

For the reasons discussed in the preamble, the Coast Guard amends 46 CFR part 401 as follows:

## PART 401—GREAT LAKES PILOTAGE REGULATIONS

■ 1. The authority citation for part 401 is revised to read as follows:

**Authority:** 46 U.S.C. 2103, 2104(a), 6101, 7701, 8105, 9303, 9304; DHS Delegation No. 00170.1, Revision No. 01.4, paragraphs (I)(92)(a), (d), (e), (f).

■ 2. Amend § 401.405 by revising paragraphs (a)(1) through (6) to read as follows:

### § 401.405 Pilotage rates and charges.

(a) \* \* \*

(1) The St. Lawrence River is \$986;

(2) Lake Ontario is \$643;

(3) Lake Erie is \$576;

(4) The navigable waters from Southeast Shoal to Port Huron, MI is \$753;

(5) Lakes Huron, Michigan, and Superior is \$440; and

(6) The St. Marys River is \$825.

\* \* \* \* \*

Dated: December 6, 2024.

**A.M. Beach,**

*Captain, U.S. Coast Guard, Acting, Assistant Commandant for Prevention Policy.*

[FR Doc. 2024-29128 Filed 12-12-24; 8:45 am]

**BILLING CODE 9110-04-P**

## FEDERAL COMMUNICATIONS COMMISSION

### 47 CFR Parts 1, 90, 95, and 97

[ET Docket No. 19-138; FCC 24-123; FR ID 265055]

### Use of the 5.850–5.925 GHz Band

**AGENCY:** Federal Communications Commission.

**ACTION:** Final rule.

**SUMMARY:** In this document, the Federal Communications Commission (Commission) adopts rules and takes other steps to further address the transition of 5.9 GHz Intelligent Transportation System (ITS) operations from Dedicated Short Range Communications (DSRC)-based technology to cellular-vehicle-to-everything (C-V2X)-based technology. Specifically, the Commission adopts technical and operational rules governing devices using C-V2X-based technology, eliminates the DSRC requirement for communications zone designations, finalizes the timeline for sunsetting the use of DSRC-based technology, addresses the issue of

additional spectrum allocations for ITS use, addresses the issue of reimbursing the transition costs of DSRC incumbents, and encourages the development of industry standards.

**DATES:** This final rule is effective February 11, 2025. Existing licenses for DSRC systems may be renewed as necessary following this effective date but only for a period not to exceed December 14, 2026.

### FOR FURTHER INFORMATION CONTACT:

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**SUPPLEMENTARY INFORMATION:** This is a summary of the Commission's *Second Report and Order*, ET Docket No. 19-138, FCC 24-123, adopted on November 20, 2024, and released on November 21, 2024. The full text of this document is available for public inspection and can be downloaded at <https://docs.fcc.gov/public/attachments/FCC-24-123A1.pdf>. Alternative formats are available for people with disabilities (Braille, large print, electronic files, audio format) by sending an email to [fcc504@fcc.gov](mailto:fcc504@fcc.gov) or calling the Commission's Consumer and Governmental Affairs Bureau at (202) 418-0530 (voice), (202) 418-0432 (TTY).

### Procedural Matters

*Regulatory Flexibility Act.* The Regulatory Flexibility Act of 1980, as amended (RFA), requires that an agency prepare a regulatory flexibility analysis for notice and comment rulemakings, unless the agency certifies that “the rule will not, if promulgated, have a significant economic impact on a substantial number of small entities.” Accordingly, we have prepared a Final Regulatory Flexibility Analysis (FRFA) concerning the possible impact of the rule changes contained in the *Second Report and Order* on small entities. The FRFA is set forth in Appendix B of the FCC document, <https://docs.fcc.gov/public/attachments/FCC-24-123A1.pdf>.

*Congressional Review Act.* The Commission has determined, and the Administrator of the Office of Information and Regulatory Affairs, Office of Management and Budget concurs, that this rule is “major” under the Congressional Review Act, 5 U.S.C. 804(2). The Commission will send a copy of this *Second Report and Order* to Congress and the Government Accountability Office pursuant to 5 U.S.C. 801(a)(1)(A).

## Synopsis

### Introduction

The Intelligent Transportation System (ITS) holds promise to improve transportation safety and mobility by integrating advanced communications technologies into vehicles and infrastructure. The connected vehicle ecosystem of the future will make the nation's transportation system more flexible, resilient, and safe. This ecosystem requires technical and operational rules governing devices using C-V2X (cellular-vehicle-to-everything) based technology. In the *First Report and Order* of the Federal Communications Commission's (FCC) proceeding, 86 FR 23281 (May 1, 2021), the Commission retained the upper 30 megahertz portion (5.895–5.925 GHz) of the 5.850–5.925 GHz (5.9 GHz) band for ITS operations. The Commission also required the ITS service to transition from Dedicated Short Range Communications (DSRC)-based technology to C-V2X-based technology as the connected mobility platform for implementing the future of ITS communications in the United States. In the *Second Report and Order*, the Commission further addresses the transition of 5.9 GHz ITS operations from DSRC to C-V2X by codifying C-V2X technical parameters in the Commission's rules, including band usage, message priority, and channel bandwidth. The Commission promulgates rules governing equivalent isotropically radiated power (EIRP) and out-of-band emissions (OOBE) limits for C-V2X on-board units (OBUs) and roadside units (RSUs), and antenna height limits for RSUs. In addition, the Commission encourages the development of industry standards and finalizes the timeline for sunsetting the use of DSRC-based technology. Finally, the Commission addresses the issues of additional spectrum allocations for ITS use and reimbursing the transition costs of DSRC incumbents.

### Background

The Commission adopted the *First Report and Order* in 2020, wherein it concluded that the most efficient use of the 75 megahertz of spectrum in the 5.9 GHz band would be achieved by expanding unlicensed operations in the lower 45 megahertz of the band (5.850–5.895 GHz), and designating the upper 30 megahertz of the band (5.895–5.925 GHz) for the ITS service using C-V2X technology. Among other considerations, the Commission made this decision because (1) the DSRC services once contemplated for operations across the full 5.9 GHz band

had not come to fruition in the 20 years since it allocated the spectrum for the ITS service; (2) those envisioned vehicle-safety features can be or are already being provided using other spectrum bands or alternative technology; and (3) the significant public interest benefits of adding 45 megahertz of Unlicensed National Information Infrastructure (U-NII) spectrum to enable the next-generation Wi-Fi, which operates on wider channels and allows gigabit connectivity with lower latency, improved coverage, and power efficiency. To protect incumbent 5.9 GHz band services, including federal incumbent operations, from potential harmful interference from unlicensed operations, the Commission imposed stringent power limits and operating requirements on unlicensed devices (*i.e.*, access points, subordinate devices, and client devices) operating in the lower 45 megahertz and restricted unlicensed use of the lower 45 megahertz to indoor locations. As the *First Report and Order* determined that the operators in the revised ITS band must use C-V2X technology, the *Further Notice of Proposed Rulemaking (FNPRM)*, 86 FR 23323 (May 6, 2021), sought comment on further transition issues and proposed rules to finalize the technical parameters for C-V2X operations and the timing of when operations must transition from the DSRC technology. Although the *FNPRM* sought comment on the possibility for full-power outdoor unlicensed operations across the lower 45 megahertz portion of the 5.9 GHz band, those unlicensed operations issues are not addressed in the *Second Report and Order*. In an *Order on Reconsideration*, 89 FR 24835 (April 9, 2024), the Commission affirmed its decision in the *First Report and Order* to repurpose the lower 45 megahertz for indoor unlicensed operations and rejected various arguments regarding indoor unlicensed devices' potential to cause harmful interference to ITS operations in the upper 30 megahertz.

Recently, the Office of Engineering and Technology (OET), the Public Safety and Homeland Security Bureau (PSHSB), and the Wireless Telecommunications Bureau (WTB) (hereafter, "the Bureaus") granted rule waivers to parties requesting to deploy C-V2X operations in the upper 30-megahertz portion of the 5.9 GHz band (5.895–5.925 GHz) prior to adopting final C-V2X-based technical rules. Specifically, each waiver applicant sought waivers for rule sections that establish the technical requirements

mandating DSRC-based technology in the upper 30 megahertz of the 5.9 GHz band, to allow C-V2X-based operations in the band, and to provide adjustments to the technical parameters where the two technologies differ. The Bureaus found that waiving those rules was warranted under 47 CFR 1.925, subject to the waiver applicants' commitments to adhere to certain technical parameters and conditions developed to protect DSRC and federal incumbents from potential harmful interference caused by C-V2X operations in the upper 30 megahertz. All C-V2X operations pursuant to a waiver are limited to transportation and vehicle-safety related communications. Finally, the granted waivers were conditioned on the requirement that each waiver recipient would ensure that all operations and devices authorized under the waiver would comply with the final rules or other guidance provided by the Commission.

#### Discussion

In the *Second Report and Order*, the Commission finalizes rules concerning band usage, message prioritization, channel bandwidth, communications zones, power for RSUs and OBUs, and OOB limits for C-V2X operations, along with other transition issues, including the transition timeline. Additionally, the Commission reaches several conclusions related to the incorporation of standards, the allocation of additional spectrum for ITS, and compensation to incumbents. The decisions in this document will not only promote the efficient use of 30 megahertz of spectrum dedicated to ITS but also the safety benefits this technology promises to deliver to the American public.

DSRC is defined in the Commission's rules as the use of radio techniques to transfer data over short distances between roadside and mobile units, between mobile units, and between portable and mobile units to perform operations related to improving traffic flow, traffic safety, and other ITS applications in a variety of environments. DSRC systems may also transmit status and instructional messages related to the units involved. Currently, local government entities and entities eligible for Industrial/Business Pool licenses are eligible to operate RSUs using DSRC, while OBUs in vehicles are licensed by rule. The existing DSRC rules lay out a hierarchical priority system for messages. Communications involving safety of life have priority access over all other DSRC communications. Communications involving public safety

have the next highest priority, with a presumption that RSUs operated by State or local governmental entities are engaged in public safety communications. The lowest tier in this communications hierarchy are non-priority communications, which include all other communications not related to safety of life or public safety.

As stated in the *FNPRM*, the Commission's goal is to facilitate a smooth transition from DSRC-based operations to C-V2X-based operations. Accordingly, the Commission must address the need, if any, to adopt requirements analogous to existing DSRC requirements that would similarly govern C-V2X operations in the 5.895–5.925 GHz band. The Commission now addresses the technical issues necessary to ensure efficient and effective use of the band.

#### C-V2X Standards

In the *5.9 GHz NPRM*, 85 FR 6841 (February 6, 2020), the Commission proposed to incorporate by reference into the Commission's rules the 3rd Generation Partnership Project (3GPP) C-V2X standard Release 14. The Commission did not receive significant comment on this issue. After the release of the *5.9 GHz NPRM*, 3GPP announced the completion of Release 16, which includes enhanced 5G network capabilities. Accordingly, the *FNPRM* sought further comment on how the Commission should handle standards with respect to C-V2X. Specifically, the Commission asked whether either 3GPP C-V2X standard Release 16 or Release 14, in whole or in part, should be incorporated into its rules; whether Release 14 should be incorporated initially with an eventual transition to Release 16; or whether there is a compelling argument for not incorporating either standard into the rules.

Comments received in this regard suggest a variety of approaches to the issue. T-Mobile disputes the need for a general incorporation, stating that "referencing specific 3GPP releases in the rules [would] quickly make them outdated and stifle innovation by freezing technologies in place, instead of allowing them to evolve naturally to satisfy customer needs and reflect innovation." The Institute of Transportation Engineers (ITE) expresses similar views, suggesting that the Commission refrain from incorporating by reference any one particular standard, instead allowing industry to test and evaluate the technology and applicable standards without imposing a regulatory ceiling. Further, ITE asserts that the

Commission's question regarding a phased-in approach where it would adopt Release 14 now and replace it with Release 16 later does not correctly characterize the actual technology implementation process. Rather, ITE indicates that the 5G equipment based on Release 16 would enhance and complement Release 14 Long Term Evolution (LTE) operating equipment and Release 14 equipment would likely remain in use even after Release 16 becomes dominant. Other commenters find merit in incorporating standard(s) references in some manner. 5G Americas, for example, citing the ongoing technology evolution, asks the Commission to generally refer to 3GPP releases covering C-V2X, instead of "cementing a specific 3GPP release." While skeptical that C-V2X can be sufficiently realized on the allocated spectrum, AT&T nonetheless suggests, without further specificity, that "the Commission should incorporate by reference those portions of both Release 14 and Release 16 that are relevant to C-V2X, giving ITS band users sufficient latitude to innovate." Autotalks indicates that "Releases 14, 15, and 16 are non-interoperable" and it supports incorporating by reference "explicit" C-V2X releases to assure "wide-scale interoperability."

Based on the record before the Commission, the Commission is not incorporating by reference any one particular standard. The Commission encourages industry to develop a consensus concerning 3GPP releases covering C-V2X. The Commission believes this approach is necessary due to the constantly evolving nature of both 3GPP standards and the functionality of C-V2X. As stated by ITE, new testing will undoubtedly lead to changes or enhancements to the applicable standards—and being held to a regulatory ceiling by imposing a particular standard may cap the potential of future C-V2X applications. The Commission's focus in the proceeding is to set objective performance expectations for C-V2X technology but let industry come to a consensus on the technology standard that should be applicable to C-V2X moving forward. Given the broad record support for not incorporating any one particular standard, the Commission will thus provide industry the flexibility to develop a technology standard that fits within the technical bounds prescribed in this document.

In making this decision, the Commission reiterates its commitment to vehicle safety and the need for all vehicles that incorporate C-V2X technology to have the capability to

successfully communicate with each other. Although the Commission is not mandating a particular standard through incorporation by reference, the Commission expects that the industry will ensure that all equipment, regardless of manufacturer or vehicle integrator, is interoperable and that future iterations of equipment based on evolving standards will be forwards and backwards compatible to ensure that C-V2X technology delivers the expected safety benefits to the American public.

