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Matthew T. Carlisle, PE
State ITS & Signals Management Engineer
NC Department of Transportation
Transportation Mobility & Safety Division
1561 Mail Service Center
Raleigh, NC 27699-1561

Mohamed Talas
Director Systems Engineering
NYC Department of Transportation
Division of Traffic Operations
34-02 Queens Blvd., 2nd Floor
Long Island City, NY 11101

Kenneth A. Doyle
Interim Director of Smart Cities
1100 Market Street, Suite 300
Chattanooga, TN 37402

Robert B. Kelly
Kahina I. Scheige
Squire Patton Boggs (US) LLP
2250 M. Street NW
Washington, DC 20037
Counsel to P3Mobility

Robert Townsend
Vice President, Government Affairs
DENSO International America, Inc.
24777 Denso Drive
Southfield, MI 48033

Jarrett Wendt
CEO & Co-Founder
Spoke Safety, Inc.
1459 South Steele Street
Denver, CO 80210

Eva Zheng
Certification Engineer
Rolling Wireless S.àr.l.
15, rue Edward Steichen
2450 Luxembourg

Rodney Mathis
Managing Director
Yunex LLC
9225 Bee Cave Rd.
Building B, Suite 201
Austin, CA 78733

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 eight individual waiver requests submitted by certain state, local, and municipal transportation authorities including the North Carolina Department of Transportation, the New York City Department of Transportation, and the City of Chattanooga, Tennessee, a private automated vehicle technology company, Sonamore, Inc. d/b/a P3Mobility, and four equipment manufacturers, DENSO International America, Inc, Rolling Wireless S.àr.l. RX113A, Spoke Safety LLC, and Yunex LLC (collectively, the "Waiver Applicants" or

"Applicants").[1] 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) technology within the 5.895–5.925 GHz band.

I. Background

Each Waiver Applicant[2] 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.[3] 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. Several Applicants seek a waiver of 47 CFR § 2.106(d)(160)[4] 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.[5] Each Applicant also seeks a waiver of certain part 90 and part 95 rules[6] (47 CFR

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[1] *See* Appendix A: List of Waiver Petitions/Applicants, attached hereto. Note that Sonamore, Inc. d/b/a P3Mobility (hereafter, P3Mobility) previously received a waiver as an equipment manufacturer to provide them eligibility to obtain the necessary equipment certifications for their C-V2X enabled roadside units (RSUs) and on-board units (OBUs). *See Requests for Waiver of 5.9 GHz Band Rules to Permit Initial Deployment of Cellular Vehicle-to-Everything Technology*, Order at 6–7 (Rel. Aug. 16, 2023). In this Order, we address the additional request in P3Mobility's waiver petition to operate a system of C-V2X enabled RSUs and OBUs as an ITS licensee in a specified geographic area.

[2] Hereafter, individual waiver requests and supplemental requests, as referenced in Appendix A, will be referred to as follows: (1) state, local, and municipal transportation authorities for North Carolina (*NCDOT Waiver Request*), New York City (*NYCDOT Waiver Request* or *NCYDOT Waiver Supplement*), the City of Chattanooga, Tennessee (*Chattanooga Waiver Request or Chattanooga Waiver Supplement*); (2) automated vehicle technology company, Sonamore, Inc. d/b/a P3Mobility (*P3Mobility Waiver Request* or *P3Mobility Waiver Supplement*); and (3) equipment manufacturers, DENSO International America, Inc. (*DENSO Waiver Request*), Rolling Wireless S.à.r.l., RX113A (*RX113A Waiver Request* or *RX113A Waiver Supplement*), Spoke Safety, LLC (*Spoke Safety Waiver Request* or *Spoke Safety Waiver Supplement*), and Yunex LLC (*Yunex Waiver Request* or *Yunex Waiver Supplement*).

