Before the
DEPARTMENT OF TRANSPORTATION
Washington, D.C. 20590

In the Matter of	)	
	)	
Notice of Request for Comments: V2X Communications	)	Docket No. DOT-OST-2018-0210
	)	

COMMENTS OF PANASONIC CORPORATION OF NORTH AMERICA

I. INTRODUCTION AND SUMMARY.

Panasonic Corporation of North America[1] ("Panasonic") respectfully submits its comments in response to the above-captioned Request for Comments ("RFC") issued by the Department of Transportation ("DOT" or "Department") seeking comment on the development of V2X[2] communication technologies and on DOT's role in encouraging V2X integration.[3] Panasonic, an industry leader in DSRC, C-V2X, and other connected vehicle technologies, continues to deploy innovative vehicle safety and connected highway solutions in the 5.9 GHz band with enormous lifesaving potential.

The U.S. faces a dire need for technological solutions for crash avoidance. The Department's National Highway Traffic Safety Administration ("NHTSA") reports that 37,461

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[1] Panasonic Corporation of North America is a leading technology partner and integrator to businesses, government agencies and consumers across the region. The company is the principal North American subsidiary of Osaka, Japan-based Panasonic Corporation and leverages its strengths in Immersive Entertainment, Sustainable Energy, Integrated Supply Chains and Mobility Solutions to enable its business-to-business customers. For more about Panasonic V2X technology, visit: https://na.panasonic.com/us/intelligent-transportation

[2] Dedicated Short-Range Communications ("DSRC") and Cellular Vehicle-to-Everything ("C-V2X") technology will be referenced herein, collectively, as "V2X." V2X includes vehicle-to-vehicle ("V2V"), vehicle-to-infrastructure ("V2I"), vehicle-to-network ("V2N") and vehicle-to-pedestrian ("V2P") communications.

[3] U.S. Department of Transportation, *Notice of Request for Comments: V2X Communications*, 83 Fed. Reg. 66338 (Dec. 26, 2018) ("RFC").

people died in motor vehicle crashes in 2016, a 5.6% increase compared to 2015. Moreover, in 2017, drivers in the United States wasted three billion gallons of fuel and 6.9 billion hours spent in traffic.

V2X solutions make roads safer and reduce carbon dioxide emissions and traffic congestion. And deployment of V2X services is a critical step in the progression to higher levels of vehicle autonomy. According to DOT, "[c]ooperative automation allows automated vehicles to communicate with other vehicles and the infrastructure to coordinate movements and increase efficiency and safety."[4]

Panasonic agrees with the Department "that V2X 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 . . . ."[5] This can occur only with dedicated 5.9 GHz band spectrum. Panasonic agrees with NHTSA that "preserving the 5.9 GHz band for transportation communications is essential to public safety today and in the future."[6] This is because 5.9 GHz band V2X communications have "the potential to revolutionize motor vehicle safety."[7]

Any unlicensed use in the 5.9 GHz band should be done without harmful interference to the incumbent technology or other future intelligent transportation systems ("ITS") technologies.

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4 U.S. Dept. of Transportation, *Automated Vehicles 3.0: Preparing for the Future of Transportation*, at 13, 16 (Oct. 4, 2018), *available at* https://www.transportation.gov/av/3; *see also id.*, at 16 (providing additional examples of cooperative automation applications).

5 RFC, at 66338.

6 U.S. Department of Transportation's National Highway Traffic Safety Administration issues statement on safety value of 5.9 GHz spectrum, NHTSA.gov (Oct. 24, 2018), *available at* https://bit.ly/2PFDD5u.

7 U.S. Department of Transportation, National Highway Traffic Safety Administration, *Federal Motor Vehicle Safety Standards: V2V Communications*, Notice of Proposed Rulemaking, 82 Fed. Reg. 3854, 3855 (Jan. 12, 2017) ("V2V NPRM").