Finally, the Commission recognizes that safety-related wireless devices and services need to be secure to protect user privacy and ensure efficient and timely delivery of the intended safety service. The Commission prioritizes cybersecurity and privacy of consumer communications through rulemaking and other activities. In addition, cybersecurity and privacy actions specific to connected vehicles are the focus of ongoing actions at the U.S. Department of Transportation (U.S. DOT) with its C-V2X acceleration plan and at the U.S. Department of Commerce's Bureau of Industry and Security with its proposed ban on the sale or importation of connected vehicles integrating specific pieces of hardware and software, or separately sold components, with a sufficient nexus to the People's Republic of China or Russia. 89 FR 79088 (Sept. 26, 2024). The Commission expects that equipment manufacturers implementing C-V2X technology will comply with existing standards and best practices and collaborate with the automotive industry to develop new guidance, standards, and best practices that consider cybersecurity and privacy concerns to improve the C-V2X security posture. The FCC will continue to monitor and engage with federal and private sector partners on these vital issues.

#### *Band Usage*

The Commission's existing ITS rules lay out a hierarchical priority system for messages. In the *FNPRM*, the Commission sought comment on whether to retain the message priority hierarchy for C-V2X deployment and whether the 5.895–5.925 GHz band should be limited to non-commercial services or safety-of-life applications, and if so, how such a restriction could be implemented. In this regard, the Commission noted that because the stated purpose of ITS is to promote safety, it was inclined to retain this message prioritization system in the rules to help ensure successful transmission of the most important messages. The Commission asked how

"safety-of-life" should be defined, how appropriate applications should be delineated, and whether such a limitation could be established via changes to the licensee eligibility requirements. Additionally, the Commission asked how the priority requirement would work in the C-V2X environment and whether the priority determination should continue to be associated with the type of licensee or a more granular approach that considers the type of message. As noted above, all C-V2X operations pursuant to the recently granted waivers are limited to transportation and vehicle-safety related communications.

Several commenters state that the upper 30 megahertz (5.895–5.925 GHz) of the 5.9 GHz band should be limited to safety-of-life or non-commercial applications. In its comments, Auto Innovators states that safety-of-life messages should always have priority when competing for spectrum with other types of messages and that the Commission should retain its three-tier message priority hierarchy. The Motor and Equipment Manufacturers Assoc. (MEMA) also states that the Commission should retain its existing message priority hierarchy, given the need to ensure that the most important messages are successfully transmitted over less critical messages. Robert Bosch LLC (Bosch) comments that a hierarchical priority system is necessary to ensure safety-of-life messages. Therefore, Bosch states that the FCC should preserve the safety-of-life/public safety/non-priority framework for message prioritization. Bosch recommends that the Commission allocate a dedicated portion of the 30 megahertz to safety-of-life messages, which would help ensure uninterrupted transmission of related messages. Bosch claims that the remainder of the band could be used for both safety-of-life messages and/or advanced safety services, thereby reducing the risk of interference, while mitigating high channel load scenarios. However, Bosch states that advanced safety messages that are not strictly safety-of-life can also provide notable safety benefits as well as improved efficiency. For example, Bosch contends that vehicle platooning or timed vehicle intersection movement can be viewed as beneficial functionalities within the transportation sector. Bosch expressed agreement with the Alliance for Automotive Innovation that the Commission should not overly restrict operations in the upper 30 megahertz to only safety-of-life operations and that it is critical for the Commission to recognize the importance and value of

additional functions, such as vehicle platooning, that require use of the spectrum.

Responding to the Commission's request that commenters address the need for granularity in the three-tier message priority hierarchy, MEMA states that, utilizing the existing framework, any messages that could reduce the risk of an accident should receive priority over other messages. For instance, MEMA mentions that public safety messages should defer to safety-of-life messages, while messages that strictly relate to traffic congestion, efficiency, or other non-safety issues should only be transmitted when there is little risk of harmful interference. On the other hand, MEMA asserts that commercial operations should be permitted in the ITS band because a prohibition on commercial operations "will further disincentivize continued innovation in V2X applications" and, in any case, the distinction between "commercial" vs. "non-commercial" services is undefined in this context. AT&T suggests that the Commission should limit the ITS band to non-commercial applications and services that promote road safety, but allow the U.S. DOT to define specific road-safety related applications and services that qualify for use in the 5.895–5.925 GHz band. New America's Open Technology Institute (OTI) and Public Knowledge (PK) state that prohibiting commercial activity on the upper 30 megahertz would be consistent with the auto industry's repeated insistence on the critical need for additional spectrum for public safety and collision avoidance purposes. Similarly, DSA questions the automotive industry's claims that 30 megahertz is an insufficient amount of spectrum for vehicular safety applications while it also advocates for the ability to use that same 30 megahertz to support commercial, non-safety applications and services. OTI/PK also state that if the Commission does not prohibit commercial use, it would be creating an incentive for both the auto and mobile industries to underinvest in potential safety-of-life signaling applications in favor of commercial applications that are quicker to monetize. OTI/PK "continues to believe that requiring licensees to use public safety spectrum exclusively for public safety best serves the public interest and avoids any potential conflict between maximizing safety and maximizing profit."

The Intelligent Transportation Society of America (ITS America) argues that spectrum use questions have traditionally been decided by groups that construct standards for these

technologies—namely, the U.S. DOT, SAE International, or the Institute of Electrical and Electronics Engineers ("IEEE"). ITS America asserts that these groups have appropriately balanced the primacy of safety-of-life applications and the possibility of commercial applications that could incentivize V2X on-board unit deployment in private vehicle fleets. ITS America contends that OTI/PK's suggestion to limit use of the 5.895–5.925 GHz band to safety-of-life and public safety communications would materially deter V2X investment and deployment, thereby limiting the number of vehicles utilizing V2X safety measures. NCTA—The Internet & Television Association (NCTA) contends that it is unfair to allow licensees to gain access to valuable spectrum without an auction. AT&T states that limiting use of the spectrum to non-commercial applications and services would prevent undue commercial gain from those deploying C–V2X and allow the range of operations needed to improve road safety. ITE and ITS America join MEMA in arguing that it is impractical to try determining which applications are safety-of-life for the purposes of restricting the use of the spectrum.

Given that the ITS remains focused on integrating radio-based technologies to enhance the transportation and vehicular-safety related ecosystem, the Commission agrees with those commenters that argue C–V2X operations should be governed by a prioritization system that is similar to the hierarchical system currently in place for DSRC. Thus, safety-of-life messages have top priority, followed by public safety communications, and then non-priority communications that promote road safety and efficient, effective road use. The Commission disagrees with commenters such as OTI/PK who state that allowing non-priority communications in the band could lead to underinvestment in safety-of-life applications. The Commission also disagrees with commenters such as Bosch that the Commission allocate a dedicated portion of the 30 megahertz to safety-of-life messages. Given that the Commission is prioritizing safety-of-life and public safety usage, the Commission expects that C–V2X operators will focus their efforts on applications within this range in order to effectively utilize the 30 megahertz of spectrum made available to them in this document. The Commission adopts C–V2X rules that reflect the existing DSRC message prioritization hierarchy as follows (in order of precedence): safety-

of-life, public safety, and non-priority communications.

Based on the record in the FCC's proceeding, the Commission believes that the communications prioritization hierarchy will ensure that the ITS spectrum is not being used for communications and applications that would impair the timely and reliable use of the spectrum for safety of life and public safety communications. As a practical matter, the Commission's decision to adopt a prioritization system for C–V2X communications and the high priority to which safety-of-life and public safety usage messages are entitled will limit the extent to which other type of applications (such as those supporting paid advertising and marketing messages) can be effectively developed and deployed. The Commission notes that the distinction between "commercial" and "non-commercial" remains undefined in the C–V2X context, and find limited information in the record to help the Commission craft a meaningful and readily applicable definition at this time. The Commission further notes that there is fundamental disagreement in the record as to whether such a distinction would be helpful or harmful to the realization of C–V2X's fundamental safety-related objectives. Finally, there is no "commercial" component to the definition the Commission adopts for C–V2X, which is limited to operations "related to the improvement of traffic flow, traffic safety, and other Intelligent Transportation System applications." Given the evolving nature of the C–V2X technology integration, the Commission will continue to assess how the C–V2X technology in the upper 30 megahertz develops and promotes safety-of-life applications and public safety services and whether a further change to the band usage would maximize the spectrum usage without compromising the intended safety purposes to be supported by the 5.9 GHz band.

The Commission also sees no reason to modify the structure by which C–V2X licenses are licensed under parts 90 and 95 of its rules, notwithstanding NCTA's contention that the value of the spectrum warrants use of an auction process unless the spectrum's use is restricted to safety-of-life services. As an initial matter, RSU/OBU licenses are issued on a non-exclusive basis and the Commission sees no need to revise that approach based on the record here. Because the Commission's RSU/OBU licensing process does not contemplate the acceptance of mutually exclusive applications, there is no basis to use an auction process. The Commission also

sees no reason to deviate from the history of this band that supported the prior DSRC licensing process. Under the Transportation Equity Act for the 21st Century, Public Law 105–178, 112 Stat. 107 section 5206(f) (1998), Congress directed the Commission to consider the spectrum needs for ITS. The subsequent allocation of the 5.9 GHz band was made based on a finding that DSRC applications would be a key element in meeting the nation’s transportation needs and improving highway safety. Additionally, in the *DSRC Report and Order*, 64 FR 66405 (November 26, 1999), the Commission decided against an auction requirement for ITS licensees, as users would already be subject to licensing and regulatory fees.

#### Channel Bandwidth

In the *FNPRM*, the Commission proposed a “light touch” regarding C–V2X channel bandwidth, essentially retaining the remaining portion of the ITS band plan in place for the legacy DSRC technology beyond the transition to C–V2X-based technology. In this regard, the Commission described “the existing ITS band plan” in the upper 30 megahertz as containing three, 10-megahertz DSRC channels: channels 180, 182, and 184 corresponding to 5.895–5.905 GHz, 5.905–5.915 GHz, and 5.915–5.925 GHz, respectively. Channels 180 and 182 can be combined into channel 181 (5.895–5.915 GHz) to provide a single 20-megahertz channel. In the *FNPRM*, the Commission sought comment on whether this band plan, specifying three 10-megahertz channels, *inter alia*, should apply to C–V2X operations. Specifically, the Commission asked whether the band plan should continue to accommodate combining two channels into a single 20-megahertz channel; whether channels 182 and 184 should be permitted to be combined into a single 20-megahertz channel; and whether all three channels should be permitted to be combined and used as a single 30-megahertz channel. The Commission further asked what consequences any of these channel bandwidths would have on C–V2X deployment and adoption and how a completely flexible band plan versus a prescriptive band plan would affect the ability of C–V2X technology to maximize efficient and effective use of the band. In this regard, the Commission urged commenters to provide sufficient detail regarding their preferred band plan and how such a plan could work with C–V2X and all other operational and technical rules being addressed, such as power limits and out-of-band emissions limits.

Some commenters state that the Commission should refrain from an overly prescriptive plan and instead allow C–V2X operators to utilize the upper 30 megahertz in a flexible manner. Other commenters state that C–V2X channelization issues should be determined by the transportation industry. Arguing for maximum flexibility, AT&T cites the continued evolution of C–V2X and states that the Commission should continue to allow “10 MHz channels and, through their aggregation, wider 20 MHz and 30 MHz channels.” The Utah Department of Transportation (UDOT) similarly echoes the desire for the band plan to continue to accommodate combining two 10-megahertz channels into a single 20-megahertz channel for C–V2X. The Motor Equipment and Manufacturers Association (MEMA) argues for retaining the existing ITS 30-megahertz band plan following the transition to C–V2X, saying that “by retaining separate channels within the ITS band, licensees can better support safety-of-life use cases which rely on more stringent requirements in terms of safety, security, prioritization, and resource availability.”

Given the Commission’s preference for a light touch to minimize disruption to ongoing transition activities, the Commission will continue to provide for 10-megahertz channel bandwidths, resulting in three channels: 5.895–5.905 GHz, 5.905–5.915 GHz, and 5.915–5.925 GHz, respectively. The Commission will allow users to combine the 10-megahertz channels into 20 megahertz contiguous channels or a single 30-megahertz channel without restriction, thus accommodating various ITS applications and services. Additionally, because the current channel number designations reflect the original DSRC band plan and related standards, such designations are not relevant to C–V2X and the Commission therefore do not assign channel number designations to the 10-megahertz bandwidths in the C–V2X rules adopted in this document. This band plan will provide maximum flexibility to enable the ITS industry, which is in the early stages of implementing C–V2X systems, to evolve and modify operations as necessary to use the band in the most efficient way possible to deliver safety applications to the American public.

#### Communications Zones

The 5.9 GHz band ITS spectrum is shared and licensed in non-exclusive geographic areas based on geo-political boundaries. To maximize the use within this shared spectrum, the Commission’s rules require that each registered RSU

designate its intended area of operation or “communications zone” and that such communications zones be the smallest necessary. Under the rules, a communications zone is defined as the service area associated with an individual fixed RSU. The communications zone radius is derived from the RSU equipment class specified in 47 CFR 90.375. In the *FNPRM*, the Commission proposed to retain the “communications zone” designations currently in the rules and require RSUs to specify their intended zone, believing this would maximize spectrum use among all users, continue to ensure that stations only cover their intended area, and provide opportunities for other licensees to install RSUs for other nearby areas without mutually interfering. The Commission asked commenters to address whether the current communications zone distance limits should be retained without change, modified, or eliminated. The Commission also sought comment on what effect any proposed changes would have on the ability for C–V2X to deploy new systems and continue operating into the future. The Commission also sought comment on whether it should continue to specify both transmitter output power and radiated power levels for communications zones.

