefits to drivers, passengers, pedestrians, and other vulnerable road users.

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[14] Zach Overholt, *Trek, Tome, and Ford – are B2V and C-V2X the future of safer cycling?*, BikeRumor! (Jan. 9, 2018), https://bikerumor.com/2018/01/09/trek-tome-and-ford-are-b2v-and-c-v2x-the-future-of-safer-cycling.

[15] Press Release, 5GAA, *5G Automotive Association at CES 2019: Highlighting connected mobility through 5G* (Jan. 7, 2019), http://5gaa.org/news/5g-automotive-association-at-ces-2019-highlighting-connected-mobility-through-5g; Tracy Cozzens, *Harman to demonstrate Autotalks' C-V2X capabilities at CES 2019*, GPS World (Jan. 7, 2019), https://www.gpsworld.com/harman-to-demonstrate-autotalks-c-v2x-capabilities-at-ces-2019.

[16] *See* Ministry of Industry and Information Technology of the People's Republic of China, MIIT No. 203 regulation (Nov. 2018). *See also*, Stephen Lawson, *C-V2X's Momentum in China May Drive Connected-Car Development*, TU Automotive (Nov. 7, 2018), https://www.tu-auto.com/c-v2xs-momentum-in-china-may-drive-connected-car-development/.

[17] *See* Samira Sarraf, *Telstra gets $3.5M grant to trial connected vehicle technology*, ARN from IDG (Dec. 14, 2018), https://www.arnnet.com.au/article/650847/telstra-gets-3-5m-grant-trial-connected-vehicle-technology/.

III. STAKEHOLDERS FROM THE AUTOMOTIVE, WIRELESS, AND TECHNOLOGY INDUSTRIES SUPPORT THE WAIVER

Transportation, telecommunications, and technology industry stakeholders urged the Commission to allow for initial C-V2X deployment.[18] Most notable is the support from the automotive industry. Nearly every automobile manufacturer on record supports the Waiver Request.[19] Moreover, even those commenters that do not expressly support grant of the waiver request acknowledge that C-V2X shows great promise.[20]

[18] *See* Comments of Ericsson, at 1 (filed Jan. 18, 2019) ("Ericsson Comments"); Comments of Nokia, at 1 (filed Feb. 8, 2019) ("Nokia Comments"); Comments of Panasonic Corporation of North America, at 8 (filed Jan. 29, 2019) ("Panasonic Comments"); Comments of Samsung Electronics America, Inc. and HARMAN International, at 1 (filed Feb. 6, 2019) ("Samsung/HARMAN Comments"); Comments of Intel Corporation, at 1 (filed Jan. 24, 2019) ("Intel Comments"); Qualcomm Comments at 1; Comments of T-Mobile USA, Inc., at 1 (filed Jan. 29, 2019) ("T-Mobile Comments"); Comments of HAAS Alert (filed Jan. 28, 2019); Comments of InterDigital, Inc. (filed Jan. 17, 2019); Comments of Savari, Inc. (filed Jan. 22, 2019) ("Savari Comments"). Recently the U.S. Department of Transportation sought comment on the status of V2X communications. Request for Comments V2X Communications, 83 Fed. Reg. 66338. Comments in that docket likewise expressed support for C-V2X. *See* Comments of Next Generation Mobile Networks, DOT-OST-2018-0210, at 2 (filed Jan. 25, 2019) ("C-V2X is not only able to enhance safety features for vehicles, but also supports use cases for other traffic participants, like pedestrians and cyclists."); Comments of CTIA, DOT-OST-2018-0210, at 3 (filed Jan. 25, 2019) ("5G technology deployments will increase the scale and impact of C-V2X."); Comments of Applied Information Inc., DOT-OST-2018-0210, at 9 (filed Jan. 18, 2019) (noting that there are "immediate benefits obtainable through adoption and use of LTE C-V2X"); Comments of Tesla, Inc., DOT-OST-2018-0210, at 3 (filed Jan. 31, 2019) ("C-V2X is now poised to offer several advantages over DSRC . . . . Empowering C-V2X offers a greater likelihood of harmonization across global markets, which increases the likelihood of adoption").