Panasonic urges DOT to continue its work with the Federal Communications Commission ("FCC") to complete all three phases of testing, including testing in a range of real-world conditions, prior to any decisions on spectrum sharing or reallocation. Doing so will continue to unleash lifesaving innovation on American roadways and benefit the public interest.

Finally, Panasonic agrees with DOT's technology-neutral approach to communications protocols that support V2X technology. Panasonic has a long history of technology development focused on DSRC, but we are also working with industry partners to develop emerging C-V2X capabilities. Panasonic is also following DSRC advances in the IEEE 802.11 "Next Generation V2X" (NGV) study group, which is expected to amend the 802.11p standard. The development of both C-V2X and DSRC will accelerate the innovation our nation needs to improve vehicle safety and address highway capacity limits. For these reasons, Panasonic supports the use of 20 MHz for C-V2X in the top two channels of the 5.9 GHz spectrum, provided it will not interfere with DSRC transmissions in the remaining five channels.

II. PANASONIC HAS DEEP CAPABILITIES IN VEHICLE COMMUNICATION TECHNOLOGIES AND IS DEPLOYING INNOVATIVE CONNECTED HIGHWAY SOLUTIONS.

Panasonic is a leading technology partner and integrator for businesses, government agencies, and consumers across the North American region. As the principal North American subsidiary of Osaka, Japan-based Panasonic Corporation, Panasonic provides a wide range of solutions in Immersive Entertainment, Sustainable Energy, Integrated Supply Chains, and Mobility Solutions to support its business-to-business customers. Since its establishment in 1918, Panasonic has operated in accordance with the philosophy of "contributing to the progress and development of society and the well-being of people worldwide through its business activities." Consistent with this fundamental philosophy, Panasonic strives to develop technologies and systems that improve vehicle safety and make transportation systems safer and

more efficient.

Panasonic is a leading tier 1 supplier of automotive infotainment and vehicle components. In addition, Panasonic has been a leading developer of ITS since the late 1990s, when the ITS Business Development Center was established to develop solutions such as electronic toll collection ("ETC") systems for roadways in Japan.[8] Panasonic uses these many years of experience with V2X technologies to provide both DSRC and C-V2X components for Original Equipment Manufacturer ("OEM") vehicles.

Vehicle-connected roads are expected to reduce travel times by almost half, and vehicle-to-vehicle communication has the potential to eliminate 89% of Light Vehicle to Light Vehicle crashes and 85% of their associated economic costs.[9] Indeed, NHTSA estimated that by 2051, implementing V2V could prevent almost 600,000 crashes and reduce the costs resulting from these crashes by $53-$71 billion.[10] 5GAA has prepared a study suggesting that improved non-line-of-site and other performance factors may increase these benefits still further.[11]

Panasonic continues to invest in vehicle connectivity solutions that improve driver and pedestrian safety and save lives. For instance, in 2017, Panasonic Corporation acquired a majority share in Ficosa International, S.A. ("Ficosa"), a global, tier-one supplier of automotive parts and systems. Panasonic and Ficosa are combining their respective technologies to jointly develop products such as electronic mirror systems, next-generation cockpit systems and

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8 *See*: "History of Initiatives to Create the ITS Business" available at: https://www.panasonic.com/global/business/p-its/column.html#003

9 U.S. Department of Transportation, National Highway Traffic Safety Administration, *Federal Motor Vehicle Safety Standards: V2V Communications*, Notice of Proposed Rulemaking, 82 Fed. Reg. 3854, 3863 (Jan. 12, 2017) ("V2V NPRM").

10 *Id.*, at 3858.

11 5GAA, Petition for Waiver, FCC GN Docket No. 18-357, at 14 (filed Nov. 21, 2018) ("5GAA Petition").