[3] *See, e.g., NCDOT Waiver Request* at 1; *NYCDOT Waiver Request* at 1; *Chattanooga Waiver Request* at 1; *P3Mobility Waiver Request* at 1; *DENSO Waiver Request* at 1; *RX113A Waiver Request* at 1; *Spoke Safety Waiver Request* at 1; *Yunex Waiver Request* at 1.

[4] "In the band 5895–5925 MHz, the use of the non-federal mobile service is limited to operations in the Intelligent Transportation Systems radio service." 47 CFR § 2.106(d)(160). As the Bureaus previously noted in the Joint Waiver Order, section 2.106 merely limits operations in the upper 30 megahertz of the 5.9 GHz band to ITS services, so such a waiver is unnecessary. *See* Joint Waiver Order at 5. None of the Waiver Applicants contemplates deploying non-ITS operations in the upper 30 megahertz of the 5.9 GHz band. Therefore, the requests for a waiver of this provision are dismissed as moot.

[5] *See, e.g., NCDOT Waiver Request* at 1; *NYCDOT Waiver Request* at 1; *P3Mobility Waiver Request* at 1; *RX113A Waiver Request* at 1; *Spoke Safety Waiver Request* at 1; *Yunex Waiver Request* at 1.

[6] *See, e.g., NCDOT Waiver Request* at 1, footnote 2; *NYCDOT Waiver Request* at 1, fn. 2; *Chattanooga Waiver Request* at 1, fn. 3; *P3Mobility Waiver Request* at 1, fn. 2; *DENSO Waiver Request* at 1, fn. 3; *RX113A Waiver Request* at 1, fn. 2; *Spoke Safety Waiver Request* at 1, fn. 2; *Yunex Waiver Request* at 1.

§§ 90.375, 90.377, 90.379, 95.3159,[7] 95.3163, 95.3167, and 95.3189)[8] 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.[9] Specifically, the state, local, and municipal transportation departments, and the private automated vehicle technology company listed in Appendix A (hereafter, "the ITS licensees") seek certain rule waivers under section 1.925 to deploy C-V2X operations, including RSUs and OBUs, within and throughout their respective state and/or local borders, under the FCC ITS licenses each currently holds or for which it has applied.[10] The equipment manufacturers listed in Appendix A (DENSO, Rolling Wireless, Spoke Safety, and Yunex) seek certain rule waivers under section 1.925 to allow them to obtain the necessary equipment certifications for their C-V2X equipment.[11]

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.[12] 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.[13] On April 24, 2023, the Bureaus granted the *Joint Waiver Request*.[14] The Bureaus conditioned the waiver grant on certain technical and operational parameters set forth in the Joint Waiver Order[15] and further modified those conditions by our Waiver Modification Order on July 5, 2023.[16]

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[7] 47 CFR § 95.3159 is a reserved section and does not presently contain any regulatory information. Thus, we dismiss this aspect of each of the waiver requests where it is made as moot.

[8] *See* 47 CFR §§ 90.375, 90.377, 90.379, 95.3163, 95.3167, 95.3189.

[9] 47 CFR § 1.925.

[10] *See, e.g., NCDOT Waiver Request* at 2 (WQZX495); *NYCDOT Waiver Request* at 1 (WQBH353); *Chattanooga Waiver Request* at 1 (WXRP201); *P3Mobility Waiver Request* at 3 (petitioner seeks a waiver to deploy and operate C-V2X-based technology pursuant to a geographic area license – application pending, FCC File No. 0010441749).

[11] *See DENSO Request* at 1, 3; *RX113A Waiver Request* at 1-3; *Spoke Safety Waiver Request* at 1–3; and *Yunex Waiver Request* at 1.

[12] *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.

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

[14] *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 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.

[15] Joint Waiver Order at 10–11.