[19] *See* Comments of American Honda Motor Co., Inc., at 1 (filed Jan. 25, 2019) ("Honda Comments"); Comments of BMW of North America, LLC, at 1 (filed Jan. 18, 2019) ("BMW Comments"); Comments of Daimler North America Corporation, at 1 (filed Jan. 18, 2019) ("Daimler Comments"); Comments of Ford Motor Company, at 1 (filed Jan. 24, 2019) ("Ford Comments") (submitted as name of filer Nick Baracos); Comments of General Motors Company, at 1-2 (filed Jan. 18, 2019); Comments of Jaguar Land Rover, at 1 (filed Jan. 22, 2019); Comments of Volkswagen Group of America, Inc., at 1 (filed Jan. 30, 2019) ("Volkswagen Comments").

[20] *See, e.g.*, Maryland Department of Transportation Comments, at 2 (filed Jan. 18, 2019) (noting that a "future including both DSRC and C-V2X would provide the most opportunities for safety benefits to be realized"); Comments of the Association of Global Automakers, Inc., at 3 (filed Feb. 7, 2019) (noting that both DSRC and C-V2X "may be leveraged to support an expanded auto safety application ecosystem"); Comments of the Institute of Transportation Engineers, at 2 (filed Jan. 18, 2019) (submitted as name of filer Jeffrey Lindley) (noting that "C-V2X technology will very likely have a promising future").

Commenters largely cite three key reasons for a grant: C-V2X's ability to improve safety, C-V2X's evolution path to 5G, and a desire to position America as an ITS leader. First, with respect to safety, Ford notes that "C-V2X will be critical in bettering the roads and cities of the future."[21] Honda similarly highlights that a waiver will "provide safer travel and improve traffic flow on America's roadways."[22] Positive action is also warranted according to Qualcomm, "so all U.S. cities and states, vehicle manufacturers, and the many millions of American drivers, passengers, and pedestrians can reap the safety benefits of this advanced connected vehicle communications technology as soon as possible."[23] Intel notes that C-V2X is ready to fulfill NHTSA's vision to help improve road safety.[24]

Second, commenters cite to C-V2X's evolution path to 5G. T-Mobile notes the cost efficiencies enabled by the telecom industry's investment in 5G deployment, observing that connected vehicles will "leverage these investments through the development of new applications that will profoundly benefit the transportation sector."[25] Similarly, Ericsson states that C-V2X's evolution path to 5G will help unlock "a richer array of services."[26] And Ford tells

[21] Ford Comments at 1.

[22] *See* Honda Comments at 1. *See also* Daimler Comments at 1 ("Daimler is committed to reducing roadway fatalities, fossil fuel emissions, and traffic congestion on the highways of tomorrow . . . . The [FCC] can help advance the realization of these benefits by . . . allow[ing] for the near term deployment of C-V2X, a promising new V2X technology."); Volkswagen Comments at 1 ("The 5GAA [waiver request] provides further proof that emerging technologies like C-V2X and 5G-V2X could provide additional benefits to the public good if allowed to share the 5.9 GHz [Intelligent Transportation System – Radio Service] spectrum.").

[23] Qualcomm Comments at 1. *See also* Panasonic Comments at 5 ("V2X technologies for transportation and vehicle safety applications hold enormous potential to save American lives and enable the deployment of an 'internet of roads' to improve the efficiency of transportation infrastructure."); Nokia Comments at 2 ("C-V2X is poised for near-term deployment and offers key safety benefits.") Samsung/HARMAN Comments at 2 (explaining C-V2X holds the potential to "facilitate important improvements in public safety, traffic efficiency, mobility, and energy efficiency on America's roads").

[24] Intel Comments at 1.

[25] T-Mobile Comments at 2.