Advanced Driver Assistance Systems. Ficosa has focused a large part of its work on developing antenna systems and telematics modules, which enable internal and external connectivity and are crucial for both connected cars and autonomous driving. Deployment of V2X services is a critical step in the progression to higher levels of vehicle autonomy. At the September 2018 ITS World Congress, Ficosa demonstrated its CarCom technology platform. This pioneering development allows integration of different connectivity solutions in a modular manner to enable the vehicle to directly communicate with existing and new technologies that will define the future of mobility, including DSRC, C-V2X, high-precision positioning, antennas with digital synchronization, and 5G technology.

Panasonic agrees with the RFC statement that "the Department, State and local governments, and industry are taking many other actions in developing and deploying V2X technologies."[12] In 2017, Panasonic and the Colorado Department of Transportation ("CDOT") partnered to build a connected transportation program in which real-time data is shared across vehicles, infrastructure and people to improve safety and mobility on the road. This program has progressed significantly, with extensive deployment of V2X systems and roadside units ("RSUs") in a real-world environment along the I-70 Mountain Corridor, followed by other Colorado highways. In early 2019, 100 RSUs will be in place – many in locations not served by existing cellular infrastructure – and more than 2,500 CDOT and partner vehicles will be equipped with technology that allows them to communicate information to and from the CDOT Traffic Operations Center. Indeed, at the recent Consumer Electronics Show in January 2019, CDOT and Panasonic announced that the project would extend an additional 450 miles across the state of Colorado. By creating this connected system—an "internet of roads"—drivers and

12 RFC, at 6638.

traffic managers will receive real-time information about road conditions such as traffic delays, icy conditions, and crashes through continuous and automatic communications between individual vehicles and roadside infrastructure. This allows traffic managers to immediately send messages to connected vehicles via the RSUs, alerting drivers to new roadway hazards on in-vehicle screens.[13]

V2X technology also promotes transportation efficiencies, improve traffic flows, and reduce road congestion.[14] According to the Maryland Department of Transportation, in that state alone, "[t]he statewide cost of congestion based on auto delay, truck delay and wasted fuel and increased emissions was a staggering $2.11 billion in 2016, and it continues to grow."[15] V2X can improve cost- and fuel-efficiencies with truck platooning, which benefits interstate commerce overall and the environment.[16] Platoons are predicted to reduce carbon dioxide levels up to 16 percent from trailing vehicles and up to eight percent from the lead vehicle.[17]

Panasonic's lifesaving innovations do not stop there. During the September 2018 ITS World Congress in Copenhagen, Denmark, Panasonic unveiled "Cirrus," a traffic management

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13 *See* CDOT and Panasonic Take First Steps to Turn I-70 into Connected Roadway, CODOT.gov (July 26, 2018), *available at* https://bit.ly/2qT0f3P.

14 *See* Maryland Department of Transportation (MDOT) Comments, ET Docket No. 13-49 (filed Nov. 26, 2018).

15 *Id.* at 1.

16 *See* American Trucking Associations, Inc. Comments, ET Docket No. 13-49, 2 (filed Nov. 28, 2018) ("Among the developments since 2016 is the rapid development of driver-assistive truck platooning enabled by DSRC technology. Truck platooning uses V2V communication to connect the active safety systems – braking, acceleration, and in some cases steering between trucks – allowing them to travel closer together than would otherwise be possible for aerodynamic fuel efficiency.").

17 APTIV, *Platooning: Driving the Safety of the Commercial Fleet* (Sep. 12, 2018), *available at* https://bit.ly/2SAGJVU.

center solution for transportation agencies. Cirrus, an open development platform for data sharing and collaboration, is designed to enable traffic managers to leverage the transformative benefits and new capabilities provided by V2X technology.[18] Cirrus was developed using industry V2X standards and supports integration to existing transportation systems. The Cirrus software platform is built to scale for state-wide deployment of V2X technology on all roadways, highways and arterials alike. Roadway operators receive transportation data that can trigger immediate deployment of first responders during emergency conditions and optimize traffic flows in real time. Collaborating with CDOT, Panasonic is developing Cirrus to allow DOTs to effectively deploy these technologies at scale for all roadways throughout an entire state or region.

