



5.9 GHz SAFETY BAND STAKEHOLDER FORUM:

Leveraging Existing V2X Investments in a Changing Spectrum Environment

**U.S. Department of Transportation (U.S. DOT)
December 16, 2020**

5.9 GHz SAFETY BAND STAKEHOLDER FORUM: U.S. DOT SPEAKER



Diana Furchtgott-Roth

Deputy Assistant Secretary for Research and Technology

Office of the Assistant Secretary for Research and Technology, Office of the Secretary

HOUSEKEEPING

- Please mute your phones
- Please put additional questions into the Chat Box
- In case you need audio:
 - 1-866-398-2885
 - Passcode 426684
- This virtual event is being recorded
- Materials will be available in the coming days and we will post them to the Safety Band Website



5.9 GHz SAFETY BAND STAKEHOLDER FORUM: U.S. DOT SPEAKER



Joel Szabat

Acting Under Secretary for Transportation Policy
Office of the Secretary

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Acting Under Secretary for Transportation Policy, Office of the Secretary

- **Our National transportation goal is to move to a zero-crash society.**
- **The transportation Safety Band is essential for helping us achieve our goal.**
- **US DOT is looking forward to further cooperation with industry for next steps.**



5.9 GHz SAFETY BAND STAKEHOLDER FORUM: U.S. DOT SPEAKER



James Owens

Deputy Administrator
National Highway Traffic Safety Administration

James Owens

Deputy Administrator, National Highway Traffic Safety Administration

- We see an opportunity to save lives through technology, specifically vehicle-to-everything technology—or V2X.
- Rarely has there been a traffic safety technology with as much potential as V2X communications.
- V2X technology also holds the promise of increased protections for vulnerable road users.
- We remain committed to supporting the development and deployment of V2X technology.
- V2X may also be considered in future updates to the New Car Assessment Program.
- NHTSA will continue to do our part in working with our state and industry partners to advance this technology.



5.9 GHz SAFETY BAND STAKEHOLDER FORUM: U.S. DOT SPEAKER



Mala Parker

Deputy Administrator
Federal Highway Administration (FHWA)

Mala Parker

Deputy Administrator, Federal Highway Administration

- Access to 5.9 GHz spectrum, without interference, is crucial to deploying life-saving applications for V2V and V2I communications.
- This spectrum is a public benefit, dedicated to transportation safety.
- Changes to this spectrum's allocation would greatly affect the work of our State and local transportation partners and the progress they have made.
- Together, we have made significant investments, for example:
 - AASHTO's signal phase and timing challenge;
 - Georgia—Approx. 1,700 intersections in Atlanta for red light violations warnings (2 percent of all traffic fatalities) and public safety priority;
 - Wyoming—Approx. 75 roadside units for V2I along I-80 across the State;
 - Utah—Approx. 127 intersections, 81 transit buses and snow plows in Salt Lake City; and
 - Many others!
- Any transition may be significant.



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Deputy Assistant Secretary for Research and Technology

Office of the Assistant Secretary for Research and Technology, Office of the Secretary

FCC Rulemaking: 5.9 GHz Safety Band Changes

- **BAND REALLOCATION.** FCC reallocates the transportation 75 MHz spectrum into two bands:
 - 5.850-5.895 GHz for unlicensed Wi-Fi uses (lower 45 MHz channels)
 - 5.895-5.925 GHz dedicated for transportation uses (upper 30 MHz channels)
- **FCC CHOOSES A TECHNOLOGY.** The provisions of the First Report & Order (R&O) indicate a selection of the LTE-CV2X technology over the current technology, Dedicated Short Range Communications (DSRC).
- **CONTINUATION OF DSRC OPERATIONS.** DSRC users have 12 months from effective date of First R&O to continue to operate in the entire 75 MHz. DSRC users must vacate the lower 45 MHz and move to the upper 30 MHz of the band. They can continue operating in this upper part of the band for an additional 12 months from effective date of the FCC Second Report and Order as they transition to LTE-CV2X.
- **LTE-CV2X CANNOT INTERFERE WITH DSRC.** LTE-CV2X users must seek a waiver to operate in the new 30 MHz band and must not interfere with DSRC uses during this 24-month period.
- **WAIVER PROCESS FOR LTE-CV2X TO COME FROM FCC SOON.** The process for LTE-CV2X users to request a waiver is not established in this First R&O—that process is expected to be presented by FCC 30 days after the publication of the First R&O in the Federal Register.
- **RULES FOR GOVERNING.** LTE-CV2X will be forthcoming by FCC in 2021-2022. LTE-CV2X emerging technology – device development and maturity continue to evolve. The standards for these devices are not yet available. FCC will establish rules of operation for LTE-CV2X in the Second R&O.