[26] Ericsson Comments at 1.

the Commission that "[5G] C-V2X will help unlock the full potential of self-driving technology by serving as an additional source of data about city infrastructure, traffic, construction, and emergency vehicles that will solve for some of the more challenging road interactions."[27]

And third, commenters note that grant of the Waiver Request will help position America as a leader in ITS. According to T-Mobile, a "[g]rant of the [waiver] will . . . ensure America's continued global leadership in the development and evolution of C-V2X."[28] Nokia states that "[w]idespread deployment of C-V2X also will help to facilitate America's global leadership in C-V2X and the next generation of communications technologies."[29] And Savari writes that "[a]s regulators in other regions of the world consider [C-V2X] allocation decisions, the United States risks being left behind as this technology continues to progress."[30] To capitalize on these benefits and ensure that America is positioned to lead in the progression of C-V2X, the Commission should grant this waiver to allow for initial deployments of this technology.

IV. GRANT OF THE WAIVER WILL MAKE AMERICA'S ROADS SAFER AND SMARTER

As 5GAA explained in its Waiver Request, good cause exists for the requested waiver. First, the waiver will expedite the widespread availability of C-V2X, which will enable important safety, mobility, efficiency and environmental benefits on America's roads, provide Americans with access to the same modern safety technologies that are available in other parts of the world, and facilitate American leadership in ITS. Second, rather than undermining the underlying purpose of the rules, the waiver advances the Commission's objectives for allocating the 5.9 GHz band for short-range ITS services.

[27] Ford Comments at 1.

[28] T-Mobile Comments at 1.

[29] Nokia Comments at 3.

[30] Savari Comments at 2.

A. The Waiver is Procedurally Proper

Certain parties erroneously assert that the Commission should address this matter in a general rulemaking proceeding.[31] While the Commission has broad discretion to decide matters through either its waiver process or a rulemaking proceeding,[32] the Commission's "discretion to proceed in difficult areas through general rules is intimately linked to the existence of a safety valve procedure for consideration of an application for exemption based on special circumstances."[33] Here, this "safety valve" is warranted to enable the new and innovative ITS services that C-V2X will make available to consumers. Indeed, the Commission has granted numerous waivers in similar contexts.[34]

The Commission has also granted waivers to facilitate the use of new technologies that will promote the safety of the traveling public. For instance, the Commission granted PTC-220 (a joint venture of the nation's Class I freight railroads) a waiver to facilitate the deployment of Positive Train Control ("PTC") systems.[35] The Commission's decision to grant a waiver rested in part on its determination that Congress' PTC mandate pursuant to the Rail Safety Improvement Act of 2008 constituted "unique and unusual factual circumstances," and that strict application of the Commission's rules would therefore be "contrary to the public interest in the

[31] *See, e.g.*, Comments of Cisco Systems, Inc., at 8 (filed Feb. 8, 2019) ("Cisco Comments"); Comments of the Utah Department of Transportation, at 2 (filed Jan. 18, 2019) ("Utah Department of Transportation Comments").

[32] *See SEC v. Chenery Corp.*, 332 U.S. 194, 202-03 (1947); *South Central Bell Tel. Co. v. Louisiana Pub. Serv, Comm'n*, 744 F.2d 1107, 1118 (5th Cir. 1984) (subsequent history omitted).

[33] *WAIT Radio v. FCC*, 418 F.2d 1153, 1157 (D.C. Cir. 1969).

[34] *See, e.g., Application for Review of Ad Hoc Telecommunications Users Committee et al.*, Memorandum Opinion and Order, 13 FCC Rcd 23801, 23806 ¶ 12 (1998) (finding that the emergence of a new technology that is not available when the Commission originally adopts rules constitutes "special circumstances" warranting a waiver).

