



## FCC 5.9 GHz Band Proposal

### First Report and Order, Further Notice of Proposed Rulemaking, and Order of Proposed Modification ET Docket No. 19-138

On October 28, the Federal Communications Commission (FCC) released a First Report and Order (First R&O), Further Notice of Proposed Rulemaking (FNPRM), and Order of Proposed Modification (OPM) related to its proposal to reallocate the 5.9 GHz safety spectrum band. The First R&O, FNPRM, and OPM are available [here](#). A summary of the documents is provided below.

#### I. Executive Summary

The First Report and Order would:

- Adopt rules to reallocate 45 MHz of spectrum in the 5.850-5.895 GHz band (the lower 45 MHz) for unlicensed use and allow immediate access for unlicensed indoor operations as of the effective date of the First R&O.
- Allow requests for outdoor unlicensed operations in certain geographic locations through existing regulatory processes – special temporary authorizations (STAs) and/or waivers – similar to current STAs provided to wireless internet service providers (WISPs) to operate in the lower 45 MHz during the last several months.
- Require Intelligent Transportation System (ITS) licensees to cease use of the 5.850-5.895 GHz band one year following the effective date of the First R&O and to only operate in the 5.895-5.925 GHz band (the upper 30 MHz).
- Require all ITS services to transition to C-V2X technology, subject to a transition period to be defined pursuant to the FNPRM.

The Further Notice of Proposed Rulemaking would:

- Propose rules to allow outdoor unlicensed operations across the 5.850-5.895 GHz band after ITS operations have exited the band (within one year of the effective date of the First R&O).
- Seek comment on various issues related to transitioning to C-V2X:
  - Timeline for transition;
  - Technical parameters: channel usage, priority system for messages, power and antenna height, OOB limits; and
  - Other transition considerations including transition costs and potential reimbursement.
- Seek comment on whether the FCC should allocate additional spectrum for ITS applications.

The Order of Proposed Modification would:

- Propose modifying all ITS licenses in the 5.9 GHz band to allow existing DSRC licenses to operate in the upper 30 MHz and to require existing operations in the lower 45 MHz to cease operations after the one-year transition period.

#### II. Timeline of Actions

The FCC intends to vote to approve the First R&O, FNPRM, and OPM at its next meeting on November 18, 2020. The timeframe for additional submissions to the docket will close on November 11, and any additional *ex parte* communications must occur with the FCC by that date. We expect the FCC

documents will be published in the Federal Register in the weeks following the November 18 vote, likely in the first half of December. Below are several timelines related to the publication of the document in the Federal Register.

- 30 days after publication: Deadline for parties to petition the FCC for reconsideration of any aspects of the First R&O. Deadline for licensees and other parties seeking to file a protest to the First R&O pursuant to Section 316 will be 30 days after publication.
- 30 to 60 days after publication: Initial comments on the FNPRM will likely be due within 30 to 60 days after publication.
- 60 days after publication:
  - First R&O Effective Date.
  - Indoor use of unlicensed devices in the 5.850-5.895 GHz portion of the 5.9 GHz band allowed.
  - DSRC incumbent licenses modified to add authorization to operate in the 5.895-5.925 GHz band for any lacking authority to do so and to limit operations to the 5.895-5.925 GHz one year after the effective date of the First R&O.
- One year after effective date of the First R&O: ITS licensees must cease operations in the 5.850-5.895 GHz band and operate only in the 5.895-5.925 GHz band.
- Two years after the effective date of the Second R&O: the FCC proposes that all operations in the 5.895-5.925 GHz band must convert to C-V2X or cease operating.

### **III. First Report and Order**

The First R&O would reallocate the lower 45 MHz of the 5.9 GHz spectrum band for unlicensed devices while reserving the upper 30 MHz for safety-related ITS operations. The First R&O also provides technical and operational rules for unlicensed operations, ultimately requires ITS operations in the upper 30 MHz to use C-V2X technology, establishes a one-year transition period for ITS operations in the lower 45 MHz to move to the upper 30 MHz, evaluates statutory requirements related to the proposal, and discusses the FCC's economic analysis related to the proposal.