In response, 5GAA states that, while DSRC technology theoretically was required to utilize RSU communications zones to manage congestion, use of communications zones did not occur in practice, and C–V2X does not require a similar mechanism for congestion control. 5GAA recommends revisions to 47 CFR 90.375 and 90.377 of the rules to remove references to communications zones and the associated output power limits. Furthermore, as noted in this document, the Bureaus recently granted waivers to parties requesting to deploy C–V2X operations in the upper 30-megahertz portion of the 5.9 GHz band (5.895–5.925 GHz) prior to adopting final C–V2X-based rules. Notably, C–V2X waiver applicants did not specify communications zones in their waiver requests and requested waiver of that rule section. Consequently, as part of those grants, the Bureaus permitted C–V2X RSUs and OBUs to operate with a 33 dBm EIRP and without transmitter output power limits. Waiver grant recipients are not required to designate communications zones or limit their transmitter output power or EIRP for designated communications zone sizes in their areas of operation.

The Commission finds that retaining the existing communications zone construct is unnecessary as ITS evolves

from DSRC to C-V2X technology. Based on information contained in the record indicating that DSRC operations did not utilize communications zones to manage congestion and that C-V2X operations do not require such a mechanism to manage congestion, along with the fact that no C-V2X waiver applicants requested communications zone designations, the Commission concludes that the communications zone definitions, designations, and associated reduced power limits are unnecessary to manage congestion control in C-V2X operations. Thus, the C-V2X rules adopted herein do not include communications zone requirements. See the Final Rules, 47 CFR 90.7, 90.375, 90.377 for these rule changes.

#### *C-V2X Technical Requirements*

##### Power and Antenna Height Limits for C-V2X Roadside Units (RSUs)

**Power.** The Commission's current DSRC rules specify the maximum radiated RSU power permitted on each channel, ranging generally from 23 dBm to 33 dBm, but permitting State and local government entities to radiate at higher levels on the control channel (channel 178) at up to 44.8 dBm and on the public safety priority channel (channel 184) at up to 40 dBm. In the *FNPRM*, the Commission sought comment on what RSU power levels should be associated with each communications zone, channel, and user under the modified ITS band plan, and whether the rules should continue to permit higher radiated power for State and local government entities or be consistent among all users as a way of maximizing spectrum use and controlling potential harmful interference between users. The Commission sought comment on whether RSU radiated power should be limited to 23 dBm as specified for some channels, 33 dBm as specified for others, or some other value, such as permitting higher power on a control channel; whether the rules should continue to specify both output power (power delivered to the input of the transmitting antenna) and radiated power levels for communications zone/channel combinations, or whether it would be more appropriate to specify only a radiated power limit, and specify power as a power density (power per unit of frequency, commonly known as power spectral density (PSD)) to normalize power for wider bandwidth channels, if the use of such channels is still permitted; and whether compliance with the limits should be determined with a root mean square (RMS) detector

(*i.e.*, average measurement) or with a peak detector.

5GAA recommends adopting a maximum 33 dBm EIRP without transmitter output power limits for C-V2X RSUs to promote more robust safety services and maximize the overall benefits of C-V2X safety services. A broad range of commenters support 5GAA's recommendation. Auto Innovators contends that raising the RSU EIRP limit in this manner would provide more flexibility to C-V2X operations. DENSO International America, Inc., on behalf of DENSO Corporation and its US affiliate (DENSO) supports a maximum 33 dBm EIRP for C-V2X RSUs to provide more protection from unlicensed device out-of-band emissions from the adjacent 5.850–5.895 GHz U-NII-4 band. 5G Americas supports 5GAA's recommendation for C-V2X RSU's in-band power limit because the proposal is consistent with 3GPP physical layer standards. In response to the *5.9 GHz NPRM* proposal, the National Telecommunications and Information Administration (NTIA) supported a maximum RSU EIRP limit of 33 dBm. In its comments on the Joint Waiver Parties C-V2X waiver request, which only specified the 5.905–5.925 GHz band, NTIA supported an RSU EIRP limit of 33 dBm over a 20-megahertz channel (33 dBm/20 MHz) at 5.905–5.925 GHz, and then, in its October 2020 Technical Report, an RSU EIRP limit of 33 dBm in the lower 10-megahertz channel (33 dBm/10 MHz) at 5.895–5.905 GHz. In its June 7, 2024 letter, NTIA further expressed support for the 33 dBm limit throughout the entire 30 megahertz. NTIA expressed agreement with the Commission's conclusion that requiring coordination for ITS RSU installations located within a section 90.371 coordination zone is the best approach to facilitate sharing with federal systems. The Commission received no comments on whether it would be appropriate to specify the EIRP as a PSD, or whether compliance with the EIRP limits should be evaluated using RMS or peak measurements.

After consideration of the record, the Commission adopts an EIRP PSD limit for C-V2X RSU operations, without any limit on the transmitter output power. Because the PSD limit will limit the overall EIRP, the Commission sees no need to also adopt a corresponding maximum EIRP limit. By specifying radiated power limits, without a transmitter output power limit, the Commission offers more flexibility for RSU stations to provide reliable service in a given coverage area, and enable licensees to select the most efficient and

effective equipment parameters to meet their coverage requirements, while protecting incumbent federal radiolocation stations from harmful interference. An EIRP PSD limit will keep the power even across the channel to avoid RSUs concentrating energy in a narrow bandwidth, thereby keeping the harmful interference potential low, and promoting more efficiency/higher data throughput by making the use of wider bandwidth channels more attractive when RSUs are transmitting. Although the Commission adopts these general limits, the Commission notes that if C-V2X RSUs are to be located within a coordination zone identified in 47 CFR 90.387(b), they must first be coordinated with NTIA. As recommended in the NTIA letter and supported in the record, the Commission adopts a 33 dBm/10 MHz, 33 dBm/20 MHz, and 33 dBm/30 MHz EIRP PSD limits for C-V2X RSUs. These power levels will enable ITS systems to operate over their intended service areas and protect federal incumbent radar systems for any RSU location outside the coordination zones.

Consistent with the measurement procedure for out-of-band emissions from unlicensed devices that operate in the 5.850–5.895 GHz (U-NII-4) and 5.925–6.425 GHz (U-NII-5) bands, the Commission permits compliance with the RSU EIRP limits to be determined using RMS measurements rather than requiring peak measurements. As the Commission has previously determined, RMS measurements are more appropriate to characterize a transmitter's operation because peak power may only be reached occasionally and for short periods of time, whereas RMS measurements represent the continuous power being generated from a device.

**Antenna height.** The Commission's rules restrict DSRC RSU antenna height to limit their signals within their designated zones to the extent practicable. RSU antenna height is currently limited to 8 meters at full power and may be as high as 15 meters with a corresponding power reduction. In the *FNPRM*, the Commission sought comment on whether the existing RSU antenna height limitations in the rules are justified, if there are any reasons to permit higher antenna heights, and whether licensees should continue to be required to reduce their power for higher RSU antenna heights as a way of controlling coverage area and reducing the potential for harmful interference. In the C-V2X waiver grants noted in this document, the Commission requires compliance with the existing RSU antenna height limitation requirements.

In its comments, 5GAA recommends that the Commission retain the existing RSU antenna height limitations and associated power reduction requirement for roadside antennas over 8 meters in height up to a maximum of 15 meters. DENSO contends that the power and antenna height issues require sufficient technical study and should be agreed to by all stakeholders because these technical requirements have a significant impact on V2X communication system performance and cost.

The Commission agrees with 5GAA that the existing limitations on roadside unit transmitting antenna height and associated power reduction requirement for RSU transmitting antennas over 8 meters in height up to a maximum of 15 meters should be retained in the Commission's rules. These limitations have been successful in enabling coexistence within the band and preventing harmful interference between ITS DSRC operations and to other incumbent operations in the 5.9 GHz band while also enabling sufficient signal coverage over the localized areas being served by each RSU. Retaining the roadside antenna height limits and the associated power reduction requirements for antennas more than 8 meters in height will continue to provide a known spectral environment for C-V2X systems so that network designers can create efficient systems while reducing the potential for harmful interference with other ITS licensees and incumbents in the 5.895–5.925 GHz band. Thus, the Commission retains the roadside unit antenna height limitations and associated power reduction requirement currently specified in the Commission's rules. In instances where the maximum RSU EIRP must be reduced due to an antenna height greater than 8 meters above the roadway surface, the RSU PSD limits must be equivalently reduced.

#### Power Limits for C-V2X On-Board Units (OBUs)

Under the Commission's part 95 rules, DSRC OBU transmitters operating in the 5.895–5.925 GHz band must comply with technical standard Institute of Electrical and Electronics Engineers (IEEE) 802.11p–2010 for wireless access in vehicular environments. For vehicular and portable on-board units, IEEE standard 802.11p–2010 specifies maximum transmitter output power (power supplied to the input of the transmitting antenna) limits ranging from 1 mW (0 dBm) to 760 mW (28.8 dBm), and maximum radiated power (EIRP) permitted on each channel ranging generally from 23 dBm to 33

dBm, but permitting State and local government entities to radiate at higher levels up to 44.8 dBm. In the *FNPRM*, the Commission sought comment on whether it should modify these power rules for application to C-V2X on-board units. The Commission proposed to limit C-V2X OBU transmitter output power to no more than 20 dBm and EIRP to no more than 23 dBm, believing these power levels to be appropriate for C-V2X vehicular and portable devices. The Commission sought comment on whether it should increase the OBU EIRP limit to 33 dBm and whether such an increase would affect the ability of C-V2X roadside units to co-exist with and protect federal radiolocation stations. Further, in this context, the Commission also reminded commenters of the need to simultaneously ensure that portable on-board units comply with the Commission's radiofrequency (RF) radiation exposure limits.

In its comments, 5GAA recommends increasing the C-V2X OBU EIRP limit to 33 dBm and eliminating the transmitter output power limit requirement. A broad range of commenters support this 5GAA recommendation. Ford Motor Company (Ford) stated "that the transmit power limit for OBUs should be specified only as an EIRP of 33 dBm RMS to provide broader coverage including emergency/public safety vehicles." Ford submits that "an increased EIRP limit (achieved through a combination of higher transmit power and antenna gain) will allow C-V2X-OBU equipped vehicles to communicate more effectively among each other and with C-V2X RSUs. This additional flexibility can be useful to first responders and public safety vehicles in providing higher reliability and range for their safety critical needs (e.g., traffic light preemption)." Auto Innovators similarly supports 5GAA's proposed power limits to provide more flexibility for C-V2X operations.

Fiat Chrysler Automobiles supports swift adoption of 5GAA's proposed C-V2X service rules to facilitate deployment in the U.S. 5G Americas supports 5GAA's proposed C-V2X technical rules, including the OBU in-band power limit, because it is consistent with 3GPP physical layer standards. OTI/PK agree that the Commission should adopt 5GAA's proposal and authorize on board units to operate at up to 33 dBm, if feasible. Dynamic Spectrum Alliance (DSA), a global, cross-industry alliance focused on increasing dynamic access to unused radio frequencies and unlicensed usage proponent, supports 5GAA's request for OBUs to operate with a 33 dBm EIRP.

In its reply comments, NCTA states that the 5GAA proposal would increase power tenfold without addressing NTIA guidance relating to the protection of radiolocation exclusion zones. Further, NCTA suggests that "if the Commission determines that C-V2X OBUs can operate at such high power (i.e., up to 33 dBm) without the need for exclusion zones, it should also permit U-NII-4 devices to operate using at least the same power level without exclusion zones, as they would pose a significantly lower risk of potential harmful interference to federal radars than similarly powered C-V2X devices."

Subsequent to the comment period, 5GAA modified its original support for a general 33 dBm EIRP limit by suggesting that the Commission's rules should allow the OBU EIRP limits that were granted in the C-V2X waivers i.e., OBUs operating in the 5.905–5.925 GHz band may operate at 33 dBm EIRP, but not exceed 27 dBm EIRP within  $\pm 5$  degrees of horizontal. 5GAA states that OBUs that seek to operate at up to 33 dBm within  $\pm 5$  degrees of horizontal can implement a geolocation function to reduce their power to the 27 dBm EIRP level when operating near federal radar sites that require protection.

In its Technical Report submitted in response to the *5.9 GHz NPRM*, NTIA determined that OBUs operating at 23 dBm EIRP or less would not need to be coordinated to protect federal operations in the 5.905–5.925 GHz band, thus providing an implied power limitation for non-NTIA coordinated ITS operations. Subsequently, in its comments on the *Joint Waiver Request* filing, NTIA supported a maximum 33 dBm OBU EIRP limit for the C-V2X operations in the 5.905–5.925 GHz band. However, to adequately protect the primary federal radiolocation services operating in the 5.9 GHz band during the period in which devices are operating under a waiver, NTIA requested that C-V2X OBUs be limited to 27 dBm EIRP within  $\pm 5$  degrees in elevation from the horizontal plane. The granted waivers limit OBU operations and power reduction conditions to the 5.905–5.925 GHz band, as requested by NTIA.

On June 7, 2024, NTIA submitted a letter to the Commission providing additional information in response to the *5.9 GHz FNPRM*. The NTIA letter addressed, among other things, the C-V2X OBU EIRP limits necessary for "the protection of federal radiolocation systems." As the NTIA's OBU proposal, which was similar to the most recent 5GAA proposal, differed from the Commission's initial *5.9 GHz FNPRM*

proposal, OET issued a Public Notice on June 11, 2024 inviting comment on the proposal. The NTIA proposal, as set forth in the OET Public Notice, would permit OBU devices to optionally incorporate geofencing techniques to protect federal radiolocation sites from harmful interference, while operating with higher power in otherwise unaffected areas. In sum, for geofenced devices, the Public Notice proposal would provide a 33 dBm EIRP PSD limit over the operating bandwidth in areas outside of coordination zones. Such devices would rely on a geofencing capability to limit the EIRP PSD to 23 dBm for operations that utilize the 5.895–5.905 GHz band within coordination zone areas and 27 dBm within  $\pm 5$  degrees of horizontal for coordination area operations that exclusively use the 5.905–5.925 GHz band. Geofenced devices operating in any portion of the 5.895–5.905 GHz band would have to abide by the “worse-case” 23 dBm limit if operating within the coordination zones. Devices that do not incorporate a geofencing capability would be required to meet the aforementioned restrictions at all locations.