[35] *See PTC-220, LLC, Request for Waiver to Facilitate Deployment of Positive Train Control*, Memorandum Opinion and Order, 30 FCC Rcd 2281 (WTB 2015).

safety of life and property."[36] Likewise, a waiver grant here will further the goals of Congress and the DOT to improve the efficiency and safety of the nation's transportation infrastructure, and will facilitate the growth and development of America's ITS industry.[37]

Delaying the availability of C-V2X for a general rulemaking proceeding will undermine U.S. leadership in C-V2X and delay the availability of critical modern safety applications on America's roads. The potential hazards of a long and arduous rulemaking process is well-understood by the Commission. Just last year, the Commission observed:

> The legal and administrative requirements for conducting rulemaking proceedings can often result in those proceedings extending over long periods of time, and they also are subject to judicial review. Often, competitors petition to deny or oppose the introduction of new technologies or services that may have a negative economic effect on their own service but would otherwise provide significant public interest benefits if the Commission moved quickly to allow the new technologies or services to be offered. . . . [D]elays can deny the public the benefits of and opportunities provided by new technological choices and new services, and inventors and entrepreneurs are often left in limbo with little progress to show for their creative efforts.[38]

In the context of C-V2X services, these are just a few of the risks that could result from a lengthy rulemaking process. While 5GAA fully intends to seek permanent rule changes to allow for C-V2X communications in the 5.9 GHz band, the requested waiver appropriately allows for the immediate deployment of C-V2X and the subsequent realization of the safety and other benefits enabled by this technology.

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[36] *Id.* at 2286 ¶ 17. As the Commission observed, PTC systems "are intended to reduce the risk of rail accidents caused by human error, including train-to-train collisions, derailments caused by excessive speed, and unauthorized train movements in work zones." *Id.* at 2281 ¶ 2.

[37] *See, e.g.*, Intermodal Surface Transportation Efficiency Act, Pub. L. No. 102-240, 105 Stat. 1914, § 6052 (b) (1991), https://www.gpo.gov/fdsys/pkg/STATUTE-105/pdf/STATUTE-105-Pg1914.pdf.

[38] *Encouraging the Provision of New Technologies and Services to the Public*, Notice of Proposed Rulemaking, 33 FCC Rcd 2512, 2514 ¶ 7 (2018).

B. A Waiver Grant Will Enable Important Safety, Mobility, Efficiency and Environmental Benefits, Provide Americans With Access to the Same Modern Safety Technologies That Are Available in Other Parts of the World, and Ensure American Leadership in ITS

In the Waiver Request, 5GAA explained how a waiver would serve the public interest by expediting the availability of C-V2X technology that can improve safety, traffic efficiency, mobility, and energy efficiency on America's roads, and provide Americans with access to the same modern safety technologies that are available in other parts of the world. Commenters in the record also note that a grant will help ensure American leadership in ITS. However, some commenters question whether a grant of the waiver will deliver these public interest benefits. Upon a closer examination of a few of these questions, it becomes clear these concerns ring hollow.

First, a few commenters question whether C-V2X can create a safer and more efficient transportation system.[39] Yet, C-V2X's performance advantages over DSRC can help unlock improvements in a variety of V2X applications and in a variety of different scenarios. For example, because in-vehicle camera and sensor-based technologies experience limitations in non-line-of-sight scenarios, C-V2X's performance advantage over DSRC may allow vehicles to perceive and provide earlier warnings of threats hidden from view.

In one use case, C-V2X's increased reliability provides better support for intersection movement applications. Left Turn Assist and Intersection Movement Assist – both of which have been identified by NHTSA as particularly important – benefit from C-V2X's ability to reliably deliver safety messages in intersection scenarios where line-of-sight is limited or

[39] *See, e.g.*, Cisco Comments at 4 (stating that 5GAA has failed to show "that C-V2X will create a safer and more efficient transportation system").

obstructed.[40] Similarly, C-V2X's ability to deliver communications over an extended range enables this platform to provide unrivaled support for highway passing applications. In particular, Do Not Pass Warning – which provides warnings when it is not safe to pass a slower moving vehicle – requires communications over an extended range to ensure warnings are delivered in a manner that provides drivers with sufficient reaction time. C-V2X's ability to deliver messages over such an extended range in both line-of-sight and non-line-of-sight scenarios make it ideally suited to support this and other similar types of passing applications.