Together, these innovations demonstrate Panasonic's commitment to the lifesaving potential of DSRC and C-V2X in a dedicated 5.9 GHz band.

III. PANASONIC URGES DOT TO WORK WITH THE FCC TO ENABLE V2X INNOVATION IN A ROBUST 5.9 GHZ ECOSYSTEM.

Automotive manufacturers and intelligent transportation solutions providers have unified around the need to preserve the entire 5.9 GHz band – all seven channels – for auto safety services.[19] Panasonic and other industry stakeholders need the full 5.9 GHz allocation of unimpaired spectrum for these technologies to be deployed to their fullest potential. Reducing or eliminating the 5.9 GHz spectrum allocation would risk chilling innovation and stranding investment, which would deny safety benefits to consumers. Accordingly, the Department

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[18] *Panasonic Unveils 'Cirrus' V2X Traffic Management Solution at ITS World Congress Copenhagen*, Press Release, Panasonic.com (Aug. 15, 2018), *available at*: https://bit.ly/2S4Uf3o.

[19] *See* Global Automakers, Press Release, *Global Automakers are Committed to Preserving the 5.9 GHz Safety Spectrum*, Globalautomakers.org (Oct. 16, 2018), *available at* https://bit.ly/2PGfuMu.

should work with the FCC to ensure that the 5.9 GHz band is maintained to ensure that innovation necessary for future highly-automated vehicle operations can proceed. In addition, DOT should also work with the FCC to mitigate out-of-band emissions from adjacent unlicensed bands.

In August 2018, Panasonic teamed with Ford and Qualcomm to begin the first large-scale implementation of C-V2X technology.[20] Three months later, Panasonic started the industry's first deployment of dual DSRC/C-V2X roadside units in Colorado.[21] As of early 2019, Panasonic will have installed 100 RSUs on I-70. These RSUs support both IEEE 802.11p™ DSRC operating on channel 172 and 3GPP C-V2X (PC5 Mode 4) wireless communication operating on channel 182-184 for interoperable ITS applications with the Cirrus ITS platform. Panasonic deployed C-V2X under an FCC experimental license for statewide deployment in Colorado.

While this example indicates how quickly real-world deployment can occur, industry needs certainty that the full 75 MHz of the 5.9 GHz ITS band will be available for vehicle safety applications. For vehicle safety applications to achieve ubiquity, 5.9 GHz spectrum supporting low-latency direct (peer-to-peer) communications are required. That is why vehicle-to-cell tower applications cannot be considered to be an adequate substitutes.

Panasonic urges DOT to work with the FCC to provide regulatory certainty so that the safety benefits of DSRC and C-V2X can be realized fully.

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[20] Press Release, *Panasonic, Qualcomm and Ford Demo the First Real-World Application of C-V2X in Colorado*, Panasonic.com (Aug. 15, 2018), *available at* https://bit.ly/2S7C79n.

[21] *See* Exhibit 1, a photo of the first unit installed on I-70 on Nov. 14, 2018.

IV. PANASONIC AGREES THAT A TECHNOLOGY-NEUTRAL APPROACH WILL FACILITATE C-V2X DEPLOYMENT.

The RFC asks a series of questions to evaluate the trade-offs of potentially allowing deployment of multiple V2X technologies in the 5.9 GHz band. While the questions highlight challenges posed by different V2X technologies sharing the band, Panasonic submits that DOT's commitment to technological neutrality is the right approach. The band should support multiple technologies, with marketplace competition advancing innovation, accelerating deployment, and delivering the maximum safety and mobility benefits for American consumers. Below, Panasonic provides responses to a number of the specific inquiries posed by the RFC.