Additionally, NTIA asks that the Commission adopt specific compliance requirements to ensure geofencing capabilities are properly implemented. In this regard, NTIA suggests that manufacturers implementing a geofencing capability would need to specifically demonstrate and certify compliance of the capability within the FCC’s equipment certification process specified in part 2 of the Commission’s rules. Further, in the event that interference protection requirements are changed, resulting in updated protection zones, the device should include a mechanism to update the OBUs with new information within a reasonable timeframe.

Comments filed in response to the Public Notice support the optional use of geofencing techniques. In its comments, the Intelligent Transportation Society of America (ITS America) states that it supports NTIA’s proposal related to optional geofencing capabilities and appreciates the flexibility that the proposal provides to C–V2X operations with regards to power levels. ITS America further states that updating geofencing parameters for deployed devices poses challenges and will require collaboration among government and industry stakeholders to successfully implement. Auto Innovators also supports the use of geofencing techniques to enable operations at less restrictive EIRP levels.

Support for geofencing techniques also came from additional commenters, including the 5G Automotive Association, the American Association of State Highway and Transportation Officials, the Institute of Transportation Engineers, and the Wireless Infrastructure Association. These commenters recommend the Commission define two distinct C–V2X channels, specifically focusing on the lower 10 megahertz channel at 5.895–5.905 GHz and the upper 20 megahertz channel at 5.905–5.925 GHz. Doing so, they say, will ensure interoperability within the band. These commenters also request that the Commission adopt rules requiring C–V2X operators to look to the NTIA website for information on the location of coordination zones. Both the Commission’s rules and the NTIA’s comments in this document specify 47 CFR 90.371(b) of the rules as the location of the coordination zones necessary to protect federal radiolocation systems. Lastly, these commenters also recommend including provisions in the rules that would require an OBU equipped with geofencing capability to lower its transmit EIRP to the appropriate level within 60 seconds of entering the power reduction zone.

Based on consideration of the record, the Commission adopts power limit rules for C–V2X OBUs that provide for optional use of “geofencing” techniques to allow the OBUs to operate at a higher radiated power in some locations. As the Commission has discussed, geofencing technique involves a radiofrequency device using a geolocation capability to determine whether its geographic coordinates are within a defined geographic area. In the instant case, “geofenced” OBU devices would incorporate a geolocation capability to be aware of the appropriate protection areas around federal radiolocation sites. The OBUs would be programmed with the existing 5.895–5.925 GHz band federal radiolocation sites’ coordination zones (specified by geographic coordinates and a radius) to ensure that they operate with lower power levels within the protected areas. OBU equipment that does not incorporate this geolocation capability would be required to comply with the more restrictive OBU EIRP limit.

Thus, reflective of NTIA’s June 7, 2024 recommendation and to allow the maximum flexibility possible for C–V2X OBU operations while still protecting incumbent federal radar operations in the band from harmful interference, the Commission will permit C–V2X OBUs with geolocation capabilities to operate with up to the maximum 33 dBm/10

MHz, 33 dBm/20 MHz, and 33 dBm/30 MHz EIRP PSD outside of a 47 CFR 90.387(b) coordination zone. Within the coordination zones, the following limits will apply: all operations that include use of the 5.895–5.905 GHz channel (*i.e.*, 5.895–5.905 GHz, 5.895–5.915 GHz, and 5.895–5.925 GHz) are limited to a 23 dBm EIRP over the channel bandwidth; all other channels (*i.e.*, 5.905–5.915 GHz, 5.915–5.925 GHz, 5.905–5.925 GHz operations) are limited to 33 dBm over the channel bandwidth, but must be reduced to 27 dBm over the channel bandwidth within  $\pm 5$  degrees of horizontal in elevation. OBUs not equipped with geofencing capability will be limited to the power levels specified for operation within the coordination zones. Manufacturers incorporating geofencing capability for an OBU will need to specifically demonstrate and certify that the device implements the capability in a manner that complies with the requirements discussed herein when seeking an FCC Equipment Certification under part 2 of the Commission’s rules. If geofencing locations and parameters are subsequently modified, a mechanism should be available such that OBUs can be updated with the new information.

The Commission further declines to implement recommendations from parties responding to the Public Notice that the Commission re-channelizes C–V2X operations into two distinct 10 megahertz and 20 megahertz channels. As stated in the channel bandwidth section above, the Commission is providing maximum flexibility to enable the ITS industry to evolve and modify operations as necessary to use the band in the most efficient way possible to deliver safety applications to the American public. The Commission also declines these parties’ recommendation that the Commission adopt rules requiring C–V2X operators obtain coordination zone information from NTIA’s website. However, the Commission does support industry and government collaboration on additional means of obtaining this information. To that end, the Commission notes that NTIA has developed machine readable KML files for download from its website that can be used by C–V2X devices for determining if they are within a coordination zone. The Commission also declines to implement a 60-second EIRP adjustment requirement after an OBU enters a coordination zone. The rules require C–V2X devices to comply with the power limits for their location and manufacturers must ensure that devices operate such that they comply with the rules for their location. Thus,



a specific requirement, such as a 60-second adjustment period is not necessary.

Although the rules the Commission adopts today permit OBUs to operate at up to 33 dBm (with geolocation capability), the Commission declines to grant similar power limits for U–NII–4 devices at this time. The *Second Report and Order* is focused solely on C–V2X operations in the 5.9 GHz band and issues related to U–NII–4 operations as contemplated in the FNPRM remain pending. Although NCTA suggested that the Commission should simultaneously address U–NII–4 outdoor rules and C–V2X service rules, the record has not been sufficiently developed to address the interference dynamics to licensed operations from the outdoor U–NII–4 operations, including the federal radar operations. Application of the *2023 Policy Statement* regarding the spectrum management will be considered when outdoor U–NII–4 operation is addressed.

#### Out-of-Band Emissions Limits for C–V2X Roadside Units and On-Board Units

Under the Commission’s part 90 and 95 rules, DSRC RSU and OBU transmitters operating in the 5.895–5.925 GHz band must comply with IEEE standard 802.11p–2010 for wireless access in vehicular environments. Under this standard, the applicable out-of-band emissions (OOBE) EIRP limits are:

- – 16.0 dBm/100 kHz at the channel edge;
- – 22.0 dBm/100 kHz at 1 megahertz from the channel edge;
- – 30.0 dBm/100 kHz at 10 megahertz from the channel edge; and
- – 40 dBm/100 kHz at 20 megahertz from the channel edge.

In the recently granted C–V2X waivers, the Bureaus require C–V2X RSUs and OBUs to comply with these IEEE 802.11p–2010 OOBE limits.

In the FNPRM, the Commission proposed that all C–V2X equipment limit OOBE measured at the antenna input (*i.e.*, conducted limits) to:

- – 29 dBm/100 kHz at the band edge;
- – 35 dBm/100 kHz at  $\pm 1$  megahertz from the band edge;
- – 43 dBm/100 kHz at  $\pm 10$  megahertz from the band edge; and
- – 53 dBm/100 kHz at  $\pm 20$  megahertz from the band edge.

The Commission also proposed to limit out-of-band radiated emissions to –25 dBm/100 kHz or less EIRP outside the 5.895 GHz and 5.925 GHz band edges. The Commission sought comment on these proposed limits and whether they would continue to be

appropriate for C–V2X equipment. Additionally, in the FNPRM, the Commission noted that 5GAA, in its comments to the *5.9 GHz NPRM*, recommended the following C–V2X conducted OOBE limits for RSUs and OBUs:

- – 16 dBm/100 kHz at  $\pm 1$  megahertz of the band edge;
- – 13 dBm/MHz at  $\pm 1$  megahertz to  $\pm 5$  megahertz of the band edge;
- – 16 dBm/MHz at  $\pm 5$  megahertz to  $\pm 30$  megahertz of the band edge; and
- – 28 dBm/MHz beyond 30 megahertz from the band edges.

The Commission sought comment on 5GAA’s proposed limits, asking whether it should adopt those alternative OOBE limits; what effect those relaxed limits would have on the ability to design and manufacture C–V2X equipment; how they would affect equipment cost; and whether the limits would ensure compatibility with adjacent U–NII devices in both the U–NII–4 (5.850–5.895 GHz) and U–NII–5 (5.925–6.425 GHz) bands, which are below and above the modified ITS band, respectively; and what effects those limits would have on adjacent band fixed services in the 6 GHz band. The Commission also sought comment on the measurement standards that should be associated with equipment approval for verifying that C–V2X equipment meets whatever OOBE limits it ultimately adopts.

In response, 5GAA recommends that the Commission provide more flexibility for C–V2X operations by adopting the OOBE limits for RSUs and non-public safety OBUs that it had previously proposed. Their proposed limits are less restrictive than the OOBE limits the Commission proposed in the FNPRM and specified in the C–V2X waiver grants. For RSUs and non-public safety OBUs, 5GAA recommends that the Commission adopt the following conducted OOBE limits:

- – 16 dBm/100 kHz at  $\pm 1$  megahertz of the band edge;
- – 13 dBm/MHz at  $\pm 1$  megahertz to  $\pm 5$  megahertz of the band edge;
- – 16 dBm/MHz at  $\pm 5$  megahertz to  $\pm 30$  megahertz of the band edge; and
- – 28 dBm/MHz beyond 30 megahertz from the band edges.

To help “improve the performance and speed the delivery of critical C–V2X services to fire trucks, police vehicles, ambulances, and other public safety vehicles,” 5GAA recommends that the Commission adopt the following conducted OOBE limits for OBUs operating from such vehicles:

- – 10 dBm/100 kHz at the band edge linearly decreasing to –26 dBm/100 kHz at  $\pm 20$  megahertz from the band edges;

- – 16 dBm/MHz within 20 to 30 megahertz from the upper band edge and within –30 megahertz to –20 megahertz from the lower band edge; and

- – 28 dBm/MHz beyond 30 megahertz from the band edges.

A broad range of commenters support 5GAA’s recommended C–V2X OOBE limits. 5G Americas supports adopting 5GAA’s recommended OOBE limits because they are consistent with 3GPP physical layer standards. Auto Innovators urges the Commission to adopt 5GAA’s recommended C–V2X OOBE limits, rather than the OOBE limits proposed in the FNPRM, because the more relaxed OOBE limits recommended by 5GAA would “facilitate both C–V2X’s evolution and more robust safety services for travelers” given V2X’s reduced spectrum allotment. CNH Industrial America LLC urges the Commission to provide slightly more relaxed OOBE limits for safety messages transmitted in “off-road” rural areas. Qualcomm expresses support for 5GAA’s recommended OOBE limits for RSUs and OBUs that operate in the upper 30-megahertz portion of the 5.9 GHz band. Fiat Chrysler Automobiles also supports 5GAA’s recommended C–V2X service rules to facilitate deployment in the U.S. Ford expresses its belief that the power and emissions rules 5GAA specified in its comments on the FNPRM are essential.

T-Mobile expresses support for technical rules for C–V2X operations that are based on 3GPP standards and potentially more permissive requirements if they are necessary to fully maximize C–V2X operations and are based on sound technical analyses. However, Autotalks urges the Commission not to adopt the 3GPP’s C–V2X OOBE values because they are too strict, would be challenging to implement, require a filter in most systems that would increase costs, and add an insertion loss that would decrease the system reception sensitivity and communication range. According to Autotalks, 5GAA’s recommended OOBE limits can be supported without adding a filter.

On the other hand, NCTA—The Internet & Television Association, argues that 5GAA’s push for relaxed OOBE limits for C–V2X operations in the 5.895–5.925 GHz band threatens to undermine Wi-Fi across the country; those OOBE limits could erode reliance on Wi-Fi in the new U–NII–4 band adjacent to C–V2X operations in the 5.895–5.925 GHz band. Instead of adopting 5GAA’s recommended limits, NCTA recommends adopting the C–V2X

OOBE limits the Commission proposed in the *FNPRM*, claiming those limits are sufficient for C-V2X operations and support compatibility with adjacent U-NII operations. NCTA argues that the Commission should reject 5GAA's proposed OOBE limits because C-V2X advocates have failed to describe the impact of these more permissive levels on the Commission's goal of making the U-NII-4 and U-NII-5 bands a success for Wi-Fi service. In response, 5GAA asserts that the Commission should dismiss NCTA's assertion, which 5GAA characterizes as baseless both because it is made without any technical support and because unlicensed broadband communications inside buildings should not be impacted, much less undermined, by C-V2X operations occurring on roadways.

Based on consideration of the record, the Commission adopts 5GAA's recommended set of OOBE limits for all RSUs and OBUs. The Commission declines to adopt different OOBE limits for public safety OBUs because there is not enough information in the record to justify how more relaxed OOBE limits for public safety OBUs can improve the performance of critical safety message delivery. Also, because of the wide variety of vehicles associated with public safety and uncertainty in whether they get outfitted with ITS equipment by the manufacturer or through aftermarket vehicle alterations, it would be administratively burdensome for entities within the supply chain, equipment integrators and installers, and agencies themselves to track different classes of OBUs for different vehicles. Furthermore, having a single class of OBUs would lower manufacturing costs as separate public safety and non-public safety models are not necessary to design and build. Thus, consistent with the limits recommended by 5GAA, the Commission adopts the following conductive OOBE limits outside of the authorized 5.895–5.925 GHz band for all RSUs and OBUs:

- –16 dBm/100 kHz within  $\pm 1$  megahertz of the band edges;
- –13 dBm/MHz within  $\pm 1$  megahertz to  $\pm 5$  megahertz of the band edges;
- –16 dBm/MHz within  $\pm 5$  megahertz to  $\pm 30$  megahertz of the band edges; and
- –28 dBm/MHz beyond 30 megahertz from the band edges.

