



Federal Communications Commission
Washington, D.C. 20554

July 19, 2024

DA 24-707

Yuval Lachman
VP of Business Development
Autotalks LTD
Grand Netter Building
Kfar Netter, 4059300
Israel

Youngsoo Kwak
CEO
Innowireless Co., Ltd.
190, Seohyeon-ro, Bundang-gu
Seongnam-si, Gyeonggi-do
South Korea

Megumi Suzuki
Advanced Vehicle Technology Manager
Government and Regulatory Affairs
North American Subaru, Inc.
One Subaru Dr.
Camden, NJ 08103

Laura Stefani
Venable LLP
600 Massachusetts Avenue, NW
Washington, DC 20004
Counsel for
Keysight Technologies Inc.

Re: Requests for Waiver of 5.9 GHz Band Rules to Permit Initial Deployment of Cellular Vehicle-to-Everything Technology, ET Docket No. 19-138

Dear Petitioners:

We, the Public Safety and Homeland Security Bureau, the Office of Engineering and Technology, and the Wireless Telecommunications Bureau (collectively, the Bureaus) have before us individual waiver requests submitted by three equipment manufacturers, Autotalks Ltd.¹ (Autotalks), Innowireless Co., Ltd.² (Innowireless), and Keysight Technologies Inc.³ (Keysight), and auto manufacturer, North American Subaru, Inc.⁴ (Subaru) (also collectively, the “Waiver Applicants” or “Applicants”). For the reasons stated below, and subject to the technical parameters and conditions set forth herein, the Bureaus grant each of the Applicants’ waiver requests to deploy Cellular Vehicle-to-Everything (C-V2X)

¹ See Request for Waiver of 5.9 GHz Band Rules to Permit Deployments of Cellular Vehicle-to-Everything Technology, Autotalks Ltd., ET Docket No. 19-138 (filed Jun. 19, 2024) (*Autotalks Waiver Request*), <https://www.fcc.gov/ecfs/document/106191037911705/1>.

² See Request for Waiver of 5.9 GHz Band Rules to Permit Deployments of Cellular Vehicle-to-Everything Technology, Innowireless Co., Ltd., ET Docket No. 19-138 (filed May 20, 2024) (*Innowireless Waiver Request*), <https://www.fcc.gov/ecfs/document/10520321800317/1>.

³ See Request for Waiver of 5.9 GHz Band Rules to Permit Deployments of Cellular Vehicle-to-Everything Technology, Keysight Technologies Ltd., ET Docket No. 19-138 (filed May 17, 2024) (*Keysight Waiver Request*), <https://www.fcc.gov/ecfs/document/10517110304542/1>. Keysight is designing C-V2X products through its subsidiary, Keysight Technologies Deutschland GmbH (“Keysight Deutschland”), located in Böblingen, Germany.

⁴ See Request for Waiver of 5.9 GHz Band Rules to Permit Deployments of Cellular Vehicle-to-Everything Technology, North American Subaru, Inc., ET Docket No. 19-138 (filed Apr. 12, 2024) (*Subaru Waiver Request*), <https://www.fcc.gov/ecfs/document/10412279111829/1>.

technology within the 5.895–5.925 GHz band.

I. Background

Each Waiver Applicant seeks a waiver of certain Commission rules applicable to intelligent transportation systems (ITS) operations to allow C-V2X technology to be used in the upper 30 megahertz portion (5.895–5.925 GHz) of the 5.9 GHz (5.850–5.925 GHz) band prior to adoption of final C-V2X-based rules.⁵ The C-V2X equipment subject to the Waiver Requests would operate in the 5905–5925 MHz portion of the 5.9 GHz band using a 20-megahertz channel.

Waiver Requests. The Applicants seek a waiver of the Commission’s rules to allow the 5.905–5.925 GHz band to be used for C-V2X safety systems operating in the Intelligent Transportation System radio service. Specifically, each Applicant seeks a waiver of certain part 90 and part 95 rules (47 CFR §§ 90.375, 90.377, 90.379, 95.3163, 95.3167, and 95.3189)⁶ governing the operation of Dedicated Short-Range Communication (DSRC)-based roadside units (RSUs) and on-board units (OBUs) in the upper 30 megahertz of the 5.9 GHz band.

