5.9 GHz Second Report and Order

Frequently Asked Questions

What, at a high level, did the 5.9 GHz Second Report and Order (Second R&O) do?

The Second R&O adopted the technical rules needed to transition 5.9 GHz Intelligent Transportation Service (ITS) operations from DSRC to C-V2X. It codified C-V2X technical parameters including band usage, message priority, channel bandwidth, power and out-of-band emissions limits for C-V2X onboard units (OBUs) and roadside units (RSUs), and antenna height limits for RSUs. Notably, the Second R&O adopted power limit rules for C-V2X OBUs that provide for voluntary use of geofencing to allow the OBUs to operate at higher power levels within coordination zones. It also established a two-year timeline for sunsetting the use of DSRC-based technology.

When do the new rules take effect?

The new rules take effect on February 11, 2025.

Where can I get a copy of the Second R&O?

See the FCC website link here.

Who can deploy C-V2X under the Second R&O?

Once the new rules take effect on February 11, 2025, anyone can deploy authorized C-V2X RSUs and OBUs consistent with the technical rules that were adopted in the Second R&O, with the caveat that operation of RSUs (but not OBUs) requires an individual FCC license.

How can I get C-V2X equipment authorized?

Appendix A to this FAQ document explains the equipment authorization process.

How do I get a C-V2X license?

Licenses to operate OBUs are granted by rule and require no action on your part. Appendix B explains in detail how to secure a license to operate RSUs and to register individual RSU locations.

What equipment can I use to provide C-V2X?

You can use RSUs and OBUs that have been authorized by the FCC pursuant to the Second R&O.

Are there established standards for channelization?

Industry is deploying using the upper 20 MHz channel. The FCC did not specify channelization requirements for the 30 megahertz dedicated to C-V2X, but rather provided 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—which users may combine into 20- or 30-megahertz channels. The industry, however, is currently deploying in the upper 20 MHz and will use the lower 10 MHz once standards are complete.

There is industry consensus to deploy C-V2X services in North America using LTE-V2X radio parameters in the 20-megahertz channel from 5905-5925 MHz and the 10-megahertz channel from 5895-5905 MHz. While 5GAA acknowledges the FCC's decision to provide flexibility for C-V2X deployments by including power levels for multiple 10, 20, and 30-megahertz channel combinations in the 5.9 GHz C-V2X band, industry will deploy services using the foregoing 20- megahertz and 10-megahertz channels.

Existing Standards and Certification. The FCC did not incorporate a particular standard for C-V2X into its rules.

SAE International standards define use of the underlying radio access layer for C-V2X to be 3GPP Rel-14 direct specifications. SAE International standards define the use of a single 20- megahertz C-V2X channel from 5905-5925 MHz. Additional information can be found at: *SAE J3161 LTE Vehicle-to-Everything (LTE-V2X) Deployment Profiles and Radio Parameters for Single Radio Channel Multi-Service Coexistence*, and *SAE J3161/1 On-Board System Requirements for LTE-V2X V2V Safety Communications* profile V2I and V2V applications, respectively, using this 20-megahertz channel.

OmniAir Consortium certification is based on these same foundational SAE standards. Additionally, many state DOTs and local transportation agencies have deployed OmniAir- certified C-V2X RSUs for V2I communications based on these SAE standards.

There is an SAE International information report covering use of the lower 10 megahertz from 5895-5905 MHz): *SAE J3161/2 LTE Vehicle-to-Everything (LTE-V2X) Deployment Profiles and Radio Parameters for PC5 Interface in 10 MHz Channel 180*. While this information report is non- binding, it prescribes additional C-V2X services that may use the lower adjacent 10-megahertz channel. Note that use of the lower 10-megahertz channel in addition to the main 20-megahertz C-V2X channel would require a second C-V2X radio.

While there has been some discussion that 5G V2X New Radio (NR) Rel-16+ direct communications can operate in the 5.9 GHz C-V2X band in the U.S., SAE standards, present and prospective deployments, broad industry consensus, and the lack of additional spectrum beyond the present 30-megahertz allocation renders direct 5G V2X NR technology not applicable in North America. The automotive industry recognizes that C-V2X deployments using LTE-V2X as detailed above exceeds all requirements to support V2X safety operations today.

What should I do if I want to implement geofencing to take advantage of the higher authorized power limits?