#### **Reallocating the 5.9 GHz Band for Unlicensed Operations and ITS Operations**

- Allows indoor unlicensed devices to operate immediately upon the effective date of the First R&O, 60 days after publication in the Federal Register. [13]
- Establishes a one-year period after which existing ITS operations must cease use of the lower 45 MHz, beginning on the effective date of the First R&O. [49]
- Modifies all existing ITS licenses to provide authorization to operate in the upper 30 MHz and to remove authority to operate in the lower 45 MHz after the one-year transition period. Creates a notification requirement consistent with the transition deadline of one year, which will require licensees to certify that they have ceased operating in the lower 45 MHz. [51-52]

- This one-year period also applies to OBUs licensed by rule, though the FCC notes that it will not pursue enforcement action against vehicle owners if their DSRC units are still operating in the lower 45 MHz. [53, FN 143]
- During the one-year period, licensees may modify their registrations and move any of their operations to the upper 30 MHz. [54]
- Prohibits new ITS applications from operating in the lower 45 MHz. [53]
- New RSUs may be registered to operate in the upper 30 MHz. [54]

## Unlicensed Operations in the Lower 45 MHz

The First R&O reallocates the lower 45 MHz of spectrum in the 5.9 GHz band for unlicensed devices and defines technical and operational rules for indoor unlicensed operations.

- Indoor Unlicensed Operations
  - Allows only indoor unlicensed operations immediately upon the effective date.
  - Limits indoor access point EIRP to 33 dBm/20 MHz and 36 dBm/40 MHz (the 36 dBm limit applies for 80 and 160 MHz channels). [64]
  - Requires U-NII-4 devices (those operating in the lower 45 MHz) to incorporate design measures to ensure indoor devices are not deployed outdoors, these include: [65]
    - Requires that access points cannot be weather resistant;
    - Requires that access points have integrated antennas or otherwise prohibit the capability of connecting other antennas to the devices;
    - Prohibits access points from operating on battery power (except for backup power in case of a power outage); and
    - Requires the access points be marketed “for indoor use only” and include a label attached to the equipment stating that “FCC regulations restrict operation to indoor use only.”
  - Limits client devices to power levels 6 dB below the power limits for access points and requires that client devices operate only under the control of an access point. [77]
  - Limits indoor unlicensed device OOB limits of 15 dBm/MHz at 5.895 GHz, decreasing linearly to -7 dBm/MHz at 5.925 GHz. [81]
  - Adopts a root mean square (RMS) measurement, effectively using an average measurement rather than a peak measurement for OOB limits. [82]
- Outdoor Unlicensed Operations
  - Allows requests for operation in the lower 45 MHz in certain specified locations and on a non-interference basis, upon a proper showing submitted through the STA or waiver process. [84]

### ITS Operations in the Upper 30 MHz

- Adopts C-V2X as the sole ITS delivery technology and phases out the existing DSRC technology. [98, 102]
- Modifies existing ITS licenses to allow operation only in the upper 30 MHz and requires licensees to transition out of the lower 45 MHz within one year of the effective date of the First R&O and designates C-V2X technology as the ITS delivery system allowed for once the transition to the revised ITS band is complete. [107]
- Allows DSRC licensees who wish to operate C-V2X-based ITS in the upper 30 MHz to do so through the STA, experimental licensing, or other existing regulatory processes on a non-interference basis upon proper showing. [107]

### Statutory Considerations

- Dismisses arguments from opponents of the proposal that raised legal questions related to Section 316, Section 312, and Section 1 of the Communications Act, as well as the Transportation Equity Act for the 21<sup>st</sup> Century. [112-120]

### Economic Analysis

- Dismisses economic arguments from opponents of the proposal related to the costs of reallocating the lower 45 MHz away from transportation safety. [121-139]

## **IV. Further Notice of Proposed Rulemaking**

The FNPRM focuses on four issues: (1) the transition of all ITS operations to C-V2X-based technology; (2) the establishment of C-V2X technical parameters in the Commission's rules; (3) additional transition considerations; and (4) the transmitted power and emission limits, and other issues, related to full-power outdoor unlicensed operations across the lower 45 MHz portion of the 5.9 GHz band.