2. Of the V2X communications technologies previously discussed, at present only DSRC is permitted to be used in the 5.9 GHz spectrum band for transportation applications. If that allocation were to be changed to allow any communication technology for transportation applications, could DSRC and other technologies (e.g., C-V2X, 5G or any future technology) operate in the same spectrum band or even the same channel without interference? Why or why not? If there are any technical challenges to achieving this goal, what are they and how can they be overcome?

As noted, FCC rules specify only DSRC may be used in the 5.9 GHz band, and several manufacturers have made commitments to include DSRC-based OBUs in their vehicles, while others have indicated a preference for C-V2X. Panasonic has advocated for the FCC to consider reasonable technical measures to prevent harmful interference between C-V2X and DSRC.[22] Industry organizations are discussing coexistence mechanisms that may provide solutions to this issue.

For these reasons, Panasonic agrees with DOT's technology-neutral approach regarding radio protocols that support V2X technology. Such an approach serves the public interest and comports with "the Department's general desire to remain technologically neutral and avoid

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22 *See* Comments of Panasonic, FCC GN Docket No. 18-357, at 8 (Jan. 29, 2019).

interfering with the many innovations in transportation and telecommunication technologies."[23]

Panasonic further agrees with NHTSA Deputy Administrator Heidi King that:

> "The market will eventually sort out which of these may be the preferred solution for V2X communications, or even if they might exist side-by-side while supporting varying transportation applications. The [DOT] sees great advantages in having spectrum available to allow these technologies to mature — and, avoiding policies that would force a premature, or less-considered, decision on technologies. . . . [W]e are at a point in time with the rollout of V2X connectivity that is not unlike when Wi-Fi entered the marketplace at 2.4 GHz more than 20 years ago. It would have been impossible to predict the exact applications and services that would develop, or the magnitude of their deployment. Yet develop they did, and the Wi-Fi industry is now looking for more bandwidth and spectrum to serve a market that would have been impossible to predict 20 years ago. Just like Wi-Fi growth and development, there is a near certainty that innovative transportation applications designed to leverage V2X's unique attributes will develop, and they will need spectrum to work effectively. Further, as many of you know, device-to-device communications technologies themselves are improving and changing at a fast pace — including continued advancements in DSRC as well as emerging C-V2X and even all-new 5G protocols to support high-performance, direct communications between devices."[24]

3. To what extent is it technically feasible for multiple V2X communications technologies and protocols to be interoperable with one another? Why or why not? Can this be done in a way that meets the performance requirements for safety of life applications, as they were discussed in the V2V NPRM? What additional equipment would be needed to achieve interoperability or changes in standards and specifications? What is the projected cost of any necessary changes? How soon can these changes and equipment prototypes be available for testing?
4. To what extent is it technically feasible for different generations of the same V2X communications technologies and protocols to be interoperable with one another? Why or why not? Can this be done in a way that meets the performance requirements for safety of life applications? What additional equipment or changes in standards and specifications would be needed to achieve interoperability? What is the projected cost of any necessary changes?

As an initial matter, it is important to define "interoperability," which can mean *radio* interoperability at the PHY/MAC (physical and medium access control) level or *message*

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[23] RFC, at 66339.

[24] Heidi King, Deputy Administrator, NHTSA, *Prepared Keynote Remarks at the International Symposium on Advanced Radio Technologies 2018 Conference*, NHTSA.gov (July 25, 2018), *available at* https://bit.ly/2StcKPy.

interoperability. Because C-V2X and DSRC use a different radio protocols, radio interoperability is not currently feasible. However, Panasonic believes message interoperability at the application layer is achievable today between DSRC and C-V2X, which both reference the SAE J2945/1 standard. This allows the roadway operator to communicate with OBUs using either DSRC or C-V2X RSUs using the same message formats.

An RSU might act as an intermediary bridge between vehicles for applications not requiring low latency. For example, a roadway operator may receive information from vehicles on road conditions and relay this information using an RSU placed in locations where objects such as buildings or mountainsides impair direct V2V communication. The use of RSUs to bridge V2V communication between DSRC and C-V2X-equpped vehicles is an area that requires further research and real-world testing.