Manufacturers incorporating geofencing capability for an OBU will have to specifically demonstrate and certify that a device implements the capability in a way that complies with the Second R&O when requesting an FCC equipment certification, but the FCC has not yet provided guidance on that process. 5GAA will provide further guidance once we have more information from the FCC on approving OBUs with geofencing capability.

What happens to the C-V2X waivers that the FCC issued?

The waivers will terminate on February 11, 2025. The FCC has issued an Order and Proposed Order of Modification to modify the waiver recipients' original licenses to

comply with the Second R&O's rules, effectively replacing the waivers. The FCC will modify the licenses on its own.

What happens to C-V2X equipment that was authorized under the waivers?

C-V2X RSUs and OBUs authorized under the waivers can still be operated and marketed under their existing equipment authorizations.

If I have a waiver, do I need to do anything differently once the new rules take effect?

The parameters imposed in the waiver grants are consistent with the rules adopted in the Second R&O, so waiver recipients can continue deploying in the same way.

What happens now to DSRC?

On December 14, 2026, DSRC-based operations will no longer be permitted. Existing DSRC licensees may continue to use DSRC during the transition period, but no new DSRC licenses will be issued after February 11, 2025.

Are DSRC licensees getting reimbursed for transitioning or terminating their operations?

No. Under the Second R&O, DSRC incumbents are not entitled to reimbursement for transitioning or terminating DSRC operations.

Did the FCC adopt any cybersecurity or privacy requirements for C-V2X operations?

No. The Second R&O noted, however, that cybersecurity and privacy actions specific to connected vehicles are the focus of ongoing actions at the U.S. Department of Transportation and at the U.S. Department of Commerce's Bureau of Industry and Security. The FCC said it expects equipment manufacturers implementing C-V2X technology to comply with existing standards and best practices and to collaborate with the automotive industry to develop new guidance, standards, and best practices that consider cybersecurity and privacy concerns.

Are RSU "communications zones" still required?

No. The FCC eliminated a previous requirement for a communications zone defining the service area associated with an individual fixed RSU, agreeing with 5GAA that the rule was generally unnecessary to manage congestion in C-V2X operations.

Are C-V2X direct operations authorized in any other spectrum?

Not at this time. The FCC expects that industry testing, system optimization, and evaluation will obviate the need for additional spectrum allocations, and it encourages industry to fully implement C-V2X within the current spectrum allocation before reaching consensus on whether additional spectrum is needed to support safety-of-life services.

Appendix A
Certification of Onboard and Roadside Units

Radio Frequency devices generally must be certified by the FCC before they may be marketed. (See 47 C.F.R. §2.803) Below is high-level guidance on the general requirements for obtaining that certification. Within each of the categories discussed below, there are more detailed considerations that will be specific to individual manufacturers and products.

Design and certification of C-V2X equipment under the newly adopted FCC rules will need to address issues associated with compliance with the FCC rules from two different types of parties associated with bringing a certified product to market: Testing Laboratories and Telecommunications Certification Bodies (TCBs).

Testing Laboratories

Testing laboratories perform measurements to demonstrate compliance with the technical requirements in the FCC rules. Manufacturers can find a testing laboratory using the FCC's Test Firm Search tool. Testing laboratories typically use the FCC technical rules as the pass/fail criteria for determining if the equipment under test complies with the requirements. While test results from any FCC-recognized test laboratory can be used, some testing laboratories are likely to be better able to perform C-V2X testing than others. Manufacturers should discuss this aspect with the testing laboratory and with the TCB before performing tests. Many testing laboratories are associated with TCBs as well. Manufacturers are not required to use a testing laboratory and TCB that are managed by the same company, but there may be advantages to doing so, especially for non-standard testing scenarios such as are encountered with testing under newly adopted rules.

Telecommunications Certification Bodies (TCBs)

FCC equipment certification in the United States is all done through third-party TCBs that are recognized by the FCC. Manufacturers can find a TCB using the FCC's TCB Search tool. The FCC has issued specific guidance to TCBs through its Knowledge DataBase (KDB) for how to file an equipment certification application associated with the C-V2X waivers. (*See* 502150 D01 Certification Under Waiver v01) The FCC will likely use this same guidance document as it transitions from certifying devices under the waivers to certifying devices under the newly adopted rules. Thus, there should be minimal delay in moving to certification of equipment under the new rules. The FCC updates its KDB guidance documents from time to time, so equipment manufacturers should keep informed on any changes to the guidance.