### Transition of All ITS Operations to C-V2X-based Technology

- Proposes that all operations in the upper 30 MHz either convert to C-V2X or cease operating two years after the effective date of a Second Report and Order (Second R&O) adopted in response to the FNPRM. [143]
  - Details that licensees may immediately operate C-V2X facilities in the upper 30 MHz of the band through STAs, experimental licenses, or other existing regulatory processes without first implementing interim DSRC operations. [144]
    - Seeks comment on the number of licensees that may decide to operate in such a fashion and the number that plan to continue offering DSRC in the 30-MHz band during the transition period.
  - Seeks comment on the state of development of C-V2X equipment, both roadside and on-board units, on whether manufacturers can distribute equipment through their existing supply chains, and on whether vehicle manufacturers can install C-V2X equipment into new vehicles within this timeframe. Additionally, seeks comment on the

steps involved with converting all ITS operations in the 5.9 GHz band to C-V2X technology and the expected time to complete the entire process. [144]

- Seeks comment on the FCC's proposed two-year sunset date and how to treat DSRC OBU operations at the final transition date (whether OBUs can be turned off via over-the-air instructions, the potential for harmful interference if they continue to operate, etc.). [145]
- Seeks comment on issues related to modifying OBUs already deployed, including estimates of the number of vehicles under this category and identifying responsibility for contacting owners of OBU-equipped vehicles. [146]

## Establishment of C-V2X Technical Parameters in the Commission's Rules

- Seeks comment on the technical considerations related to the simultaneous operation of DSRC and C-V2X in the upper 30 MHz portion of the 5.9 GHz band and, ultimately, exclusive operation of C-V2X in that band: [148]
  - What spectral and/or geographic separation requirements, if any, are necessary to prevent harmful interference between the two types of operations?
  - Can existing licensees be permitted to modify to C-V2X operations premised simply on not exceeding their existing "communication zone" footprint?
  - Can new licensees be authorized to use C-V2X in the near term, provided that they avoid existing geographic licensed areas or simply avoid existing registered roadside units?
  - Are there any adjacent-channel issues that need to be considered between DSRC and C-V2X to enable nearby operation?
  - What accommodations can be made to protect roadside unit sites operated pursuant to the four nationwide ITS authorizations?
- Seeks information informed by current C-V2X tests being conducted under experimental licenses as to how best to enable a smooth transition from DSRC to C-V2X. [148]
- Seeks comment on the degree of channel plan flexibility that should be provided to C-V2X, specifically concerning whether the band plan should continue to accommodate combining two channels to provide a single 20-megahertz channel. [149]
- Seeks comment on whether there is a compelling reason to have specific use designations on any or all of the channels used by C-V2X. [150]
  - Seeks comment on the advantages and disadvantages of deferring to industry standardization processes in lieu of adopting prescriptive rules. [151]
  - Seeks comment on whether to retain the current rules for message priority hierarchy. [152]
- Seeks comment on power and antenna height. [153-157]
  - Seeks comment on what the appropriate C-V2X power levels under the modified ITS band plan should be, and more specifically proposes to retain the current "communication zone" designations and require roadside units to specify their intended zone. [154]

- Seeks comment on the appropriate output and radiated power levels that should be associated with each communication zone, channel, and user. [155]
- Seeks comment on an alternative method of specifying power as a power density to normalize power for wider bandwidth channels. [156]
- Seeks comment on whether the current antenna height limitations are justified. [156]
- Seeks comment on whether the FCC should specify measurement standards for equipment approval and compliance purposes. [156]
- Seeks comment on adoption of higher power levels for C-V2X OBUs. [157]
- Seeks comment on whether FCC rules should incorporate the 3GPP standard by reference. [158]
  - Seeks comment on whether to incorporate 3GPP Release 14 now with a planned transition to Release 16 (or the current version) at some date certain in the future, or to not incorporate into the rules any C-V2X standard.
  - Seeks comment on whether rules should only incorporate by reference specific aspects of either the 3GPP Release 14 or Release 16 standard.
- Proposes that all C-V2X equipment limit out-of-band emission limits measured at the antenna input (i.e., conducted limits) to: [159]
  - -29 dBm/100 kHz at the band edge;
  - -35 dBm/100 kHz  $\pm$  1 megahertz from the band edge;
  - -43 dBm/100 kHz  $\pm$  10 megahertz from the band edge; and
  - -53 dBm  $\pm$  20 megahertz from the band edge.
- Proposes to limit out-of-band radiated emissions to -25 dBm/100 kHz EIRP or less outside the band edges of 5.895 GHz and 5.925 GHz. [159]
  - Seeks comment on these out-of-band emission limits and whether they continue to be appropriate for C-V2X equipment. [160]
  - Seeks comment on the measurement standards that should be associated with equipment approval compliance for verifying that C-V2X equipment meets whatever OOB limits are adopted. [160]