Next, some commenters mistakenly assert that C-V2X is an immature and unproven technology.[41] Yet, C-V2X significantly outperforms DSRC in a number of key metrics.[42] Perhaps more to the point, however, these commenters ignore decisions by major automakers, such as Ford, and international regulators, such as the Chinese Ministry of Industry and Information Technology, to commit to C-V2X.[43] In other words, ITS stakeholders and the market already are confirming that C-V2X is a proven technology.[44]

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[40] Federal Motor Vehicle Safety Standards, 82 Fed. Reg. at 3876 ("[Intersection Movement Assist and Left Turn Assist] have the unique ability to address intersection crashes, which are among the most deadly crashes that drivers currently face in the U.S.") (citation omitted).

[41] *See, e.g.*, Utah Department of Transportation Comments at 6 (noting that it will take a long period of "intense, iterative testing, standard development, and real-world piloting" before C-V2X can be reliably introduced); Comments of NXP USA, Inc., at 2 (filed Jan. 29, 2019) ("NXP Comments") ("C-V2X technology is simply too immature for the Commission to give [it] serious consideration . . . .").

[42] As 5GAA recently noted in an *ex parte* notice to the Commission, the 5GAA report, *V2X Functional and Performance Test Report; Test Procedures and Results*, published in October 2018 and attached as Appendix C to 5GAA's Waiver Request, indicates that DSRC devices used in 5GAA's testing had employed receive antenna diversity. However, 5GAA members recently discovered that this was not the case. As a result, 5GAA is expanding its testing to collect DSRC data that reflects the use of receive antenna diversity, and 5GAA plans to file such expanded data in this docket in near term. Notably, this does not change the C-V2X test results from that report. And most importantly, 5GAA is confident this does not change the report's ultimate conclusion that C-V2X technology substantially outperforms DSRC technology. *See* Letter from Sean T. Conway, Counsel to 5GAA, to Marlene H. Dortch, Secretary, Federal Communications Commission, GN Docket No. 18-357 (filed Feb. 22, 2019).

[43] *See also* Press Release, BMW, *BMW Group Digital Day 2018* (Apr. 17, 2018), https://www.press.bmwgroup.com/global/article/attachment/T0280143EN/406493, ("As part of its commitment to drive forward the development of connected and cooperative automated driving, the

Suggestions that an experimental license is more appropriate are similarly without merit.[45] These commenters fail to recognize that automakers such as Ford want to deploy C-V2X commercially. Without the assurance of a waiver grant, this and future planned deployments may be delayed.

C. C-V2X Will Advance the Underlying Objective of the Rules: To Advance Vehicular Safety and Improve the Efficiency of Travel

In response to the Waiver Request, a few commenters suggest that a waiver grant will undermine the underlying purpose of the Commission's rules for the 5.9 GHz band. Commenters posit two central arguments. First, a handful of commenters suggest that a waiver grant will cause uncertainty and reduce investment in ITS technologies.[46] Second, a few commenters suggest that C-V2X operations in the 5.9 GHz band will cause interference to existing DSRC operations.[47] Both critiques fail.

BMW Group is also working on the implementation of wireless C-V2X (Cellular Vehicle-to-Everything) technology for two-way communication between road users.").

[44] In a forthcoming supplemental technical report, 5GAA intends to address many of the technical questions and criticisms raised in the record. *See, e.g.*, NXP Comments at 8-9 (questioning whether C-V2X will suffer from performance degradation when operating on a 20 MHz channel); Comments of u-blox America Inc., at 5 (filed Jan. 17, 2019) (submitted as name of filer Chafix Driouichi) (noting that 5GAA's testing was conducted using one specific DSRC device model, and asserting that the performance of other commercially-available DSRC devices compares more favorably to C-V2X).

[45] *See, e.g.*, Cisco Comments at 8; Utah Department of Transportation Comments at 7; Comments of The Open Technology Institute at New America, American Library Association, Benton Foundation, Consumer Federation of America, Public Knowledge and X-Lab, at 2 (filed Feb. 8, 2019) ("PIOs Comments") (submitted as name of filer Public Interest Organizations).