The OOBE limits the Commission is adopting are consistent with OOBE limits the Commission has previously adopted to protect operations in adjacent bands from harmful interference. These limits will provide equipment manufacturers and C-V2X

operators with the flexibility to design, manufacture, and operate RSUs and OBUs, respectively, that will help ensure reliable service while protecting adjacent bands operations from harmful interference. Furthermore, the Commission does not expect that the OOBE limits will impact, much less undermine, unlicensed broadband communications inside buildings, as claimed by NCTA. The separation distance between 5.895–5.925 GHz band C-V2X transmitters operated on roadways and indoor unlicensed devices operating in frequency bands adjacent to the 5.895–5.925 GHz band, coupled with signal losses due to the angular antenna discrimination between the respective transmitting and receiving antennas, and building attenuation, will significantly reduce the power level of any C-V2X OOBE received by a receiver operating on an unlicensed basis.

#### *Technology Transition*

In order to complete the transition to C-V2X technology in a timely manner, in the *FNPRM*, the Commission proposed that all ITS operations in the 5.895–5.925 GHz band either convert to C-V2X or cease operating two years after the effective date of this document. The Commission indicated that two years would be a sufficient timeframe to allow ITS supply chains to amass C-V2X equipment and to allow the remaining DSRC incumbents to sunset DSRC technology. The Commission asked commenters for input on various timeline-related issues, including the state of C-V2X equipment development, whether supply chains could readily distribute such equipment, and whether vehicle manufacturers could install C-V2X equipment within the proposed two-year timeframe. Further, the Commission asked several questions related to the technical implications of C-V2X and DSRC operations occurring simultaneously in the 5.895–5.925 GHz band during the transition period. In this regard, the Commission asked whether any geographic or spectral separation requirements are necessary to ensure that simultaneous DSRC and C-V2X operations do not result in harmful interference and generally suggested that commenters address any transitional operation concerns in the context of any comments addressing technical parameters. Additionally, the Commission sought comment on how it should treat DSRC OBUs after the final transition date. The Commission asked commenters whether OBUs could be turned off by that date, whether they could be modified to become C-V2X compatible through hardware or

software updates, whether the potential for harmful interference existed if DSRC OBUs continued to communicate after the final transition date, and whether the Commission should take affirmative steps to notify the owners of vehicles equipped with DSRC OBUs of the transition.

Commenters generally expressed agreement with the Commission's proposal to mandate a two-year timeframe for DSRC incumbents to cease operations. In its comments, the UDOT states that the two-year timeframe is reasonable and adequate for most public agencies, but stipulates that the process to replace its existing DSRC system would make any timeframe shorter than two years unacceptable. Other commenters suggest that issues such as procurement, engineering, workforce training, testing, installation, and different budgetary concerns all necessitate a minimum timeframe of two years. In its reply comments, Hyundai states that an unreasonably short transition period could prematurely discontinue ongoing deployments and research projects or add an undue investment burden to entities that operate within tighter budgetary constraints. The Institute of Transportation Engineers, however, states that C-V2X testing and deployment should serve as the main influence on the length of the transition timeframe, rather than a strictly calendar view of the issue. MEMA suggests that, during the transition period, 20 megahertz should be dedicated exclusively to C-V2X, permitting DSRC operations on the remaining 10 megahertz until the phase out is complete. MEMA suggests this proposal would reduce the chances of harmful interference occurring between DSRC and C-V2X operations during the transition.

Given the time already elapsed since the Commission's decision to adopt C-V2X technology in the 5.9 GHz band, and the information provided in the record, the Commission believes that two years will provide sufficient time for incumbents, industry, and suppliers to sunset DSRC operations. The Commission believes this timeframe adequately allows public entities with longer budgetary timelines to procure compliant equipment and complete the sunset of DSRC. This two year period will commence on the **Federal Register** publication date of the rules adopted in the *Second Report and Order*. The Commission finds good cause to start the two-year DSRC sunset effective with this **Federal Register** publication of the *Second Report and Order*, rather than the effective date of

the rules, because the Commission has provided ample notice of the pending action and the intent to sunset DSRC operations. To effectuate this transition period, new licenses issued after the effective date of the final rules will only authorize C-V2X operations (not DSRC). Recognizing the Commission will need time to update Universal Licensing System (ULS) consistent with the new rules and policies here, the PSHSB and WTB are directed to issue licensing and filing guidance to licensees during the transition. Because of the lack of interoperability between DSRC and C-V2X operations and the issuance of multiple waivers allowing early C-V2X deployment, ceasing licensing of DSRC as of the effective date of these rules will prevent circumvention of the rules the Commission adopts here and ensure a timely transition. Moreover, the period of time between release of the *Second Report and Order* and the effective date of the rules provides additional time to finalize or modify any pending license applications. The Commission directs PSHSB and WTB to work with any prospective licensees with pending applications to ensure compliance with this timeframe. Existing licensees may use DSRC technology during the two-year transition period and may file RSU modification applications as necessary to continue operations during the transition period. The Commission delegates authority to PSHSB and WTB to issue a public notice, if necessary, detailing any filing requirements for licensees transitioning from DSRC to C-V2X operations. The Commission also makes conforming and non-substantive edits to the Commission's rules that are necessitated by the decision to sunset DSRC technology in this document.

Regarding waivers for deployment of C-V2X operations in the upper 30-megahertz portion of the 5.9 GHz band (5.895–5.925 GHz), the Commission hereby terminates those waivers issued prior to adopting final C-V2X-based technical rules upon the effective date of the final rules adopted herein. The Commission directs PSHSB and WTB to implement any necessary license modifications in accordance with final rules. As to equipment authorizations granted pursuant to the same waiver authority, the Commission notes that the power limits and out-of-band emissions limits permitted under waiver authority are within those that the Commission adopted herein, with the exception of optional geofencing. Thus, the Commission does not expect that such devices would cause harmful interference and they may continue to be operated and marketed under their

existing equipment authorizations if the authorization is received or in process (*i.e.*, all required information has been provided to a Telecommunication Certification Body) as of the effective date of the final rules adopted herein. However, if any such devices are subsequently modified, the device must comply with all currently applicable rules, including those rules adopted herein.

The Commission declines to dedicate 10 megahertz to DSRC operations during the transition, as MEMA suggests. Doing so would deprive C-V2X operators of the opportunity to utilize the full bandwidth made available through the FCC's proceeding during the transition, only to require additional modifications and filings at the end of the transition. Similarly, many existing DSRC devices would require modification in order to operate on a dedicated channel or cease operation on the C-V2X channels, an inefficient process given that any requirement would only be temporary. The Commission further notes that because most licensees provide the sole service within defined geographic areas, such licensees can provision their systems accordingly, if necessary, without a Commission imposed mandate. Thus, the Commission expects instances where C-V2X and DSRC operations may cause harmful interference to each other to be unlikely. In any event, if harmful interference does occur, under the Commission's rules, the later-filed licensee would be required to take any steps necessary to protect the incumbent.

The Commission recognizes that there are existing DSRC OBUs that have been deployed and are currently in operation, many of which are operated on a licensed-by-rule basis. Commenters urge the Commission not to dictate a particular method of compliance with any transition deadline for OBUs. For example, the UDOT states that it would not be possible to turn off these units remotely, nor would such an operation be acceptable. UDOT further states that all of its DSRC OBUs will be replaced with C-V2X OBUs before the final transition date, with the replacement taking place at night to minimize service disruptions. The Commission anticipates that other OBU operators will likely follow a similar replacement strategy to replace DSRC OBUs with C-V2X OBUs, or cease to use DSRC OBUs altogether, consistent with the cessation of DSRC RSU operations. The Commission expects that any remaining DSRC OBUs are unlikely to present significant interference concerns because the opportunities for such devices to communicate with DSRC

RSUs will be significantly reduced throughout the transition period and eventually eliminated, and the Commission believes that the continued operation of DSRC OBUs will be minimal. Consistent with stakeholders' calls for flexibility, while the Commission completes the sunset of DSRC operations, the Commission will provide flexibility in ceasing DSRC OBU operations. To assist licensees and operators, the Commission directs PSHSB and WTB to conduct outreach providing appropriate reminders and information to facilitate compliance with the DSRC sunset date.

Finally, with respect to administrative issues associated with ITS station licenses during this transition, in the *First Report and Order*, the Commission modified all ITS licenses by eliminating authorization to transmit in the 5.850–5.895 GHz band (lower 45 megahertz), thus limiting authority to channels in the 5.895–5.925 GHz band (upper 30 megahertz). The Commission also required those licensees to exit the lower 45 megahertz by a date certain and file a notification confirming their timely exit. Where licensees failed to timely transition out of the lower 45 megahertz and notify the Commission, those licenses terminated automatically (but operators may seek a new license if they wish to operate in the upper 30 megahertz). Today, the Commission adopts flexible channelization rules permitting any licensee to operate on any 10-megahertz channel (or aggregation of channels) in the upper band. In light of this flexible approach, going forward, the Commission will streamline its licensing mechanism to authorize each licensee to use the entire 30-megahertz band on all of its RSUs, following registration of those RSUs with the Bureaus.

#### *Other Spectrum for ITS*

The Commission sought comment on whether, notwithstanding its determination that current safety-of-life services can continue to operate using 30 megahertz of spectrum, it should consider allocating additional spectrum for ITS applications. In this regard, the Commission directed commenters to provide specific information indicating why existing spectrum resources were inadequate and what specific safety benefits would result from additional spectrum allocations for ITS applications. Given that the Commission designated C-V2X as the sole technology for 5.9 GHz ITS applications, it also sought comment on how additional spectrum could be used to leverage C-V2X and aid in its deployment.

Commenters generally support the prospect of the Commission providing additional spectrum for C–V2X deployment. Some, such as University of Michigan Transportation Research Institute (UMTRI) and UDOT, take specific issue with the Commission’s conclusion in the *First Report and Order* that the record supported that 30 megahertz of spectrum is sufficient to provide ITS basic safety functions, both current and those under consideration in the near future. The Institute of Transportation Engineers specifically states that it is “important to note that advanced C–V2X applications, including those that rely on collective perception messages (CPM), maneuver coordination messages (MCM), and personal safety messages (PSM) will likely be lost.” Multiple commenters echo this sentiment, collectively stating that if the Commission fails to provide additional mid-band spectrum for safety-of-life and advanced safety applications, the utility of C–V2X will be limited.

Many commenters that dispute the need for additional spectrum express concerns that ITS advocates seeking additional spectrum under the guise of providing safety-of-life services in fact intend to use the additional spectrum for commercial, non-safety applications and services. OTI/PK, in their reply comments, raise this exact concern, stating that the Commission should ensure that it does not “create incentives for the auto and mobile industries to preempt future safety mandates or needs by occupying ITS spectrum for commercial applications or services.”

Commenters, such as 5GAA and the Alliance for Automotive Innovation, request that the Commission identify an additional 40 megahertz of contiguous, mid-band spectrum for advanced V2X operations. Multiple commenters implore the Commission to convene a working group consisting of representatives from the U.S. DOT, NTIA, State departments of transportation, and the private sector to identify and validate additional spectrum for V2X services.

The Commission concluded in the *First Report and Order* that the 30 megahertz provided for ITS is sufficient to provide basic safety services consistent with the objectives for this technology and the Commission remains convinced that such spectrum is sufficient for that purpose without the need for additional spectrum. Moreover, given that the Commission is adopting a safety-of-life communication priority hierarchy in the FCC’s proceeding, the Commission is confident that this

spectrum will be preserved for those vital safety applications. As C–V2X deployments are only just beginning, the Commission encourages industry to fully test the bounds of the current spectrum allocation, the C–V2X technology itself, and the technical parameters the Commission prescribes in this document for its operation in order to reach a full consensus on whether there is a need for additional spectrum to support safety-of-life services. The Commission anticipates that industry testing, system optimization, and evaluation of the currently allotted spectrum will obviate the need for additional spectrum allocations to support basic safety services.

#### *Compensation or Reimbursement for Transition Costs*

In the *FNPRM*, the Commission sought comment on the possibility of compensating for transition costs, how such costs would be documented, and the process by which such compensation would be determined or implemented. The UDOT states that incumbent DSRC users must be compensated for the cost of replacing their systems and that it should be the manufacturers and users who benefit and profit from using unlicensed technologies in the lower 45 megahertz that should pay those transition costs. In comments considering the process by which such costs would be implemented, UDOT references the method by which microwave licensees in the 2 GHz band that were displaced in the mid-1990’s to make way for broadband Personal Communications Services were compensated.

The Institution of Transportation Engineers (ITE) makes similar arguments regarding compensating incumbents, stating that “[t]he funding source for these reimbursements could be covered by those who are gaining benefit from the newly available 45 MHz of spectrum.” The Alliance for Automotive Innovation also states that the Commission should require unlicensed new entrants to the band to compensate ITS incumbents for their reasonable relocation costs.

Other commenters, however, dispute the need for unlicensed entrants to reimburse DSRC incumbents. The National Cable and Telecommunications Association (NCTA) states that “it would be arbitrary and unreasonable for the Commission to require individual purchasers of unlicensed equipment or the broadband providers, companies, schools, libraries, and hospitals that provide Wi-Fi networks to pay existing

operators for access to the U–NII–4 band, particularly after DSRC licensees failed to make meaningful use of the band for 20 years.” NCTA further expounds on the lack of a reasonable mechanism to collect a levy on the unlicensed entities, as well as the lack of a legal structure to force payment.

OTI/PK also strongly oppose imposing a reimbursement mechanism. OTI/PK cite the Commission’s broad authority under 47 U.S.C. 316 to modify licenses under the public interest standard, as well as arguments against reimbursing incumbents for investing in failed technology, and the impracticality of assessing and collecting user fees from unlicensed users. The Wireless Internet Service Providers Association (WISPA) states that, in the instances cited by proponents of the third-party reimbursement mechanism, such as UDOT above, the Commission has never required unlicensed users to reimburse transitioning licensees.