[16] *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

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).[17]

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.[18]

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, "in 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.[19] In addition, section 1.3 provides that the Commission may waive any provision of its rules on its own motion for good cause.[20]

Specifically, each of the Waiver Applicants seeks a waiver of certain Commission rules applicable to ITS operations in the 5.9 GHz band (*i.e.*, 47 CFR §§ 90.375, 90.377, 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-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,[21] 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.[22] Furthermore,

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Modification Order") (removing the 20 dBm Transmitter Output Power Limit for OBUs from the technical requirements placed on the waiver grant).

[17] *See NCDOT Waiver Request* at 2; *NYCDOT Waiver Supplement*; *Chattanooga Waiver Request* at 1–2; *P3Mobility Waiver Supplement*; *DENSO Waiver Request* at 1–2; *RX113A Waiver Supplement*; *Spoke Safety Waiver Supplement*; *Yunex Waiver Supplement* at 1–2.

[18] *See* Waiver Modification Order at 4.

[19] 47 CFR § 1.925(b)(3)(i)–(ii).

[20] 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).

[21] *See* Joint Waiver Order, paras. 7–14.

[22] 47 CFR § 1.925(b)(3)(i).

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*.[23] Granting the Waiver Applicants' requests serves the public interest by encouraging widespread deployment of ITS operations using C-V2X technology. "To deny the [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."[24] 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.[25]

Based on the record before us, we grant a waiver, to the extent necessary, to each of the Waiver Applicants listed in Appendix A 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.[26]

ITS licensees (state, local, and municipal transportation authorities, and the private automated vehicle technology company). Specifically, we grant to the ITS licensees listed in Appendix A (North Carolina, New York City, Chattanooga, TN, and P3Mobility) waiver of 47 CFR §§ 90.375 (governing RSU license areas, communication zones, and registrations) and 90.377 (RSU frequencies available, maximum power limit, antenna height, and priority communications).[27]

ITS licensees and equipment manufacturers. We grant to the ITS licensees listed in Appendix A as well as the equipment manufacturers listed in Appendix A (North Carolina, New York City, Chattanooga, TN, P3Mobility, DENSO, Rolling Wireless, Spoke Safety, and Yunex) waiver of 47 CFR §§ 90.379 (governing Technical Standards for RSUs).

Equipment manufacturers. We grant to the equipment manufacturers (DENSO, Rolling Wireless, Spoke Safety, and Yunex) 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).

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[23] *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), *petitions for review denied sub nom. Intelligent Transp. Soc'y of America v. FCC,* 45 F.4th 406 (D.C. Cir. 2022) (*5.9 GHz First R&O*).

[24] Joint Waiver Order at 5.

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

[26] 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.

[27] 47 CFR §§ 90.375, 90.377.

B. Waiver Grant Conditions.

Consistent with the technical requirements and restrictions imposed by the Joint Waiver Order,[28] as modified by the Waiver Modification Order,[29] this waiver grant is subject to the technical parameters and conditions set forth below.

Scope of the Waiver. With respect to the ITS licensees, this waiver is limited to the state, local, and municipal transportation departments (North Carolina DOT, New York City DOT, and the City of Chattanooga), and the private automated vehicle technology company (P3Mobility) listed in Appendix A to allow them to deploy C-V2X infrastructure that satisfies all conditions of this Order, including RSUs and OBUs, within their respective jurisdictions. The geographic area of the waiver is limited to the area encompassing the legal jurisdictions of the listed states, localities, and municipalities, or for P3Mobility, the geographic parameters that will ultimately be defined by its license.

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.

With respect to equipment manufacturers, this waiver is limited to DENSO, Rolling Wireless, Spoke Safety, and Yunex 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.[30] Any application for equipment authorization will need to include a copy of this waiver order.[31]

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 5.895–5.925 GHz band and must protect these Federal operations from harmful interference. The NTIA reviewed the technical parameters adopted in the Joint Waiver Order,[32] as modified by the Waiver Modification Order,[33] 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.[34] 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.[35] Pursuant to their supplemental requests to

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[28] *See* Joint Waiver Order, paras. 17–26.