Each Waiver Applicant requests relief pursuant to section 1.925 of the Commission’s rules.⁷ Specifically, Applicants seek certain rule waivers under section 1.925 to allow them to obtain the necessary equipment certifications for their C-V2X equipment.⁸

Joint Waiver Order. On December 13, 2021, a group of public and private transportation stakeholders requested a waiver of the Commission’s DSRC-based rules to allow them to use C-V2X technology in the upper 30 megahertz of the 5.9 GHz band prior to adoption of final C-V2X-based rules.⁹ The *Joint Waiver Request* stated that the C-V2X equipment subject to the request would operate in the 5905–5925 MHz portion of the 5.9 GHz band using a 20 megahertz channel.¹⁰ On April 24, 2023, the Bureaus granted the *Joint Waiver Request*.¹¹ The Bureaus conditioned the waiver grant on certain

⁵ See, e.g., *Autotalks Waiver Request* at 2, n.2; *Innowireless Waiver Request* at 1-2, n.3; *Keysight Waiver Request* at 1, n.2; *Subaru Waiver Request* at 2, n.4.

⁶ See 47 CFR §§ 90.375, 90.377, 90.379, 95.3163, 95.3167, 95.3189. Each of these Waiver Applicants seeks a waiver of the rules necessary to obtain equipment certifications. However, each applicant, with the exception of Keysight Technologies, has also directly or indirectly incorporated §§ 90.375 (governing RSU license areas, communication zones, and registrations) and 90.377 (RSU frequencies available, maximum power limit, antenna height, and priority communications) in its request – provisions which govern the operations of ITS licensees. Since none of these Waiver Applicants has, or is seeking an ITS authorization, their requests for a waiver of §§ 90.375 and 90.377 are dismissed as moot.

⁷ 47 CFR § 1.925.

⁸ See footnote 5, *supra*.

⁹ See Request for Waiver of 5.9 GHz Band Rules to Permit Initial Deployments of Cellular Vehicle-to-Everything Technology, Ford Motor Company, et al., ET Docket No. 19-138, Appendix 1 at 10–11 (filed Dec. 13, 2021) (*Joint Waiver Request*), https://www.fcc.gov/ecfs/file/download/DOC-5f6d7d2ef3400000-A.pdf?file_name=C-V2X%20Waiver%20Request%2012%2013%202021.pdf; see also Letter from the C-V2X Joint Waiver Parties to Marlene H. Dortch, Secretary, FCC, ET Docket No. 19-138, at 3 (filed Apr. 20, 2022) (*Joint Waiver Request Supplement*), <https://www.fcc.gov/ecfs/document/104201266008794/1>.

¹⁰ *Joint Waiver Request* Appendix 1 at 10–11; *Joint Waiver Request Supplement* at 3.

¹¹ See *Request for Waiver of 5.9 GHz Band to Permit Initial Deployment of Cellular Vehicle-to-Everything Technology*, Order, ET Docket No. 19-138, DA 23-343 (rel. Apr. 24, 2023) (*Joint Waiver Order*). The Bureaus

technical and operational parameters set forth in the Joint Waiver Order¹² and further modified those conditions by our Waiver Modification Order on July 5, 2023.¹³ Each of the instant Waiver Applicants requests that the Bureaus grant them waivers under the same grant conditions specified in the C-V2X Joint Waiver Order, as modified by the July 5, 2023 Waiver Modification Order (C-V2X Joint Waiver Order, as modified).¹⁴

For the reasons stated below, the Bureaus collectively grant each Applicant's waiver request to deploy C-V2X technology in the upper 30 megahertz of the 5.9 GHz band, pending adoption of final C-V2X-based rules, subject to the technical parameters and conditions set forth below, which are consistent with the technical parameters and conditions set forth in the C-V2X Joint Waiver Order, as modified.¹⁵

II. DISCUSSION

A. Waiver Standard

The Applicants seek waivers pursuant to section 1.925 of the Commission's rules. Section 1.925 states that the agency may grant a waiver if it is shown that the underlying purpose of the rule at issue would not be served or would be frustrated by application to the instant case, and a grant would be in the public interest, or where, "[i]n view of unique or unusual factual circumstances," application of the rule would be inequitable, unduly burdensome or contrary to the public interest, or the applicant has no reasonable alternative.¹⁶ In addition, section 1.3 provides that the Commission may waive any provision of its rules on its own motion for good cause.¹⁷