The Commission agrees with NCTA, OTI/PK, and WISPA regarding reimbursement for DSRC incumbents. As the Supreme Court has held, “[n]o licensee obtains any vested interest in any frequency.” Moreover, Courts have repeatedly upheld the Commission’s broad authority under 47 U.S.C. 316 to modify licenses so long as it is in the public interest. 47 U.S.C. 304 and 316 grant the Commission broad authority to alter a spectrum license while also eliminating any claim that an incumbent licensee has on the spectrum it was originally allocated. Nothing in these provisions obligates the Commission to compensate a licensee when it exercises its authority to modify a license.

As the Commission stated in the *First Report and Order*, “existing DSRC licensees have recently begun to employ C–V2X on an experimental basis, telling the Commission that the transition to C–V2X is ongoing.” It was at this stage that the Commission determined that, due to the DSRC to C–V2X transition already being underway, including the cost of transitioning to C–V2X in the transition calculation was inappropriate. Further, in the *First Report and Order*, the Commission, acting in the public interest, modified all existing 5.9 GHz licenses to operate in the upper 30 megahertz. This action, coupled with the long timeline between the Commission’s issuing of the *FNPRM* and the two-year transition date adopted herein, should provide all licensees sufficient time to work within their normal budgetary cycles to procure C–V2X equipment in cases where they may have previously planned for DSRC equipment. Further, given the

Commission's broad authority to modify licenses when doing so would be in the public interest, the aforementioned ongoing transition to C-V2X currently underway, and the impracticality of levying fees on unlicensed entities and entrants, the Commission will not take action on reimbursement at this time.

**Cost-Benefit Analysis**

The rules that the Commission adopts in this document enable the repurposing and transition of ITS spectrum sought in the *First Report and Order*, in particular, by codifying C-V2X technical parameters in the Commission's rules, including band usage, message priority, channel bandwidth, and channelization building. The sources of benefits and costs of those outcomes have therefore not changed from those analyzed in the *First Report and Order*. In that analysis, the Commission concluded that the expected \$17.2 billion of benefits outweigh the costs. The benefits and costs of that analysis were calculated to occur over the time period 2022 to 2025. Because of the court challenges to, and petitions to reconsider, the *First Report and Order*, some of the benefits and costs that the Commission calculated could only be fully realized over a deferred time horizon, following the *Second Report and Order*. However, the Commission notes that demand for unlicensed use has remained strong in the intervening years, and the Commission finds that the benefits from the transition of ITS, while delayed, have not been reduced. Further, the *First Report and Order* recognized costs with regards to the ITS transition only, and the delay in implementation has likely reduced costs going forward as some efforts in the ITS transition have already occurred in the time since the release of the *First Report and Order*. The Commission therefore concludes that the benefits continue to outweigh costs for the *Second Report and Order*.

**Ordering Clauses**

Accordingly, it is ordered that, pursuant to the authority found in sections 1, 4(i), 301, 302, 303, 309, 316, and 332 of the Communications Act of 1934, as amended, 47 U.S.C. 151, 154(i), 301, 302, 303, 309, 316, and 332 that this *Second Report and Order* is hereby adopted.

It is further ordered that, except as otherwise provided below, the rules and requirements adopted herein are effective sixty days after the date of publication in the **Federal Register**.

It is further ordered that no Intelligent Transportation System license will be issued for Dedicated Short Range Communications (DSRC) systems after

the effective date of the Final Rules adopted herein. Existing licenses may be renewed as necessary following the effective date of the Final Rules but only for a period not to exceed the date two years after publication of Final Rules in the **Federal Register**. ITS licenses that reflect DSRC will cancel automatically on the date two years after publication of Final Rules in the **Federal Register**.

It is further ordered that the Commission's Office of the Secretary shall send a copy of the *Second Report and Order*, including the Final Regulatory Flexibility Analysis, to Congress and the Government Accountability Office pursuant to the Congressional Review Act, see 5 U.S.C. 801(a)(1)(A).

**List of Subjects**

*47 CFR Part 1*

Administrative practice and procedure, Communications, Radio, and Telecommunications.

*47 CFR Part 90*

Communications equipment, Radio, Reporting and recordkeeping requirements.

*47 CFR Part 95*

Communications equipment, Radio, Reporting and recordkeeping requirements.

*47 CFR Part 97*

Administrative practice and procedures, Communications, Communications equipment, Disaster assistance, Radio, Reporting and recordkeeping requirements, and Telecommunications.

Federal Communications Commission.

**Marlene Dortch**,  
*Secretary*.

For the reasons discussed in the preamble, the Federal Communications Commission amends 47 CFR parts 1, 90, 95, and 97 as follows:

**PART 1—PRACTICE AND PROCEDURE**

- 1. The authority citation for part 1 continues to read as follows:

**Authority:** 47 U.S.C. chs. 2, 5, 9, 13; 28 U.S.C. 2461 note; 47 U.S.C. 1754, unless otherwise noted.

- 2. Amend § 1.907 by revising the definition of “*Covered geographic licenses*” to read as follows:

**§ 1.907 Definitions.**

\* \* \* \* \*

*Covered geographic licenses.* Covered geographic licenses consist of the following services: 1.4 GHz Service (part

27, subpart I, of this chapter); 1.6 GHz Service (part 27, subpart J); 24 GHz Service and Digital Electronic Message Services (part 101, subpart G, of this chapter); 218–219 MHz Service (part 95, subpart F, of this chapter); 220–222 MHz Service, excluding public safety licenses (part 90, subpart T, of this chapter); 600 MHz Service (part 27, subpart N); 700 MHz Commercial Services (part 27, subparts F and H); 700 MHz Guard Band Service (part 27, subpart G); 800 MHz Specialized Mobile Radio Service (part 90, subpart S); 900 MHz Specialized Mobile Radio Service (part 90, subpart S); 900 MHz Broadband Service (part 27, subpart P); 3.45 GHz Service (part 27, subpart Q); 3.7 GHz Service (part 27, subpart O); Advanced Wireless Services (part 27, subparts K and L); Air-Ground Radiotelephone Service (Commercial Aviation) (part 22, subpart G, of this chapter); Broadband Personal Communications Service (part 24, subpart E, of this chapter); Broadband Radio Service (part 27, subpart M); Cellular Radiotelephone Service (part 22, subpart H); Citizens Broadband Radio Service (part 96, subpart C, of this chapter); Intelligent Transportation Systems Radio Service in the 5895–5925 MHz band, excluding public safety licenses (part 90, subpart M); Educational Broadband Service (part 27, subpart M); H Block Service (part 27, subpart K); Local Multipoint Distribution Service (part 101, subpart L); Multichannel Video Distribution and Data Service (part 101, subpart P); Multilateration Location and Monitoring Service (part 90, subpart M); Multiple Address Systems (EAs) (part 101, subpart O); Narrowband Personal Communications Service (part 24, subpart D); Paging and Radiotelephone Service (part 22, subpart E; part 90, subpart P); VHF Public Coast Stations, including Automated Maritime Telecommunications Systems (part 80, subpart J, of this chapter); Upper Microwave Flexible Use Service (part 30 of this chapter); and Wireless Communications Service (part 27, subpart D).

\* \* \* \* \*

**PART 90—PRIVATE LAND MOBILE RADIO SERVICES**

- 3. The authority citation for part 90 continues to read as follows:

**Authority:** 47 U.S.C. 154(i), 161, 303(g), 303(r), 332(c)(7), 1401–1473.

**Subpart A—General Information**

- 4. Amend § 90.7 by adding in alphabetical order the definition of

“Cellular Vehicle to Everything (C-V2X)”, and revising the definitions of “On-Board Unit (OBU)”, “Roadside Unit (RSU)”, and “Roadway bed surface” to read as follows:

**§ 90.7 Definitions.**

\* \* \* \* \*

*Cellular Vehicle to Everything (C-V2X).* The use of cellular radio techniques to transfer data between roadside and on-board units or between on-board units to perform operations related to the improvement of traffic flow, traffic safety, and other Intelligent Transportation System applications in a variety of environments. C-V2X systems may also transmit status and instructional messages related to the units involved.

\* \* \* \* \*

*On-Board Unit (OBU).* An On-Board Unit is an Intelligent Transportation System transceiver, operating in the 5895–5925 MHz band, that is normally mounted in or on a vehicle, or which in some instances may be a portable unit. An OBU can be operational while a vehicle or person is either mobile or stationary. The OBUs receive and transmit on one or more radio frequency (RF) channels. Except where specifically excluded, OBU operation is permitted wherever vehicle operation or human passage is permitted. The OBUs mounted in vehicles are licensed by rule under part 95 of this chapter and communicate with Roadside Units (RSUs) and other OBUs. Portable OBUs also are licensed by rule under part 95 of this chapter.

\* \* \* \* \*

*Roadside Unit (RSU).* A Roadside Unit is an Intelligent Transportation System transceiver, operating in the 5895–5925 MHz band, that is mounted along a road or pedestrian passageway. An RSU may also be mounted on a vehicle or is hand carried, but it may only operate when the vehicle or hand-carried unit is stationary. Furthermore, an RSU operating under this part is restricted to the location where it is licensed to operate. However, portable or hand-held RSUs are permitted to operate where they do not interfere with a site-licensed operation. An RSU broadcasts data to or exchanges data with OBUs. For DSRC-based RSUs operating in the Intelligent Transportation System until December 14, 2026, an RSU also provides channel assignments and operating instructions to OBUs in its communications zone, when required.

*Roadway bed surface.* For the Intelligent Transportation System Radio

Service, the road surface at ground level.

\* \* \* \* \*

**§ 90.7 [Amended]**

■ 5. Effective December 14, 2026, further amend § 90.7 by removing the definitions of “Communications zone,” “Dedicated Short Range Communication Service (DSRCS),” and the last sentence in the definition of “Roadside Units (RSU)”.

**Subpart B—Public Safety Radio Pool**

■ 6. Amend § 90.20 by revising paragraph (d)(86) to read as follows:

**§ 90.20 Public Safety Pool.**

\* \* \* \* \*

(d) \* \* \*

(86) Subpart M of this part contains rules for assignment of frequencies in the 5895–5925 MHz band.

\* \* \* \* \*

**Subpart C—Industrial/Business Radio Pool**

■ 7. Amend § 90.35 by revising paragraph (b)(91) to read as follows:

**§ 90.35 Industrial/Business Pool.**

\* \* \* \* \*

(b) \* \* \*

(91) Subpart M of this part contains rules for assignment of frequencies in the 5895–5925 MHz band.

\* \* \* \* \*

**Subpart G—Applications and Authorizations**

■ 8. Amend § 90.149 by revising paragraph (b) to read as follows:

**§ 90.149 License term.**

\* \* \* \* \*

(b) Non-exclusive geographic area licenses for Intelligent Transportation Systems radio service Roadside Units (RSUs) in the 5895–5925 MHz band under subpart M of this part will be issued for a term not to exceed ten years from the date of original issuance or renewal. The registration dates of individual RSUs (see §§ 90.375 and 90.389 of this part) will not change the overall renewal period of the single license.

■ 9. Effective December 14, 2026, further amend § 90.149 by revising the second sentence of paragraph (b) to read as follows:

**§ 90.149 License term.**

\* \* \* \* \*

(b) \* \* \* The registration dates of individual RSUs (see § 90.389 of this

part) will not change the overall renewal period of the single license.

■ 10. Amend § 90.155 by revising paragraph (i) to read as follows:

**§ 90.155 Time in which station must be placed in operation.**

\* \* \* \* \*

(i) Intelligent Transportation Systems radio service Roadside Units (RSUs) under subpart M of this part in the 5895–5925 MHz band must be placed in operation within 12 months from the effective date of registration (see §§ 90.375, 90.389 of this part) or the authority to operate the RSUs cancels automatically (see § 1.955 of this chapter). Such registration date(s) do not change the overall renewal period of the single license. Licensees must notify the Commission in accordance with § 1.946 of this chapter when registered units are placed in operation within their construction period.

■ 11. Effective December 14, 2026, further amend § 90.155 by revising the first sentence of paragraph (i) to read as follows:

**§ 90.155 Time in which station must be placed in operation.**

\* \* \* \* \*

(i) Intelligent Transportation Systems radio service Roadside Units (RSUs) under subpart M of this part in the 5895–5925 MHz band must be placed in operation within 12 months from the effective date of registration (see § 90.389 of this part) or the authority to operate the RSUs cancels automatically (see § 1.955 of this chapter).\* \* \*

**Subpart H—Policies Governing the Assignment of Frequencies**

■ 12. Amend § 90.175 by revising paragraph (j)(16) to read as follows:

**§ 90.175 Frequency coordinator requirements.**

\* \* \* \* \*

(j) \* \* \*

(16) Applications for licenses in the Intelligent Transportation Systems radio service (as well as registrations for Roadside Units) under subpart M of this part in the 5895–5925 MHz band.

\* \* \* \* \*

■ 13. Amend § 90.179 by revising paragraph (f) to read as follows:

**§ 90.179 Shared use of radio stations.**

\* \* \* \* \*

(f) Above 800 MHz, shared use on a for-profit private carrier basis is permitted only by SMR, Private Carrier Paging, LMS, and C-V2X and DSRCS licensees. See subparts M, P, and S of this part.

\* \* \* \* \*

■ 14. Effective December 14, 2026, further amend § 90.179 by revising the first sentence of paragraph (f) to read as follows:

**§ 90.179 Shared use of radio stations.**

\* \* \* \* \*

(f) Above 800 MHz, shared use on a for-profit private carrier basis is permitted only by SMR, Private Carrier Paging, LMS, and C-V2X licensees.\* \* \*

\* \* \* \* \*

**Subpart I—General Technical Standards**

■ 15. Effective December 14, 2026, amend § 90.210 by removing the entry of “5895–5925” and footnote 4 from Table 1.