[29] *See* Waiver Modification Order at 4.

[30] *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).

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

[32] *See* Joint Waiver Order, paras. 17–26.

[33] *See* Waiver Modification Order at 4.

[34] *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 (filed April 14, 2023) at 3.

[35] *Id*.

abide by the same grant conditions outlined in the Joint Waiver Order, as modified, each of the Waiver Applicants has agreed to these conditions.[36]

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 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 MHz	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

The ITS licensees' C-V2X RSU operations must protect DSRC and primary non-federal fixed-satellite service (Earth-to-space) operations in the 5.895–5.925 GHz band from harmful interference. Prior to commencing C-V2X operations, the ITS licensees must successfully coordinate with all DSRC incumbent(s) whose licensed areas either overlap or are within 25 miles of their license areas. The purpose of this coordination is to ensure that harmful interference will not occur.[37] In addition, within 30 days of commencing operations, the ITS licensees must file a report in the Universal Licensing System (ULS) confirming successful coordination (including the names of the DSRC incumbents and dates coordination was completed), or if applicable, certifying that coordination was unnecessary, and include a grandfathered list of RSU locations that will be converted from DSRC to C-V2X operation. FCC staff will add a C-V2X special condition to these RSU locations and forward the grandfathered RSU list to NTIA.

RSU registration requirements. ITS licensees must register each RSU in ULS before operating the RSU. RSUs included in the grandfathered DSRC RSU list being converted to C-V2X do not need to be filed in ULS. RSU registrations are subject to the requirements of 47 CFR § 1.923 as applicable (antenna structure registration, environmental review, international coordination, and quiet zones). Additionally, RSUs at locations subject to NTIA coordination[38] may not begin operation until the licensee receives NTIA approval. Registrations are not effective until the Commission posts them in ULS. It is the licensee's responsibility to delete from the registration database any RSUs that have been

[36] *See* footnote 17, *supra*.

[37] Setting the coordination distance at 25 miles will ensure that C-V2X RSU operators are able to identify any neighboring DSRC incumbents.

[38] *See* 47 CFR § 90.371(b).

discontinued.[39]

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, including but not limited to equipment manufacturers, 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 parties listed in Appendix A, attached hereto, to waive the requirements of 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, are HEREBY GRANTED subject to the conditions outlined above, and ARE OTHERWISE DENIED.

IT IS FURTHER ORDERED that, pursuant to section 4(i) of the Communications Act of 1934, as amended, 47 U.S.C. § 154(i), and section 1.925 of the Commission's rules, 47 CFR § 1.925, the waiver request filed by Sonamore, Inc. d/b/a P3Mobility in connection with application FCC File No. 0010441749, IS GRANTED, and the application SHALL BE PROCESSED in accordance with this Order and the Commission's rules.

IT IS FURTHER ORDERED that each of the requests to waive the requirements of 47 CFR § 2.106(d)(160) and 47 CFR § 95.3159 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*.[40]

[39] *See* 47 CFR § 90.375(b).

[40] *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

APPENDIX A
WAIVER PETITIONS/APPLICANTS

1. North Carolina Department of Transportation. *See* Letter from Matthew T. Carlisle, PE, State ITS & Signals Management Engineer, North Carolina Department of Transportation, to Jessica Rosenworcel, Chairwoman, FCC, ET Docket No. 19-138 (filed Aug. 31, 2023) (*NCDOT Waiver Request*), https://www.fcc.gov/ecfs/document/1083185905244/1.