In addition, vehicles can be equipped with OBUs that are capable of receiving basic safety messages from either DSRC or C-V2X in discrete channels. Both scenarios require additional development, but a dual DSRC and C-V2X OBU can be produced today. Panasonic's Ficosa division has developed, with chipset partner Autotalks, a dual-solution OBU capable of supporting both DSRC and C-V2X direct communications (PC5 protocol). The current product can support one V2X technology at a time – either DSRC or C-V2X (PC5). Simultaneous operation of both radio technologies in a single OBU is not currently feasible. A dual-solution OBU would require a coexistence mechanism to be defined (*e.g.,* spectral separation and more) to ensure there is no interference, and the complexities of such a solution may be uneconomical to achieve.

Accordingly, it would not be appropriate for the Department to require radio interoperability prior to C-V2X deployment.

5. Even if they are interoperable across different technologies and generations of the same technology, would there be advantages if a single communications protocol were to be used for V2V safety communications? What about other V2X safety applications, such as those involving V2I and V2P communications?

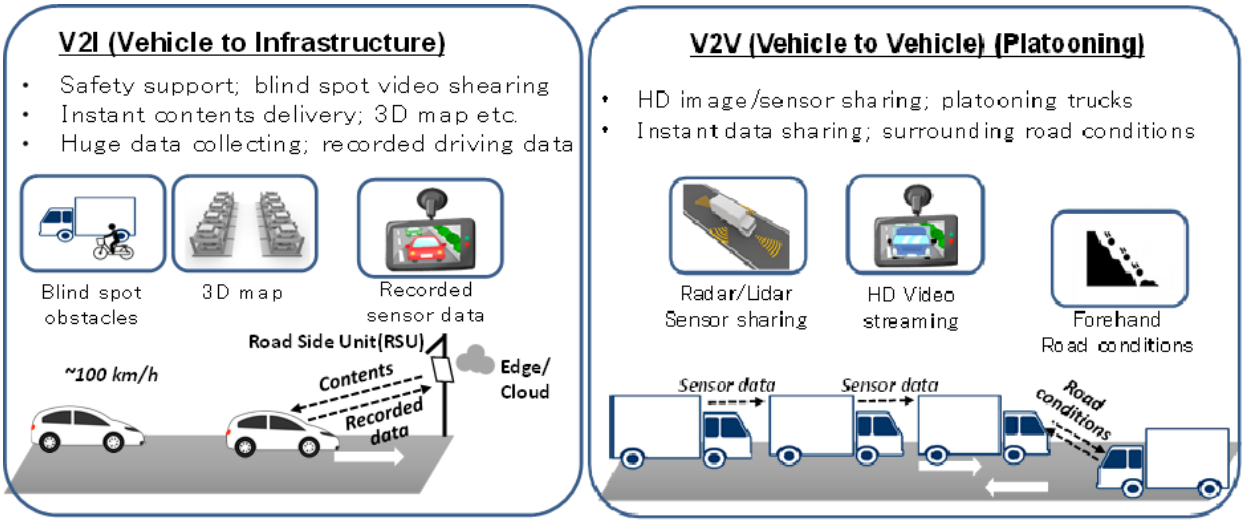
A single radio protocol simplifies equipment designs and may reduce costs for both OBUs and RSUs. When only one technology could be predicted to satisfy V2X requirements, this strategy made sense. Now, the risks of requiring a single radio protocol are imposing opportunity costs on the U.S. ITS ecosystem and limiting the benefits of competition both within the U.S. and internationally. Establishing a national mandate for a single V2X technology would lock in the U.S. market to one technology – thus limiting the potential for deploying new technologies that would offer greater safety benefits. It would deny U.S. consumers the benefit of choosing the best technology available and limit U.S.-based development of technology that could be competitive around the world.