■ 16. Effective December 14, 2026, amend § 90.213 by revising Table 1 heading and footnote 10 of paragraph (a) to read as follows:

**§ 90.213 Frequency stability.**

\* \* \* \* \*

**Table 1 to § 90.213—Minimum Frequency Stability**

\* \* \* \* \*

<sup>10</sup> For all equipment, frequency stability is to be specified in the station authorization.

\* \* \* \* \*

**Subpart M—Intelligent Transportation Systems Radio Service**

■ 17. Revise § 90.350 to read as follows:

**§ 90.350 Scope.**

The Intelligent Transportation Systems (ITS) radio service is for the purpose of integrating radio-based

technologies into the nation’s transportation infrastructure and developing and implementing the nation’s intelligent transportation systems. It includes the Location and Monitoring Service (LMS), Dedicated Short Range Communications Service (DSRCS), and Cellular Vehicle to Everything (C-V2X). Rules regarding eligibility for licensing, frequency availability, and any special requirements for services in the ITS radio service are set forth in this subpart.

(a) DSRCS stations must cease operations in the 5895–5925 MHz band no later than December 14, 2026. No applications for new DSRCS station licenses will be issued after February 11, 2025.

(b) DSRCS stations licensed as of February 11, 2025 may continue to operate and make modifications in accordance with the rules in this subpart until December 14, 2026.

■ 18. Effective December 14, 2026, amend § 90.350 by revising the introductory paragraph and deleting paragraphs (a) and (b), to read as follows:

**§ 90.350 Scope.**

The Intelligent Transportation Systems (ITS) radio service is for the purpose of integrating radio-based technologies into the nation’s transportation infrastructure and developing and implementing the nation’s intelligent transportation systems. It includes the Location and Monitoring Service (LMS) and Cellular Vehicle to Everything (C-V2X). Rules regarding eligibility for licensing, frequency availability, and any special requirements for services in the ITS

radio service are set forth in this subpart.

■ 19. In subpart M, add an undesignated center heading after § 90.350 to read as follows:

**Regulations Governing the Location and Monitoring Service (LMS)**

■ 20. Amend § 90.371 by revising the first sentence of paragraph (a) and the first sentence of paragraph (b) to read as follows:

**§ 90.371 Dedicated short range communications service.**

(a) These provisions pertain to systems in the 5895–5925 MHz band for Dedicated Short-Range Communications Service (DSRCS).\* \* \*

(b) DSRCS Roadside Units (RSUs) operating in the band 5895–5925 MHz shall not receive protection from Government Radiolocation services in operation prior to the establishment of the DSRCS station.\* \* \*

\* \* \* \* \*

■ 21. Amend § 90.377 by revising paragraph (b) to read as follows:

**§ 90.377 Frequencies available; maximum EIRP and antenna height, and priority communications.**

\* \* \* \* \*

(b) Frequencies available for assignment to eligible applicants within the 5895–5925 MHz band for RSUs and the maximum EIRP permitted for an RSU with an antenna height not exceeding 8 meters above the roadway bed surface are specified in the table below. Where two EIRP limits are given, the higher limit is permitted only for State or local governmental entities.

TABLE 1 TO PARAGRAPH (b)

Channel No.	Frequency range (MHz)	Max. EIRP (dBm)	Channel use
180 .....	5895–5905	23	Service Channel.
181 .....	5895–5915	23	Service Channel.
182 .....	5905–5915	23	Service Channel.
184 .....	5915–5925	33/40	Service Channel.

(1) An RSU may employ an antenna with a height exceeding 8 meters but not exceeding 15 meters provided the EIRP specified in the table above is reduced by a factor of 20 log(Ht/8) in dB where Ht is the height of the radiation center of the antenna in meters above the roadway bed surface. The EIRP is measured as the maximum EIRP toward the horizon or horizontal, whichever is greater, of the gain associated with the main or center of the transmission

beam. The RSU antenna height shall not exceed 15 meters above the roadway bed surface.

(2) Channels 180/182 may be combined to create a twenty-megahertz channel, designated Channel No. 181.

(3) Channel 184 is designated for public safety applications involving safety of life and property. Only those entities meeting the requirements of

§ 90.373(a) are eligible to hold an authorization to operate on this channel.\* \* \*

**§§ 90.370 through 90.384 [Removed]**

■ 22. Effective December 14, 2026, remove §§ 90.370 through 90.384.

■ 23. After § 90.384, add an undesignated center heading and §§ 90.386 through 90.394 to read as follows:

**Regulations Governing the Licensing and Use of Frequencies in the 5895–5925 MHz Band for Cellular Vehicle to Everything (C–V2X) Roadside Units (RSUs)**

**§ 90.386 Permitted frequencies.**

(a) Cellular Vehicle to Everything (C–V2X) Roadside Units (RSUs) are permitted to operate in the 5895–5925 MHz band.

(b) Frequencies in the 5895–5925 MHz band will not be assigned for the exclusive use of any licensee. Channels are available on a shared basis only for use in accordance with the Commission’s rules. All licensees shall cooperate in the selection and use of channels in order to reduce interference. This includes monitoring for communications in progress and any

other measures as may be necessary to minimize interference.

(c) Licensees of C–V2X RSUs suffering or causing harmful interference are expected to cooperate and resolve this problem by mutually satisfactory arrangements. If the licensees are unable to do so, the Commission may impose restrictions including specifying the transmitter power, antenna height and direction, additional filtering, or area or hours of operation of the stations concerned. The use of any channel at a given geographical location may be denied when, in the judgment of the Commission, its use at that location is not in the public interest; use of any such channel may be restricted as to specified geographical areas, maximum power, or such other operating

conditions, contained in this part or in the station authorization.

**§ 90.387 Cellular Vehicle to Everything (C–V2X).**

(a) These provisions pertain to Cellular Vehicle to Everything (C–V2X) Roadside Units (RSUs) operating in the 5895–5925 MHz band. C–V2X On-Board Units are authorized under part 95, subpart L of this chapter.

(b) C–V2X RSUs operating in the band 5895–5925 MHz shall not receive protection from Government Radiolocation services in operation prior to the establishment of the RSU. Operation of RSU stations within the radius centered on the locations listed in the table below, must be coordinated through National Telecommunications and Information Administration (NTIA).

TABLE 1 TO § 90.387(b)—COORDINATION LOCATIONS

Location	Latitude	Longitude	Coordination zone radius
Anclote, Florida	28–11–18	82–47–40	45
Cape Canaveral, Florida	28–28–54	80–34–35	47
Cape San Blas, Florida	29–40–31	85–20–48	47
Carabelle Field, Florida	29–50–38	84–39–46	36
Charleston, South Carolina	32–51–48	79–57–48	16
Edwards, California	34–56–43	117–54–50	53
Eglin, Florida	30–37–51	86–24–16	103
Fort Walton Beach, Florida	30–24–53	86–39–58	41
Kennedy Space Center, Florida	28–25–29	80–39–51	47
Key West, Florida	24–33–09	81–48–28	12
Kirtland AFB, New Mexico	34–59–51	106–28–54	15
Kokeepark, Hawaii	22–07–35	159–40–06	5
MacDill, Florida	27–50–37	82–30–04	47
NV Test Training Range, Nevada	37–18–27	116–10–24	186
Patuxent River, Maryland	38–16–55	76–25–12	6
Pearl Harbor, Hawaii	21–21–17	157–57–51	16
Pillar Point, California	37–29–52	122–29–59	36
Poker Flat, Alaska	65–07–36	147–29–21	13
Port Canaveral, Florida	28–24–42	80–36–17	19
Port Hueneme, California	34–08–60	119–12–24	24
Point Mugu, California	34–07–17	119–09–1	18
Saddlebunch Keys, Florida	24–38–51	81–36–22	29
San Diego, California	32–43–00	117–11–00	11
San Nicolas Island, California	33–14–47	119–31–07	195
Tonopah Test Range, Nevada	37–44–00	116–43–00	2
Vandenberg, California	34–34–58	120–33–42	55
Venice, Florida	27–04–37	82–27–03	50
Wallops Island, Virginia	37–51–23	75–30–41	48
White Sands Missile Range, New Mexico	32–58–26	106–23–43	158
Yuma, Arizona	32–54–03	114–23–10	2

(c) NTIA may authorize additional station assignments in the federal radiolocation service and may amend, modify, or revoke existing or additional assignments for such service. Once a federal assignment action is taken, the Commission’s Universal Licensing System (ULS) database will be updated accordingly and the list in paragraph (b) of this section will be updated as soon as practicable.

**§ 90.388 Eligibility.**

The following entities are eligible to hold an authorization to operate C–V2X RSUs:

(a) Any territory, possession, State, city, county, town or similar governmental entity.

(b) Any entity meeting the eligibility requirements of §§ 90.20, 90.33 or 90.35.

**§ 90.389 RSU license areas and registrations.**

(a) Roadside Units (RSUs) in the 5895–5925 MHz band are licensed on the basis of non-exclusive geographic areas. Governmental applicants will be issued a geographic area license based on the geo-political area encompassing the legal jurisdiction of the entity. All other applicants will be issued a geographic area license for their proposed area of operation based on county(s), State(s) or nationwide.



(b) Applicants who are approved in accordance with FCC Form 601 will be granted non-exclusive licenses for the channel(s) corresponding to their intended operations (see § 90.386). Such licenses serve as a prerequisite of registering individual RSUs located within the licensed geographic area described in paragraph (a) of this section. Licensees must register each RSU in the Universal Licensing System (ULS) before operating such RSU. RSU

registrations are subject, inter alia, to the requirements of § 1.923 of this chapter as applicable (antenna structure registration, environmental concerns, international coordination, and quiet zones). Additionally, RSUs at locations subject to NTIA coordination (see § 90.387(b)) may not begin operation until NTIA approval is received. Registrations are not effective until the Commission posts them on the ULS. It is the licensee's responsibility to delete

from the ULS registration database any RSUs that have been discontinued.

(c) Licensees must operate each C-V2X RSU in accordance with the Commission's rules and the registration data posted on the ULS for such C-V2X RSU.

**§ 90.390 Channels and priority communications.**

(a) *Channels.* C-V2X may operate on the following band segments:

TABLE 1 TO PARAGRAPH (a)

10-megahertz channels:	20-megahertz channels:	30-megahertz channel:
5895–5905 MHz .....	5895–5915 MHz .....	5895–5925 MHz.
5905–5915 MHz .....	5905–5925 MHz.	

(b) *Safety/public safety priority.* The following access priority governs all C-V2X operations:

(1) Communications involving the safety of life have access priority over all other C-V2X communications;

(2) C-V2X communications involving public safety have access priority over all other C-V2X except those communications described in (b)(1) of this section. Roadside Units (RSUs) operated by State or local governmental entities are presumptively engaged in public safety priority communications.

(c) *Non-priority communications.* C-V2X communications not listed in paragraph (b) of this section, are non-priority communications.

(1) If a dispute arises concerning non-priority communications, the licensee of the later-registered RSU must accommodate the operation of the early registered RSU, *i.e.*, interference protection rights are date-sensitive, based on the date that the RSU is first registered (see § 90.389) and the later-registered RSU must modify its operations to resolve the dispute in accordance with paragraph (c)(2) of this section.

(2) For purposes of this paragraph (c), objectionable interference will be considered to exist when the Commission receives a complaint and the difference in signal strength between the earlier-registered RSU and the later-registered RSU is 18 dB or less (co-channel). Later-registered RSUs causing objectionable interference must correct the interference immediately unless written consent is obtained from the licensee of the earlier-registered RSU.

**§ 90.391 Maximum EIRP and antenna height.**

(a) C-V2X licensees must limit RSU equivalent isotropically radiated power (EIRP) to 33 dBm. This limit applies to

any operation within the 5895–5925 MHz band as follows:

- (1) 33 dBm/10 MHz EIRP;
- (2) 33 dBm/20 MHz EIRP; and
- (3) 33 dBm/30 MHz EIRP.

(b) For purposes of this section, the EIRP is root mean squared (RMS) measured as the maximum EIRP toward the horizon or horizontal, whichever is greater, of the gain associated with the main or center of the transmission beam.

(c) The radiation center of an RSU antenna shall not exceed 8 meters above the roadway bed surface, except that an RSU may employ an antenna with a height exceeding 8 meters but not exceeding 15 meters provided the EIRP specified in paragraph (a) of this section is reduced by a factor of  $20 \log(Ht/8)$  in dB where Ht is the height of the radiation center of the antenna in meters above the roadway bed surface. The RSU antenna height must not exceed 15 meters above the roadway bed surface.

**§ 90.392 C-V2X emissions limits.**

C-V2X Roadside Units (RSUs) must comply with the following out-of-band emissions limits.

(a) Conducted limits measured at the antenna input must not exceed:

- (1) -16 dBm/100 kHz within ±1 megahertz of the band edges;
  - (2) -13 dBm/MHz within ±1 megahertz to ±5 megahertz of the band edges;
  - (3) -16 dBm/MHz within ±5 megahertz to ±30 megahertz of the band edges; and
  - (4) -28 dBm/MHz beyond 30 megahertz from the band edges
- (b) [Reserved]

**§ 90.393 RSU sites near the U.S./Canada or U.S./Mexico border.**

Until such time as agreements between the United States and Canada or the United States and Mexico, as

applicable, become effective governing border area use of the 5895–5925 MHz band, authorizations to operate Roadside Units (RSUs) are granted subject to the following conditions:

(a) RSUs must not cause harmful interference to stations in Canada or Mexico that are licensed in accordance with the international table of frequency allocations for Region 2 (see § 2.106 of this chapter) and must accept any interference that may be caused by such stations.

(b) Authority to operate RSUs is subject to modifications and future agreements between the United States and Canada or the United States and Mexico, as applicable.