2. New York City Department of Transportation. *See* Request for Waiver of 5.9 GHz Band Rules to Permit Deployments of Cellular Vehicle-to-Everything Technology, New York City Department of Transportation, ET Docket No. 19-138 (filed Jul. 1, 2022) (*NYCDOT Waiver Request*), https://www.fcc.gov/ecfs/document/10701248811987/1; *see also* Letter from Mohamed Talas, Director System Engineering, NYC Department of Transportation, to Marlene H. Dortch, Secretary, FCC, ET Docket No. 19-138 (filed Oct. 24, 2023) (*NYCDOT Waiver Supplement*), https://www.fcc.gov/ecfs/document/102460428478/1.

3. City of Chattanooga, Tennessee. *See* Request for Waiver of 5.9 GHz Band Rules to Permit Deployments of Cellular Vehicle-to-Everything Technology, City of Chattanooga, Tennessee, ET Docket No. 19-138 (filed Jul. 11, 2023) (*Chattanooga Waiver Request*), https://www.fcc.gov/ecfs/document/1071180745612/1.

4. Sonamore, Inc. d/b/a P3Mobility. *See* Request for Waiver of 5.9 GHz Band Rules to Permit Deployments of Cellular Vehicle-to-Everything Technology, Sonamore, Inc. d/b/a P3Mobility, ET Docket No. 19-138 (filed Mar. 3, 2023) (*P3Mobility Waiver Request*), https://www.fcc.gov/ecfs/document/10303120813893/1; *see also* Letter from Erin Milligan, Sonamore, Inc. d/b/a P3Mobility, to Marlene H. Dortch, Secretary, FCC, ET Docket No. 19-138 (filed Jul. 6, 2023) (*P3Mobility Waiver Supplement*), https://www.fcc.gov/ecfs/document/10706146789200/1.

5. DENSO International America, Inc. *See* Request for Waiver of 5.9 GHz Band Rules to Permit Deployments of Cellular Vehicle-to-Everything Technology, DENSO International America, Inc., ET Docket No. 19-138 (filed Aug. 21, 2023) (*DENSO Waiver Request*), https://www.fcc.gov/ecfs/document/108193098421567/1.

6. Rolling Wireless S.àr.l. RX113A. *See* Request for Waiver of 5.9 GHz Band Rules to Permit Deployments of Cellular Vehicle-to-Everything Technology, Spoke Safety, LLC, ET Docket No. 19-138 (filed Aug. 16, 2023) (*RX113A Waiver Request*), https://www.fcc.gov/ecfs/document/10816048638860/1; *see also* Letter from Eva Zheng, Certification Engineer, Rolling Wireless S.àr.l., to Marlene H. Dortch, Secretary, FCC, ET Docket No. 19-138 (filed Oct. 9, 2023) (*RX113A Waiver Supplement*), https://www.fcc.gov/ecfs/document/100914560046/1.

7. Spoke Safety, LLC. *See* Request for Waiver of 5.9 GHz Band Rules to Permit Deployments of Cellular Vehicle-to-Everything Technology, Spoke Safety, LLC, ET Docket No. 19-138 (filed Jul. 22, 2022) (*Spoke Safety Waiver Request*), https://www.fcc.gov/ecfs/document/10722025089016/1; *see also* Letter from Jarrett Wendt, CEO & Co-Founder, Spoke Safety, Inc. to Marlene H. Dortch, Secretary, FCC, ET Docket No. 19-138 (filed Sep. 28, 2023) (*Spoke Safety Waiver Supplement*), https://www.fcc.gov/ecfs/document/10928065355532/1.

8. Yunex LLC. *See* Letter from Rodney Mathis, Managing Director, Yunex LLC, to Marlene H. Dortch, Secretary, FCC, ET Docket No. 19-138 (filed Aug. 3, 2023) (*Yunex Waiver Request*), https://www.fcc.gov/ecfs/document/10803416708569/1; *see also* Letter from Rodney Mathis, Managing

Director, Yunex LLC, to Marlene H. Dortch, Secretary, FCC, ET Docket No. 19-138 (filed Oct. 6, 2023) (*Yunex Waiver Supplement*), https://www.fcc.gov/ecfs/document/1006377211914/1.