Specifically, each of the Waiver Applicants seeks a waiver of certain Commission rules applicable to ITS operations and the manufacture of suitable equipment in the 5.9 GHz band (*i.e.*, 90.379, 95.3163, 95.3167, and 95.3189), the rule sections that establish the technical requirements mandating DSRC-based technology in the upper 30 megahertz of the 5.9 GHz band, to allow the use of C-V2X-

waived sections 90.375, 90.377, 90.379, 95.3163, 95.3167, and 95.3189 of the Commission's rules, 47 CFR §§ 90.375, 90.377, 90.379, 95.3163, 95.3167, 95.3189. *See* Joint Waiver Order at 10–11.

¹² Joint Waiver Order at 10–11.

¹³ *See Request to Modify April 24, 2023 Waiver Order of 5.9 GHz Band Rules to Permit Initial Deployment of Cellular Vehicle-to-Everything Technology*, Order, ET Docket No. 19-138, DA 23-586 (rel. Jul. 5, 2023) (Waiver Modification Order) (removing the 20 dBm transmitter output power limit for OBUs from the technical requirements placed on the waiver grant). Following the grant conditions specified in the Joint Waiver Order and the Waiver Modification Order, the Bureaus have extended waiver authority to deploy C-V2X based technology to additional equipment manufacturers and ITS licensees. *See Requests for Waiver of 5.9 GHz Band Rules to Permit Initial Deployment of Cellular Vehicle-to-Everything Technology*, ET Docket No. 19-138, Letter (PSHSB, OET, WTB rel. Aug. 16, 2023); *Requests for Waiver of 5.9 GHz Band Rules to Permit Initial Deployment of Cellular Vehicle-to-Everything Technology*, ET Docket No. 19-138, Letter, DA 23-1048 (PSHSB, OET, WTB rel. Nov 3, 2023); *Requests for Waiver of 5.9 GHz Band Rules to Permit Initial Deployment of Cellular Vehicle-to-Everything Technology*, ET Docket No. 19-138, DA 24-363 (PSHSB, OET, WTB rel. April 18, 2024).

¹⁴ *See, e.g., Autotalks Waiver Request* at 1-2; *Innowireless Waiver Request* at 1-2; *Keysight Waiver Request* at 4; *Subaru Waiver Request* at 1.

¹⁵ *See* Waiver Modification Order at 4.

¹⁶ 47 CFR § 1.925(b)(3)(i)–(ii).

¹⁷ 47 CFR § 1.3 ("Any provision of the rules may be waived by the Commission on its own motion or on petition if good cause therefor is shown."); *see also Northeast Cellular Telephone Co. v. FCC*, 897 F.2d 1164, 1166 (D.C. Cir. 1990).

based technology in the band and to provide adjustments to the technical parameters where the two technologies differ. As discussed briefly below, and in greater detail in the Joint Waiver Order,¹⁸ we find that a waiver of these rules is warranted under section 1.925, subject to the Waiver Applicants' commitments to adhere to the technical parameters and conditions imposed by the Joint Waiver Order, as modified by the Waiver Modification Order, which are intended to protect DSRC and federal incumbents from potentially harmful interference caused by C-V2X operations in the upper 30 megahertz of the 5.9 GHz band.

We find that, pursuant to section 1.925(b)(3)(i) of the Commission's rules, the underlying purpose of the rules governing ITS operations would not be served by denying these requests and thereby delaying or precluding C-V2X operations in the upper 30 megahertz of the 5.9 GHz band.¹⁹ Furthermore, we find that a waiver in this case will facilitate early C-V2X deployment as the Commission envisioned in the *5.9 GHz First R&O*.²⁰ Granting the Waiver Applicants' requests serves the public interest by encouraging widespread deployment of ITS operations using C-V2X technology. As with the initial requests, "[t]o deny [these requests] and insist on application of the current DSRC-based rules would be contrary to the public interest as it would further entrench the DSRC technology the Commission determined needs to be replaced and preclude rapid deployment of the technology the Commission has identified as best suited to promote the most efficient and effective use of the spectrum."²¹ We further find that permitting C-V2X technologies to deploy now, prior to adoption of final C-V2X rules, will serve the public interest by advancing vehicular safety and promoting interoperability.²²