[46] *See, e.g.*, Comments of Broadcom Inc., at 1 (filed Feb. 8, 2019) ("Grant of the waiver would create further uncertainty regarding future use of this band and would stall investment in technologies proposed in the band.").

[47] *See* NXP Comments at 6 ("Grant of the requested waiver would pose an unacceptable risk that the C-V2X [operations] will interfere with DSRC communications on these and other future DSRC deployments in the dedicated 5.9 GHz Band."); Comments of APTIV, at 1-2 (filed Jan. 11, 2019) ("CV2x will cause harmful interference to [incumbent DSRC operations].").

First, rather than decrease investment, a grant of the waiver will drive new investment in ITS technologies.[48] Under the current rules, C-V2X deployment is not permitted in the United States. Yet, as demonstrated above, ITS stakeholders continue to invest in C-V2X due to the superiority of this technology. Rather than stymie this market-driven investment, a waiver grant will more likely unleash a torrent of new investment and innovation in C-V2X that ultimately will speed deployment and availability of ITS services. Indeed, consistent with this logic, the DOT's official policy is to encourage ITS stakeholders to continue developing technologies that leverage the 5.9 GHz band.[49]

Second, C-V2X will not cause interference to those existing pilot projects operating in the 5.9 GHz band. There are a handful of pilot projects involving DSRC Roadside Units that use all or a portion of the 5.905-5.925 frequencies for support. 5GAA continues to hold productive conversations with these pilot project operators and is confident that, through these conversations and continued engagement with the Commission and DOT, these entities will be able to continue to implement ITS services – either by transitioning to a lower channel or to C-V2X equipment. Thus, to the extent that there are record concerns about co-channel interference to these DSRC pilot projects, such concerns should not prohibit a grant.[50]

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[48] *See* Honda Comments at 3 (noting that allowing for the deployment of both DSRC and C-V2X technology will likely speed the availability of V2X applications in the marketplace); BMW Comments at 1 (noting that grant of the waiver request will unlock new investment and innovation); Ford Comments at 2 (announcing its intention to deploy C-V2X in all new vehicle models beginning in 2022).

[49] *See* U.S. Department of Transportation, *Automated Vehicles 3.0, Preparing For the Future of Transportation*, at 16 (Oct. 4, 2018), https://www.transportation.gov/sites/dot.gov/files/docs/policy-initiatives/automated-vehicles/320711/preparing-future-transportation-automated-vehicle-30.pdf.

[50] Certain commenters also raise questions about the treatment of legacy DSRC equipment capable of operating in the upper portion of the 5.9 GHz band. *See* Cisco Comments at 10-11. Mechanical questions such as this should be raised by the Commission in a Notice of Proposed Rulemaking, but should not delay the grant of the requested waiver.

Similarly, concerns about the potential for adjacent band interference from C-V2X operations to lower DSRC channels are misplaced.[51] 5GAA intends to file in the near term a test report demonstrating the compatibility of adjacent band C-V2X and DSRC operations. Consequently, adjacent band C-V2X operations will not cause any harmful interference to any DSRC pilot project operations.

V. WITH NEW OPPORTUNITIES TO ACCESS THE 6 GHZ AND 3.5 GHZ BANDS, THE COMMISSION CAN BOTH ADVANCE VEHICULAR SAFETY AND MAKE ADDITIONAL SPECTRUM AVAILABLE FOR WI-FI AND SIMILAR SERVICES

In their objections to the filing, unlicensed proponents contend that the urgency for making the 5.9 GHz band available for Wi-Fi and other unlicensed services necessitates a denial of the waiver.[52] Notwithstanding 5GAA's other objections,[53] these arguments ignore today's spectrum landscape. While the 5.9 GHz band may have been the best candidate for new unlicensed uses in 2013, that is simply not true today. Today, spectrum in the 6 GHz and 3.5 GHz bands are best positioned in the near term to support the types of services described by these unlicensed proponents.

Most notably, the 6 GHz band presents an opportunity to develop contiguous mid-band spectrum for unlicensed use in the very near term. In the *6 GHz NPRM*, the Commission

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[51] *See* Cisco Comments at 16-17; NXP Comments at 6 (noting that the "energy from C-V2X will interfere with DSRC message reception" on nearby channels).