6. How would the development of alternative communication technologies affect other V2I and V2P communications, such as those supporting mobility or environmental applications? Do these applications have the same or different interoperability issues as V2V safety communications? Do different V2X applications (e.g., platooning) have different communication needs, particularly latency?

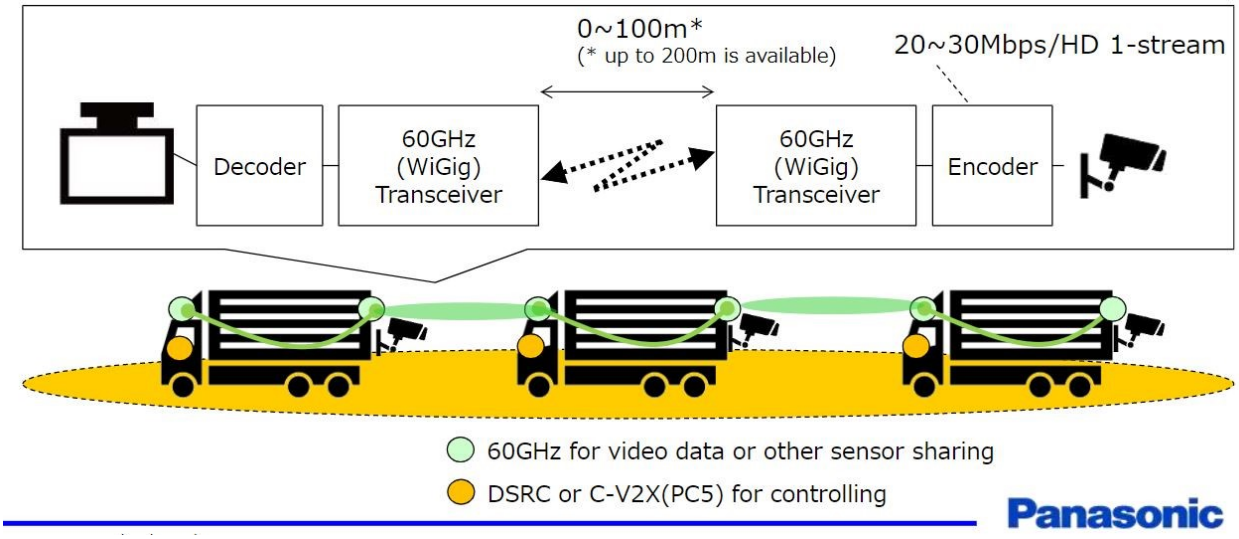
Panasonic has demonstrated, through its growing work in Colorado, that V2I can support both DSRC and C-V2X protocols in a single RSU. These RSUs support V2I applications that support message interoperability, providing the same information to inform the road operator's situational awareness.

Panasonic is also developing advanced V2X solutions using IEEE 802.11ad (WiGig) in the 60 GHz band already allocated as an unlicensed band with throughput of 1 Gbps or more. In most major countries, the 60 GHz band is also assigned as unlicensed. This spectrum is not a substitute for the 5.9 GHz band of V2X messages because it has high directivity (point-to-point)

and does not pass through objects in line-of-sight transmissions. That said, for V2I applications, WiGig is ideal for high bandwidth applications such as video streaming, downloading large payloads (such as 3D map data), and uploading probe data from a commercial vehicle's manifest. Other sensor raw data such as Radar or Lidar can also be shared among platooning trucks.



The figure below shows transmission of video between vehicles in a platoon organization using WiGig transmissions. Video sharing with low latency among platooning trucks is one of the use cases that can cooperatively utilize the 5.9 GHz band V2X as control channel.



7. Do different communication technologies present different issues concerning physical security (i.e., how to integrate alternative communication technologies into vehicle systems), message security (i.e., SCMS design or other approaches), or other issues such as cybersecurity or privacy? Would these concerns be affected if multiple but still interoperable communication technologies are used rather than one?