The TCB will review the test reports, equipment labeling, user information, and other aspects of the equipment to determine whether all the FCC requirements have been met. During this review process, where there is a need to provide case-by-case guidance, the Commission has adopted a Pre-Approval Guidance (PAG) procedure for continuing FCC oversight where compliance review procedures are not fully developed. The FCC has not indicated in the Second R&O that certification of C-V2X equipment will be subject to such PAG procedures, so it is not clear that PAG review is required. If further guidance is required, this guidance must be obtained by a TCB or equipment manufacturer through the KDB Inquiry system prior to an approval, so that the TCB

knows how to properly evaluate the test procedures and results as part of its initial review. Once the FCC completes the PAG review, and the TCB completes its compliance review, the TCB can grant the equipment certification.

Manufacturers may want to reach out to a TCB early in the manufacturing process to ensure that their designs comply with the applicable FCC requirements, and so that any questions can be resolved ahead of the testing process. This can reduce cost and delays associated with having to repeat testing if there are concerns about the measurement procedures.

Appendix B
Roadside Units

To obtain an ITS license, which is a pre-requisite to registering RSUs, the prospective licensee must do the following:

1. First, the applicant must obtain an FCC User ID, typically consisting of the applicant's e-mail address and a self-selected password. The FCC User ID may be obtained via the Commission's Registration System (CORES (*see* Instructions)). To obtain an FCC User ID, an applicant need only provide contact information (e.g., name, address, e-mail, phone number, etc.).

2. After creating an FCC User ID, the applicant must then obtain an FCC Registration Number (FRN) via CORES. The FRN is a unique, ten-digit identification number assigned to the applicant by the FCC. The following information is required when applying for a new FRN:

- The applicant's federal employer identification number (EIN), unless the applicant is not required to have one (e.g., foreign companies, Tribal governments, etc.). If the applicant is an individual, he or she must provide their Social Security Number (SSN). (The FCC treats EINs and SSNs provided by applicants as confidential).
- The name of the individual or business
- Organizational form of applicant (e.g., corporation, limited liability company, etc.).
- Contact information

3. Once an FCC User ID and FRN are created, the applicant must log into the FCC's Universal Licensing System (ULS) using the *FRN* and *FCC User ID password* to apply for an ITS license[1].

From the ULS Login page, select "Apply for a New License" from the list on the left. ULS will prompt the applicant to specify the radio service for the license being requested (IQ (public safety, such as state or local governmental entity applicants) or QQ (non- public safety, i.e., non-government applicants).

Once the radio service is specified, ULS will ask the applicant to provide all information needed for the requested license. The following information is required:

- Application Type: Choose "Not Applicable"
- Authorization Expiration Date (optional): Do not provide an expiration date, the FCC will fill in this field.
- Regulatory Status: Choose "Non-Common Carrier"
- Type of Radio Service: Choose "Fixed"
- Does the Applicant propose to provide service interconnected to the public telephone network?: Choose "No"
- Attachments?: Choose "No"
- Is the Applicant exempt from FCC application fees?: To respond, note that

1 For additional information, see the instructions for FCC Form 601 here.

applicants that are government or non-profit entities, and applicants for public safety ITS licenses, are exempt from FCC application processing fees (applicants claiming a non-profit exemption must include a current IRS determination confirming non-profit status).[2]

- Is the Applicant exempt from FCC regulatory fees?: To respond, note that applicants that are government or non-profit entities, and applicants for public safety ITS licenses, are exempt from FCC regulatory fees (applicants claiming a non-profit exemption must include a current IRS determination confirming non- profit status).[3]
- Does this application include a request for a Waiver of the Commission's Rules(s)?: Choose "No"
- Are the frequencies or parameters requested in this filing covered by grandfathered privileges, previously approved by waiver, or functionally integrated with an existing station?" Choose "No"

Once all of the questions on this page have been answered, click the "Continue" button at the bottom right to proceed to the next page, which will request the following:

- Legal Entity Type: Choose from Corporation, General Partnership, Limited Partnership, Limited Liability Partnership, Governmental Entity, Other, Individual, Limited Liability Company, Tribal Nation, Consortium, Trust, Unincorporated Association, Business Controlled by Tribal Nation
- Applicant Address: Include pertinent contact information
- Real Party in Interest: identify real party in interest if different from the applicant
- Contact Name and Contact Address: Provide contact information for person who can answer any questions about the application
- Demographics: (Optional)