Based on the record before us, we grant a waiver, to the extent necessary, to each of the Waiver Applicants listed above for the C-V2X deployments specified below, with conditions to protect incumbent licensees and interests. As to the named Waiver Applicants, we waive the Part 90 and 95 rule requirements that mandate DSRC technology in favor of C-V2X operation pursuant to the conditions articulated in Section II.B. below.²³ Specifically, we grant to all of the Waiver Applicants, an auto manufacturer and three equipment manufacturers, waiver of 47 CFR §§ 95.3163 (providing that DSRC OBUs are permitted to operate in the upper 30 megahertz of the 5.9 GHz band), 95.3167 (maximum power limit for DSRC OBUs), and 95.3189 (technical standard for DSRC OBUs), and specifically to the equipment manufacturers (Autotalks, Innovative, and Keysight) waiver of 47 CFR §§ 90.379 (governing technical standards for RSUs).

¹⁸ See Joint Waiver Order, paras. 7–14.

¹⁹ 47 CFR § 1.925(b)(3)(i).

²⁰ *Use of the 5.850–5.925 GHz Band*, ET Docket No. 19-138, First Report and Order, Further Notice of Proposed Rulemaking, and Order of Proposed Modification, 35 FCC Rcd 13440 (2020) (*5.9 GHz First R&O*), *petitions for review denied sub nom. Intelligent Transp. Soc'y of America v. FCC*, 45 F.4th 406 (D.C. Cir. 2022).

²¹ Joint Waiver Order at 5.

²² See *id.*; see also *5.9 GHz First R&O* at 13480, para. 99.

²³ We note that each of the Waiver Applicants either expressly requested a waiver of the Part 90 and Part 95 rules governing ITS operations in the 5.9 GHz band or referenced the rule waivers issued to the C-V2X Joint Waiver Parties in the Joint Waiver Order. Accordingly, for the Waiver Applicants that requested a waiver of the ITS rules generally, or that referenced the rules waived in the Joint Waiver Order, we recognize, pursuant to our own authority under section 1.3 of the Commission's Rules, that these Waiver Applicants have requested a waiver of the same rule sections identified in the Joint Waiver Order, as amended, and grant each such Waiver Applicant a waiver, to the extent necessary, of the rules waived by the Joint Waiver Order, as amended. See 47 CFR § 1.3.

B. Waiver Grant Conditions.

Consistent with the technical requirements and restrictions imposed by the Joint Waiver Order,²⁴ as modified by the Waiver Modification Order,²⁵ this waiver grant is subject to the technical parameters and conditions set forth below.

Scope of the Waiver. This waiver is limited to equipment manufacturers, Autotalks, Innoreless, Keysight, and auto manufacturer, Subaru, and provides them eligibility to obtain the necessary equipment certifications for their RSUs and OBUs. Equipment authorization requirements continue to apply to all RSUs and OBUs under this waiver order.²⁶ Any application for equipment authorization will need to include a copy of this waiver order.²⁷

All operations authorized pursuant to this waiver are limited to transportation and vehicle safety-related communications.

All C-V2X operations permitted pursuant to this waiver are limited to the 5905–5925 MHz frequencies using a 20-megahertz channel.

C-V2X operations under this waiver order are authorized on a secondary basis to the federal radiolocation service operating on a primary basis within the 5895–5925 MHz band and must protect these federal operations from harmful interference. The NTIA reviewed the technical parameters adopted in the Joint Waiver Order,²⁸ as modified by the Waiver Modification Order,²⁹ and agrees that spectrum usage should be limited to 5905–5925 MHz and that EIRP for both OBUs and RSUs be limited to 33 dBm.³⁰ In addition, “to adequately protect the primary 5.9 GHz band for federal radiolocation services during this waiver period,” NTIA also requests that C-V2X OBUs be limited to an EIRP of 27 dBm at ± 5 degrees in elevation from the horizontal plane.³¹ Pursuant to their requests to abide by the same grant conditions outlined in the Joint Waiver Order, as modified, each of the Waiver Applicants has agreed to these conditions.³²

Technical Requirements and Restrictions. All RSUs and OBUs authorized under this Order must operate using the technical characteristics and operating parameters, including power, height, and out-of-band emission limits, specified below, to ensure compliance with all existing technical rules applicable to

²⁴ See Joint Waiver Order, paras. 17–26.