Physical, message, and application security are all vital components of V2X architecture and should be addressed with similar requirements so that functional interoperability can be assured. Panasonic applauds DOT for its commitment to the security of connected vehicle technologies, exemplified by its Security Credential Management System ("SCMS") proof of concept.[25] Panasonic looks forward to continued SCMS development as DOT and industry collaborate to refine the platform.

8. How could communications technologies (DSRC, C–V2X, 5G or some other technology) be leveraged to support current and emerging automated vehicle applications? Will different communication technologies be used in different ways? How?

Automated vehicles will benefit from the enhanced situational awareness provided by V2X technologies, either by communicating with other vehicles or with smart highway

[25] *See* DOT, Security Credential Management System (SCMS) Proof of Concept, Fact Sheet, *available at* https://www.its.dot.gov/factsheets/pdf/CV_SCMS.pdf.

infrastructure. Panasonic agrees with the findings of DOT's Automated Vehicle 3.0 report, which noted that: "Communication both between vehicles (V2V) and with the surrounding environment (V2X) is an important complementary technology that is expected to enhance the benefits of automation at all levels… Cooperative automation allows automated vehicles to communicate with other vehicles and the infrastructure to coordinate movements and increase efficiency and safety."[26] Panasonic also agrees with the American Traffic Safety Services Association, which noted in this proceeding:

> "that it is vitally important that V2I and I2V technologies communicate the exact same message to automated or autonomous vehicles as is communicated to Human Driven Vehicles (HDVs). We anticipate that the United States will experience a mixed vehicle fleet for several decades and that this communication consistency is vitally important to avoid potential conflicts between HDVs and automated vehicles. This would include, but not be limited to, lane keeping, regulatory posting such as speed limits, warning signs, directional signs, attractions, etc."[27]

9. How could deployments, both existing and planned, assess communications needs and determine which technologies are most appropriate and whether and how interoperability could be achieved?

Panasonic has a long history of technology development focused on DSRC, but it is also working with industry partners to develop emerging C-V2X capabilities. Panasonic also follows DSRC advances in the IEEE 802.11 "Next Generation V2X" study group, which is expected to amend the 802.11p standard. The evolution of both standards-based technologies portends promising future developments. The development of C-V2X and DSRC help accelerate the innovation the U.S. needs to address vehicle safety and highway capacity limits.

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[26] U.S. Dept. of Transportation, *Automated Vehicles 3.0: Preparing for the Future of Transportation*, at 13, 16 (Oct. 4, 2018), *available at* https://www.transportation.gov/av/3; *see also id.*, at 16 (providing additional examples of cooperative automation applications).

[27] Comments of the American Traffic Safety Services Association, Docket DOT-OST-2018-0210, at 2 (filed Jan. 23, 2019).

In the 5GAA waiver petition pending at the FCC, the association sets forth interference protection "for the introduction of C-V2X services... [and] ensure that C-V2X deployment under the requested relief should have no significant impact on any existing DSRC operations in the band."[28] Panasonic supports the use of 20 MHz for C-V2X in the upper portion of the 5.9 GHz band to enable direct, P2P mode communications such as V2V, V2P and V2I using 3GPP C-V2X (PC5 Mode 4) for ITS applications, provided it can be done without interference to DSRC in other channels. 5GAA appears to share Panasonic's goal of non-interference, stating C-V2X can be operated without "increasing any risk of interference to other authorized users of the band."[29]

28 5GAA Petition, at 21.

29 *Id.*, at 31.

V. CONCLUSION.

Panasonic strongly supports the Department's effort to gather public comment on the transformative safety benefits that V2X provides now and will provide in the future. Preserving the entire 5.9 GHz band for transportation and vehicle safety applications holds enormous potential to save American lives. Panasonic urges the Department to maintain a technology-neutral approach to V2X communication, and to focus on functional, rather than radio, interoperability. Doing so will ensure that innovation can flourish and that the United States will remain a global leader in the development of ITS technologies and connected transportation solutions.

Respectfully submitted,

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