## Additional Transition Considerations

- Seeks updates about DSRC demonstration projects or deployment, as well as any C-V2X demonstration or pilot projects, including any funding grants that have been provided or are anticipated. Seeks comment on whether existing funding (at the Federal, state, or local level) can readily be used for transitioning costs associated with the new band plan. [162, FN 408]
- Seeks further comment on according ITS licensees reasonable compensation related to the FCC's decision to require relocation of ITS out of the lower 45 megahertz of spectrum, including on the particular types of costs that should be considered for possible compensation and the process by which such compensation might be determined or implemented. [163]
- Requests comment on any other actions the Commission should consider that would be helpful to ITS licensees with respect to these transition matters. [163]

### Outdoor Unlicensed Operations Transmitted Power and Emission Limits

- Seeks comment on the following proposals: [171]
  - For outdoor operation of U-NII-4 access point device after ITS operations move out of the U-NII-4 band, a radiated power of 23 dBm/MHz or 36 dBm radiated power for all bandwidths.
  - Not adopting the U-NII-3 point-to-point power limits in the U-NII-4 rules.
  - That client devices be permitted to operate in the 5.850-5.895 GHz band at power levels that are 6 dB lower than those permitted for outdoor access point devices.
  
- Seeks comment on the following proposals: [174, 175]
  - For outdoor U-NII-4 access point devices or outdoor access point devices that operate across a single channel that spans the U-NII-3 and U-NII-4 bands, the FCC proposes the outdoor U-NII-4 OOB limits recommended by the Wi-Fi Alliance of -5 dBm/MHz at 5.895 GHz, decreasing linearly to -27 dBm/MHz at 5.925 GHz, measured using an RMS measurement.
  - The FCC proposes to apply the existing U-NII-3 OOB limits at the lower edge of the U-NII-3 band for outdoor U-NII-4 devices, or devices that operate across a single channel that spans the U-NII-3 and U-NII-4 bands, i.e., at 5.725 GHz, while not imposing any OOB limits for U-NII-4 devices at the U-NII-3/U-NII-4 band edge, i.e., at 5.850 GHz.
  
- The FCC proposes to require outdoor standard-power access points to limit the maximum EIRP above a 30 degree elevation angle to 21 dBm, which is similar to what the Commission already requires in the U-NII-1, U-NII-5, and U-NII-7 bands to protect fixed satellite services. [179]

### Increased Transmit Power for Indoor U-NII-4 Access Points

- Seeks comment on the FCC's proposal that indoor U-NII-4 devices be permitted to increase power to 23 dBm/MHz or 36 dBm radiated power for all bandwidths upon the later of one year following the effective date of the First Report and Order (i.e., the date by when ITS operations must transition out of the 5.850-5.895 GHz band) or the effective date of a Second Report and Order adopting these proposed power increases. [181]

### Other Spectrum for ITS

- Recognizes that commenters have suggested that additional spectrum may be needed either to support simultaneous deployment of 4G and 5G-NR C-V2X service or to support other advanced capabilities. [184]
  
- Seeks comment on whether, notwithstanding the Commission's determination that current safety-of life services can continue to operate using 30 megahertz of spectrum, the FCC should consider allocating additional spectrum for ITS applications. Asks for what purposes would additional spectrum be needed. [185]
  
- Asks how additional spectrum would be used to leverage C-V2X and aid in its deployment. [187]



- Asks which spectrum band(s) should be considered. [187]
- Asks what rule changes could enable vehicular safety-related applications in other bands on a shared basis. [187]

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If you have any questions regarding this document, please contact us at:

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