²⁵ See Waiver Modification Order at 4.

²⁶ See generally 47 CFR §§ 2.901 *et seq.* (subpart J – Equipment Authorization Procedures); 47 CFR § 2.905 (Marketing of radio frequency devices prior to equipment authorization).

²⁷ The OET Laboratory has provided detailed filing guidance in its knowledge database (KDB). See [511808 D01 C-V2X Waiver v01](#).

²⁸ See Joint Waiver Order, paras. 17–26.

²⁹ See Waiver Modification Order at 4.

³⁰ See Letter from Charles Cooper, Associate Administrator, Office of Spectrum Management, National Telecommunications and Information Administration, to Ronald T. Repasi, Acting Chief, FCC Office of Engineering and Technology, ET Docket No. 19-138, at 3 (filed April 14, 2023).

³¹ *Id.*

³² See *supra* note 17.

ITS operations other than the requirement to use DSRC-based technology:

C-V2X OBU and RSU Operations

Frequency Range	Channel Bandwidth	OBU Limits	RSU EIRP Limit
5905–5925 MHz	20 megahertz	33 dBm EIRP*; 27dBm EIRP within 5 degrees of horizontal	33 dBm EIRP

*EIRP (equivalent isotropically radiated power)

C-V2X Out-of-Band Emissions (OOBE) Limits

Frequency Offset (MHz from Channel Edge)	OOBE EIRP Limits for C-V2X Transmissions (dBm/100 kHz)**
0.0	-16.0
1.0	-22.0
10.0	-30.0
20.0	-40.0

**See IEEE 802.11p-2010 Table I.8

Compliance with Final Rules. We intend by this Order to enable a fast transition to the next generation of technology in this spectrum band while the Commission contemplates the framework for final rules. Consistent with this goal, we condition the waiver on the requirement that each waiver recipient will ensure that RSU and OBU operations and devices authorized under the waiver will comply with the final rules or other guidance provided by the Commission in any timeframe determined by the Commission. This approach ensures that waiver recipients will consider the pendency of the final rulemaking and incorporate technology that will allow prompt and efficient regulatory compliance with respect to individual RSUs, OBUs, and C-V2X-based operations once any relevant final rules are implemented. Equipment manufacturers, in particular, must take steps to ensure that they can update or disable any OBUs deployed pursuant to this Order to bring these units into compliance with the final rules. Recipients of this waiver should be aware that the Commission may further tailor this and other waiver conditions, if needed and as appropriate, as part of any determination it makes in the rulemaking proceeding.

II. ORDERING CLAUSES

Accordingly, IT IS ORDERED that, pursuant to section 4(i) of the Communications Act, as amended, 47 U.S.C. § 154(i), and section 1.925 of the Commission's rules, 47 CFR § 1.925, each of the requests by the Waiver Applicants to waive the requirements of sections, 90.379, 95.3163, 95.3167, and 95.3189 of the Commission's rules, 47 CFR §§ 90.379, 95.3163, 95.3167, and 95.3189, are HEREBY GRANTED subject to the conditions outlined above, and ARE OTHERWISE DENIED.

IT IS FURTHER ORDERED that each of the requests to waive the requirements of 47 CFR § 90.375 and 47 CFR § 90.377 are HEREBY DISMISSED as moot.

These actions are taken under delegated authority pursuant to sections 0.31, 0.131, 0.191, 0.241, 0.331, 0.392, and 1.3 of the Commission's rules, 47 CFR §§ 0.31, 0.131, 0.191, 0.241, 0.331, 0.392, 1.3, and the *5.9 GHz First R&O*.³³

³³ *5.9 GHz First R&O* at 13424–65, paras. 55–56.

FEDERAL COMMUNICATIONS COMMISSION

Debra Jordan
Chief, Public Safety and Homeland Security Bureau

Ronald Repasi
Chief, Office of Engineering and Technology

Joel Taubenblatt
Chief, Wireless Telecommunications Bureau