[52] *See, e.g.*, Comments of NCTA – The Internet & Television Association, at 12 (filed Feb. 8, 2019) ("NCTA Comments") ("[T]he best course of action is for the Commission to make the entire 75 megahertz available for unlicensed operations."); PIOs Comments at 26 ("The Commission should deny 5GAA's waiver request and expeditiously adopt a Further Notice of Proposed Rulemaking to reconsider the highest and best use of the 5.9 GHz band as a whole.").

[53] For example, while some have suggested that "existing licensed cellular bands" would be more appropriate for C-V2X, these parties fail to recognize that the 5.9 GHz band *is* licensed spectrum. Letter from Rick Chessen, Chief Legal Officer, NCTA – The Internet & Television Association, to Marlene H. Dortch, Secretary, Federal Communications Commission, ET Docket No. 13-49, at 4, n.12 (filed Oct. 16, 2018) ("CV2X can operate in existing licensed cellular bands and is designed to have an evolutionary path to 5G.").

proposed to allow unlicensed use in portions of 1200 MHz of spectrum.[54] The band further offers wide channels that can accommodate the new Wi-Fi 6 standard, which is the focus of so much interest by unlicensed proponents.[55] And because the Commission already proposed making spectrum in this band available for unlicensed use, final rules to repurpose spectrum in the 6 GHz band could be adopted as soon as this year. In short, the characteristics offered by the 6 GHz band – in terms of sheer amount of spectrum, amount of contiguous spectrum, and the timing – all weigh in favor of the 6 GHz band over the 5.9 GHz band.

The 3.5 GHz band offers additional spectrum to support many of the services cited by commenters. Over half of the band – a minimum of 80 MHz – is reserved for General Authorized Access ("GAA") use, and the remainder of the band – an additional 70 MHz – will be available for opportunistic sharing.[56] Moreover, this spectrum is on the fast track for commercial availability. GAA operations – which will be allowed in virtually the entire 150 MHz band at the outset – are expected to be authorized within the next few months.[57]

At the same time, access to the 5.9 GHz band is critically important for C-V2X. The 5.9 GHz band is the internationally harmonized ITS band, facilitating the realization of economies of scale. Further, the propagation characteristics of this band make it ideal for the types of non-line-of-sight communications that make the potential of safety-related ITS services so revolutionary. Indeed, the Commission specifically recognized factors such as international

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[54] *Unlicensed Use of the 6 GHz Band*, Notice of Proposed Rulemaking, FCC 18-147, ¶ 1 (rel. Oct. 24, 2018).

[55] *See, e.g.*, Comments of Wi-Fi Alliance, at 4 ("Wi-Fi wireless networking standards, such as Wi-Fi 6, are intended to operate with wider channels…") (citation omitted); NCTA Comments at 11-12.

[56] GAA use is similar in many ways to unlicensed use.

[57] GAA operations will be permitted in virtually the entire band until the Commission holds an auction for Priority Access Licenses for the 3.5 GHz Citizens Broadband Radio Service Band. Because there appear to be a number of other spectrum bands ahead of the 3.5 GHz band in the spectrum auctions queue, GAA operations in the vast majority of the band will be permitted for the foreseeable future.

harmonization and the propagation characteristics of the band in its allocation decision.[58] These facts remain unchanged.

In light of the opportunities in the 6 GHz and 3.5 GHz band, the Commission has a unique opportunity to both promote vehicular safety services and provide access to new mid-band spectrum for unlicensed and similar uses in the near future. Objections to the Waiver Request based on C-V2X's effect on future unlicensed operations in the 5.9 GHz band should thus be summarily dismissed, and the Commission should grant the Waiver Request.