**§ 90.395 [Redesignated as § 90.384]**

■ 24. Redesignate § 90.395 as § 90.384.

**Subpart N—Operating Requirements**

■ 25. § 90.421 is amended by adding paragraph (d) to read as follows:

**§ 90.421 Operation of mobile station units not under the control of the licensee.**

\* \* \* \* \*

(d) C-V2X On-Board Units licensed by rule under part 95 of this chapter may communicate with any C-V2X roadside unit authorized under this part or any licensed commercial mobile radio service station as defined in part 20 of this chapter.

■ 26. Amend § 90.425 by revising paragraph (d)(10) to read as follows:

**§ 90.425 Station identification.**

\* \* \* \* \*

(d) \* \* \*

(10) It is a Roadside Unit (RSU) in an Intelligent Transportation System operating in the 5895–5925 MHz band.

## PART 95—PERSONAL RADIO SERVICES

■ 27. The authority citation for part 95 continues to read as follows:

**Authority:** 47 U.S.C. 154, 303, 307.

■ 28. Amend subpart L by revising the subpart heading to read as follows:

### Subpart L—Intelligent Transportation Systems (ITS) On-Board Units (OBUs) in the 5895–5925 MHz Band

■ 29. Revise § 95.3101 to read as follows:

#### § 95.3101 Scope.

This subpart contains rules that apply only to ITS On-Board Units (OBUs) transmitting in the 5895–5925 MHz frequency band. ITU Roadside Units (RSUs) are authorized under part 90, subpart M of this chapter.

■ 30. Amend § 95.3103 by:

- a. Revising the section heading.
- b. Adding in alphabetical order the definition of “*Cellular Vehicle to Everything (C-V2X)*”;
- c. Revising the definition of “*Dedicated Short-Range Communications Services (DSRCS)*”;
- d. Adding in alphabetical order definitions of “*Geofenced Onboard Unit*” and “*Geofencing*” and
- e. Revising the definition of “*Onboard Unit (OBU)*”.

The additions and revisions read as follows:

#### § 95.3103 Definitions.

*Cellular Vehicle to Everything (C-V2X)*. See § 90.7 of this chapter.

*Dedicated Short-Range Communications Services (DSRCS)*. See § 90.7 of this chapter.

*Geofenced Onboard Unit*. An OBU that incorporates geofencing to protect the appropriate areas around federal radiolocation sites currently enumerated in 47 CFR 90.387(b) by reducing power within those areas. Such OBUs programmed with information about these sites have the option of operation under the transmit power limits set forth in section 95.3404 of this subpart.

*Geofencing*. For the purposes of this subpart, geofencing is used to create a virtual boundary around a physical location by enabling a radiofrequency device using a geolocation capability to determine whether its geographic coordinates are within a defined geographic area.

*On-Board Unit (OBU)*. See § 90.7 of this chapter.

\* \* \* \* \*

■ 31. Add an undesignated center heading after § 95.3103 to read as follows:

### Regulations Governing the Use of Frequencies in the 5895–5925 MHz Band for Dedicated Short-Range Communications Services (DSRCS) On Board Units (OBUs)

\* \* \* \* \*

#### § 95.3105 through 95.3189 [Removed]

■ 32. Effective December 14, 2026, further amend subpart L, by removing the centered heading “Regulations Governing the Use of Frequencies in the 5895–5925 MHz Band for Dedicated Short-Range Communications Services (DSRCS) On Board Units (OBUs)” and §§ 95.3105 through 95.3189.

■ 33. After § 95.3189, add the undesignated center heading and §§ 95.3201 through 95.3205 to read as follows:

### Regulations Governing the Use of Frequencies in the 5895–5925 MHz Band for Cellular Vehicle to Everything (C-V2X) On Board Units (OBUs)

#### § 95.3201 Permissible uses.

C-V2X OBUs may transmit signals to other C-V2X OBUs and to C-V2X Roadside Units (RSUs) authorized under part 90 of this chapter or any licensed commercial mobile radio service station as defined in part 20 of this chapter.

#### § 95.3202 OBU transmitter certification.

(a) Each C-V2X OBU that operates or is intended to operate in the 5895–5925 MHz band must be certified in accordance with this subpart and subpart J of part 2 of this chapter.

(b) A grant of equipment certification for this subpart will not be issued for any C-V2X OBU transmitter type that fails to comply with all of the applicable rules in this subpart.

#### § 95.3203 OBU frequencies.

C-V2X OBUs are permitted to operate in the 5895–5925 MHz band.

#### § 95.3204 OBU transmit power limit.

(a) The following power limits apply for OBUs without a geofencing capability at all locations and for OBUs with a geofencing capability when operating within any coordination zone specified in § 90.387(b) of this chapter:

- (1) 10 MHz channel (5895–5905 MHz): 23 dBm/10 MHz EIRP;
- (2) 10 MHz channel (5905–5915 MHz): 33 dBm/10 MHz EIRP, reduced to 27 dBm within  $\pm 5$  degrees of horizontal;
- (3) 10 MHz channel (5915–5925 MHz): 33 dBm/10 MHz EIRP, reduced to 27 dBm within  $\pm 5$  degrees of horizontal;
- (4) 20 MHz channel (5895–5915 MHz): 23 dBm/20 MHz EIRP;
- (5) 20 MHz channel (5905–5925 MHz): 33 dBm/20 MHz EIRP, reduced to

27 dBm within  $\pm 5$  degrees of horizontal; and

(6) 30 MHz channel: 23 dBm/30 MHz EIRP.

(b) The following power limits apply to OBUs with a geofencing capability when operating at locations outside any coordination zone specified in § 90.387(b) of this chapter:

- (1) 10 MHz channel (5895–5905 MHz): 33 dBm/10 MHz EIRP;
- (2) 10 MHz channel (5905–5915 MHz): 33 dBm/10 MHz EIRP;
- (3) 10 MHz channel (5915–5925 MHz): 33 dBm/10 MHz EIRP;
- (4) 20 MHz channel (5895–5915 MHz): 33 dBm/20 MHz EIRP;
- (5) 20 MHz channel (5905–5925 MHz): 33 dBm/20 MHz EIRP; and
- (6) 30 MHz channel: 33 dBm/30 MHz EIRP.

(c) For purposes of this section, the EIRP is root mean squared (RMS) measured as the maximum EIRP toward the horizon or horizontal, whichever is greater, of the gain associated with the main or center of the transmission beam.

(d) For purposes of this section, a portable unit is a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user.

#### § 95.3205 Unwanted emissions limits.

(a) C-V2X OBUs must comply with the following out-of-band emissions limits. Conducted emissions limits measured at the antenna input shall not exceed:

- (1) – 16 dBm/100 kHz within  $\pm 1$  megahertz of the band edges;
- (2) – 13 dBm/MHz within  $\pm 1$  megahertz to  $\pm 5$  megahertz of the band edges;
- (3) – 16 dBm/MHz within  $\pm 5$  megahertz to  $\pm 30$  megahertz of the band edges; and
- (4) – 28 dBm/MHz beyond 30 megahertz from the band edges.

## PART 97—AMATEUR RADIO SERVICE

■ 34. The authority citation for part 97 continues to read as follows:

**Authority:** 47 U.S.C. 151–155, 301–609, unless otherwise noted.

■ 35. Amend § 97.303 by revising the last sentence of paragraph (r)(2) to read as follows:

#### § 97.303 Frequency sharing requirements.

\* \* \* \* \*

(r) \* \* \*

(2) \* \* \* In the United States, the use of mobile service is restricted to

operations in the Intelligent Transportation System radio service.

\* \* \* \* \*

[FR Doc. 2024–28980 Filed 12–12–24; 8:45 am]

BILLING CODE 6712–01–P

## FEDERAL COMMUNICATIONS COMMISSION

### 47 CFR Parts 2 and 30

[ET Docket No. 21–186; FCC 24–124; FR ID 267422]

### Modifying Emissions Limits for the 24.25–24.45 GHz and 24.75–25.25 GHz Bands

**AGENCY:** Federal Communications Commission.

**ACTION:** Final rule.

**SUMMARY:** In this document, the Federal Communications Commission (Commission) revises the Commission’s rules for the 24.25–24.45 GHz and 24.75–25.25 GHz bands (collectively, the 24 GHz band) to implement certain decisions made in the World Radiocommunication Conference held by the International Telecommunication Union (ITU) in 2019 (WRC–19). Specifically, the Commission aligns part 30 of the Commission’s rules for mobile operations in these frequencies with the Resolution 750 limits adopted at WRC–19 to protect the passive 23.6–24.0 GHz band from unwanted emissions on the timeframes adopted at WRC–19.

**DATES:** *Effective date:* This rule is effective January 13, 2025.

**FOR FURTHER INFORMATION CONTACT:** Simon Banyai of the Wireless Telecommunications Bureau, Broadband Division, at 202–418–1443 or by email to [Simon.Banyai@fcc.gov](mailto:Simon.Banyai@fcc.gov).

**SUPPLEMENTARY INFORMATION:** This is a summary of the Commission’s *Report and Order* in ET Docket No. 21–186; FCC 24–124; adopted on November 27, 2024 and released on December 2, 2024. The full text of this document is available at <https://docs.fcc.gov/public/attachments/FCC-24-124A1.pdf>.

*Regulatory Flexibility Act.* The Regulatory Flexibility Act of 1980, as amended (RFA), requires that an agency prepare a regulatory flexibility analysis for notice-and-comment rulemakings, unless the agency certifies that “the rule will not, if promulgated, have a significant economic impact on a substantial number of small entities.” Accordingly, the Commission has prepared a Final Regulatory Flexibility Analysis (FRFA) concerning the possible impact of the rule changes contained in this *Report and Order* on

small businesses. The FRFA is set forth in the back of this document.

*Paperwork Reduction Act.* This document does not contain new or modified information collection requirements subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104–13. In addition, therefore, it does not contain any new or modified information collection burden “for small business concerns with fewer than 25 employees,” pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107–198, see 44 U.S.C. 3506(c)(4).

*Congressional Review Act.* The Commission has determined, and the Administrator of the Office of Information and Regulatory Affairs, Office of Management and Budget, concurs, that this rule is non-major under the Congressional Review Act, 5 U.S.C. 804(2). The Commission will send a copy of this Report & Order to Congress and the Government Accountability Office pursuant to 5 U.S.C. 801(a)(1)(A).

*People With Disabilities.* To request materials in accessible formats for people with disabilities (braille, large print, electronic files, audio format), send an email to [fcc504@fcc.gov](mailto:fcc504@fcc.gov) or call the Consumer and Governmental Affairs Bureau at (202) 418–0530 (voice).

## Synopsis

### I. Background

1. The 23.6–24.0 GHz band is allocated to several passive scientific and research services, including the Earth Exploration Satellite Service (EESS) (passive), on a primary basis. EESS utilizes passive sensors located on satellites to measure the power level of naturally occurring radio emissions from water vapor and cloud liquid water molecules in the atmosphere, which are critical measurements for climatology and weather forecasting. Because naturally occurring radio emissions in the 23.6–24.0 GHz band are very weak, the passive sensors that measure them are sensitive and vulnerable to interference.

2. Observations made by EESS sensors operating in the 23.6–24.0 GHz band are essential for meteorological applications. The National Oceanic and Atmospheric Administration (NOAA) uses EESS to take measurements considered vital to the accuracy and timeliness of weather forecasting, including hurricane and tornado warnings, and the National Aeronautics and Space Administration (NASA) also operates passive EESS systems in the band to conduct climatological science. Additionally, EESS passive sensors aid

EESS active instruments that use radar on satellites to measure ocean topography, sea ice, and precipitation by measuring total atmospheric water vapor and correcting the “refraction-induced path delay in the radar signal.” The 23.6–24.0 GHz band has been used for passive sensor observations for a considerable length of time and has generated valuable long-term climate data records.

3. The Commission first authorized service in the 24.25–24.45 GHz and 25.05–25.25 GHz bands in 1997, when it transitioned the Digital Electronic Messaging Service (DEMS) to these bands from the 18 GHz band. In 2000, the Commission adopted competitive bidding and service rules for 24.25–24.45 GHz and 25.05–25.25 GHz bands and created a 24 GHz Service. This 24 GHz Service had a total of 176 Economic Areas (EAs) or EA-like service areas. In 2004, the Commission held Auction 56, in which it made 880 24 GHz Service licenses available. Only seven of the 880 24 GHz Service licenses were sold. As of 2017, there were 33 active DEMS licenses in these bands. While the former DEMS licenses were converted to Upper Microwave Flexible Use Services (UMFUS) licenses, they were subsequently cancelled.

4. In 2016, the Commission adopted licensing and technical rules for UMFUS services in the 27.5–28.35 GHz band, the 37.6–38.6 GHz band, and the 38.6–40 GHz band. Expanding on the 2016 efforts to open high-frequency spectrum, in 2017, the Commission authorized the 24 GHz band for UMFUS, and generally applied the same licensing and technical rules to UMFUS in the 24 GHz band that it applied to UMFUS in other upper microwave bands. The UMFUS rules allow licensees flexibility to the services they will deploy and the architecture of their networks. Under these rules, licensees are able to deploy mobile services, but they also may deploy fixed point-to-point and point-to-multipoint systems. Among other things, the UMFUS rules specify that emissions outside of a licensee’s assigned frequency block must be limited to –13 dBm/MHz.<sup>1</sup> In its decision authorizing UMFUS in the 24 GHz band, the Commission noted ongoing ITU studies to establish

<sup>1</sup> See 47 CFR 30.203(a). In the bands immediately outside and adjacent to the licensee’s frequency block, having a bandwidth equal to 10 percent of the channel bandwidth, the conductive power or the total radiated power of any emission shall be –5 dBm/MHz or lower. *Id.* As the 23.6–24 GHz passive band is 250 megahertz away from the UMFUS bands, the –5 dBm/MHz does not apply within that passive band for UMFUS licensees.