Once all of the questions on this page have been answered, click the "Continue" button at the bottom right to proceed to the next page and answer the "Ownership and Qualifications" questions listed below:

- Is the Applicant a foreign government or the representative of any foreign government?
- Is the Applicant an alien or the representative of an alien?
- Is the Applicant a corporation organized under the laws of any foreign government?
- Is the Applicant a corporation of which more than one-fifth of the capital stock is owned of record or voted by aliens or their representatives, or by a foreign government or representative thereof, or by any corporation organized under the laws of a foreign country?
- Is the Applicant directly or indirectly controlled by any other corporation of which more than one-fourth of the capital stock is owned of record or voted by aliens or their representatives, or by a foreign government or representative

2 47 C.F.R. § 1.1116(b),(f).

3 47 C.F.R. §§ 1.1162(b),(c),(d).

thereof, or by any corporation organized under the laws of a foreign country?

- Has the Applicant or any party to this application had any FCC station authorization, license or construction permit revoked or had any application for an initial, modification or renewal of FCC station authorization, license, or construction permit denied by the Commission?
- Has the Applicant or any party to this application, or any party directly or indirectly controlling the Applicant, ever been convicted of a felony by any state or federal court?
- Has any court finally adjudged the Applicant or any party directly or indirectly controlling the Applicant guilty of unlawfully monopolizing or attempting unlawfully to monopolize radio communication, directly or indirectly, through control of manufacture or sale of radio apparatus, exclusive traffic arrangement, or any other means or unfair methods of competition?

Once all of the questions on this page have been answered, click the "Continue" button at the bottom right to proceed to the next page for "Location List"

- Select "Add Location"
- Location Description: Select "L Geographic Location"
- Area of Operation Code: Select an appropriate category, such as statewide for a State DoT, or "O Other – Narrative" if for a county

Once all of the data on this page has been entered, click the "Continue" button at the bottom right to proceed to the next page for "General Certification Statements."

Enter the Name and Title information for the individual who is "Signing" the application – note that there is no physical signature as described below.

After the application form is completed, with all required data points provided, the application may be signed and submitted (no physical signature is required; the application is deemed signed when the name and title of the signatory is typed in the signature box). ULS will not allow an applicant to file if any required information is missing from the application. After the application is submitted, ULS will provide a filing confirmation, including a ten-digit file number, which the applicant should retain for its records. Applicants for non-public-safety ITS licenses also will be required to pay a filing fee.

4. After the ITS license is granted, the applicant will be able to log in to ULS to register RSUs. The information below is needed to register an RSU (note that RSU equipment must be certified by the manufacturer. Licensees must only purchase and install certified RSU equipment to comply with the FCC rules for C-V2X operations).

- Site name
- Geographic coordinates of the RSU
- City
- State
- Antenna Manufacturer
- Antenna Model Number
- Antenna Gain

- Antenna Beamwidth
- Antenna Center Line Height Above Ground Level
- Equipment Class Code:
- Transmitter Station Class:
- Channel Number Requested
- Maximum Transmitter Output Power (dBm)
- EIRP (dBm)
- Whether frequency coordination is required with Canada or Mexico (Y or N): Select "No"
- Whether the proposed RSU will have a significant environmental effect (Y or N):
- See 47 C.F.R. § 1.1301 et seq. to determine the response.
- Whether NTIA coordination is required (Y or N): See 47 C.F.R. § 90.387(b) to determine the response.

Note that the license will have an expiration date, which the licensee should track in order to ensure that you make a timely request to renew the license.

5. Once an RSU is registered, the licensee has 12 months to construct and begin operating the RSU. The licensee is required to provide notice of construction to the FCC within 12 months, or the registration will automatically terminate.

The 5G Automotive Association (5GAA) is a global, cross-industry organization of more than 110 members, including leading global automakers, Tier-1 suppliers, mobile operators, semiconductor companies, and test equipment vendors. 5GAA members work together to develop end-to-end solutions for future mobility and transport services. 5GAA is committed to helping define and develop the next generation of connected mobility, automated vehicles, and intelligent transport solutions based on C-V2X.

For more information, please visit www.5GAA.org

5GAA
Automotive Association