[58] *See Amendment of Parts 2 and 90 of the Commission's Rules to Allocate the 5.850-5.925 GHz Band to the Mobile Service for Dedicated Short Range Communications of Intelligent Transportation Services*, Report and Order, 14 FCC Rcd 18221, 18226 ¶ 1.12 (1999) ("For the reasons discussed above, we conclude that the 5.85-5.925 GHz band is appropriate for DSRC-based ITS applications due to the variety of operations to be accommodated, the propagation characteristics of the band, the significant efforts of the Federal and state governments paired with industry to research ITS use in this band, and ITS developments internationally.").

VI. CONCLUSION

For the reasons set forth above and in the Waiver Request, the Commission should promptly grant a blanket waiver of footnote NG160 to Section 2.106 of the Commission's rules,[59] subject to the conditions described in the Waiver Request, to allow for the deployment of C-V2X technology in the 5.905-5.925 GHz range of the 5.9 GHz band, and to facilitate the wide-spread deployment of C-V2X technology across America.

Respectfully submitted,

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February 26, 2019

[59] 47 C.F.R. § 2.106, NG160.

Appendix A - 5GAA Membership

- Airbus
- Airgain, Inc.
- Alpine Electronics Inc.
- American Tower Corp
- Analog Devices Inc.
- Anritsu A/S
- Applied Information
- AT&T Foundry
- Audi AG
- BAIC Group (Beijing Automotive Group Co., Ltd.)
- Baidu
- Baoneng
- Beijing University of Technology
- Bell Mobility
- BlackBerry UK Limited
- BMW Group (Bayerische Motoren Werke AG)
- Bosch (Robert Bosch GmbH)
- CATT (China Academy of Telecommunication Technology)
- CETECOM GmbH
- China Mobile
- China Transinfo
- China Unicom (China United Network Communications Group Co., Ltd)
- China Mobile Research Institute
- Clarion Co. Ltd
- Cohda Wireless
- Commsignia Inc.
- Continental Teves AG & Co. oHG
- Daimler AG
- Danlaw Inc.
- Dekra
- DENSO AUTOMOTIVE Deutschland GmbH
- Deutsche Telekom AG
- Dt&C
- Equinix
- Ericsson AB
- Faraday Future
- FarEasTone
- FEV Group GmbH
- Ford
- Fraunhofer Institute
- Geely Auto
- Gemalto SA

- General Motors
- Hirschmann Car Communication GmbH
- Hitachi
- Honda
- Huawei
- Hyundai America Technical Center
- Hyundai Mobis
- iDirect
- Infineon Technologies AG
- Intel
- InterDigital Communications, Inc.
- Jaguar Land Rover Ltd.
- Juniper Networks
- KDDI
- Keysight Technologies UK Limited
- KT R&D Center
- Laird Bochum GmbH
- Latvijas Mobilais Telefons
- Lear
- LG Electronics Inc.
- Magneti Marelli
- Mitsubishi Electronics
- Murata Manufacturing
- NavInfo
- Neusoft
- NIO China
- Nissan
- Nokia
- Noris Network AG
- NTT-DoCoMo
- OKI
- Orange SA
- P3 Group
- Panasonic
- Proximus B.V.
- PSA Groupe
- Qorvo
- Qualcomm Incorporated
- Quectel
- Renault
- Rohde & Schwarz GmbH & Co. KG
- Rohm Semiconductor
- SAIC Motor Corporation Limited
- Samsung Electronics Co., Ltd

- Savari Inc.
- SGS
- Shanghai Gotell Communication Technology Holdings Co., Ltd.
- SIAC (Shanghai Int. Automobile City)
- SK Telecom
- Skyworks
- Smart Mobile Labs
- Softbank Corp.
- Sumitomo Electric
- Swift Navigation
- Telefónica Digital España S.L.
- Telekom Austria Aktiengesellschaft
- Telstra
- TELUS
- Tencent
- Terranet, SE
- TÜV Rheinland AG
- Valeo (peiker acustic GmbH & Co.KG)
- Veniam Inc.
- Verizon
- Viavi
- Vodafone Group Services Ltd
- Volkswagen AG
- Volvo Cars
- VT Direct
- Wistron NeWeb Corp.
- ZF
- ZTE Corporation