5.9 GHz SAFETY BAND STAKEHOLDER FORUM: DOT TECHNICAL RESPONDENTS



Jonathan Walker, P.E., Ph.D.

Chief of Policy, Architecture, and Knowledge Transfer
Intelligent Transportation Systems Joint Program Office



John Harding

Connected/Automated Vehicles and Emerging Technologies Team Leader
FHWA, Office of Operations/Office of Transportation Management



Suzanne Sloan

Principal Technical Advisor, Technology Innovation and Policy
Volpe National Transportation Systems Center

5.9 GHz SAFETY BAND STAKEHOLDER FORUM: DOT TECHNICAL RESPONDENTS



Robert Kreeb

Chief of Electronic Systems Safety Division

National Highway Traffic Safety Administration

James Arnold

Spectrum Engineer

Office of the Assistant Secretary for Technology and Research

QUESTION-RESPONSES

- **Participants Question 1:** What is the direction on the current, ongoing deployments that are designed with DSRC?
- **Jonathan Walker:**
 - Given uncertainties, it may be unwise to remove operational equipment providing safety benefits.
 - Federally-funded projects in progress to continue under the scope, terms, and conditions of agreements; results continue to provide value and insight
 - Department leadership and spectrum experts studying the draft First Report and Order and considering next-step strategies



QUESTION-RESPONSES

- **Participants Question 2:** Will funding be made available to address the transition to LTE-CV2X or to accelerate deployment in the 30 MHz?
- **John Harding:**
 - Appropriations process does not easily allow for new items for funding
 - Ability to provide near-term funding may be constrained
 - Formula funds may be eligible, but it depends on State and local agency plans
 - We need your input.



QUESTION-RESPONSES

- **Participants Question 3:** Will the US DOT/NHTSA reconsider the V2V Rulemaking? There are concerns associated with the next steps for equipping vehicles with V2X communications. What steps is US DOT considering to incentive the deployment of V2X OBUs on vehicles?
- **Bob Kreeb:**
 - Technology and market circumstances have changed immensely since January 2017 relative to:
 - Available technology options
 - Uncertainty of spectrum and deployment of V2X applications.
 - NHTSA is evaluating the potential inclusion of V2X in NCAP for voluntary adoption and deployment of V2V technologies.
 - Look for NHTSA NCAP Request for Comment (RFC) in coming months.



QUESTION-RESPONSES

- **Participants Question 4:** What will it cost to convert the 67 operational sites and shift the 65 sites in planning from DSRC to LTE-CV2X?
- **Suzanne Sloan:**
 - We estimated the decommissioning and reinstallation in our March 2020 docket filing
 - Steps include: decommissioning, re-planning, procuring, testing, re-engineering the site before installation, retesting with existing systems
 - US DOT's estimate over all sites = \$645M + disruption time
 - FCC seeking this type of cost information from deployers as part of their Further NPRM
 - Please keep in touch with US DOT if you think there are other costs involved (5.9GHzSpectrum@dot.gov).



QUESTION-RESPONSES

- **Participants Question 5:** Will 30 MHz be enough? If not, will the Department seek additional spectrum?
- **Jim Arnold:**
 - We do not believe 30 MHz is enough to support the full suite of current V2X applications + future applications for a cooperative and automated transportation environment, truck platooning, or cooperative maneuvering of automated vehicles.
 - The Department remains committed to fighting for adequate spectrum for safety and mobility—spectrum that meets intended needs of the applications.
 - No plans to date for requesting additional spectrum
 - Plan to keep all options open, including the investigation of 5G new radio V2X and the opportunities that it might offer transportation safety.

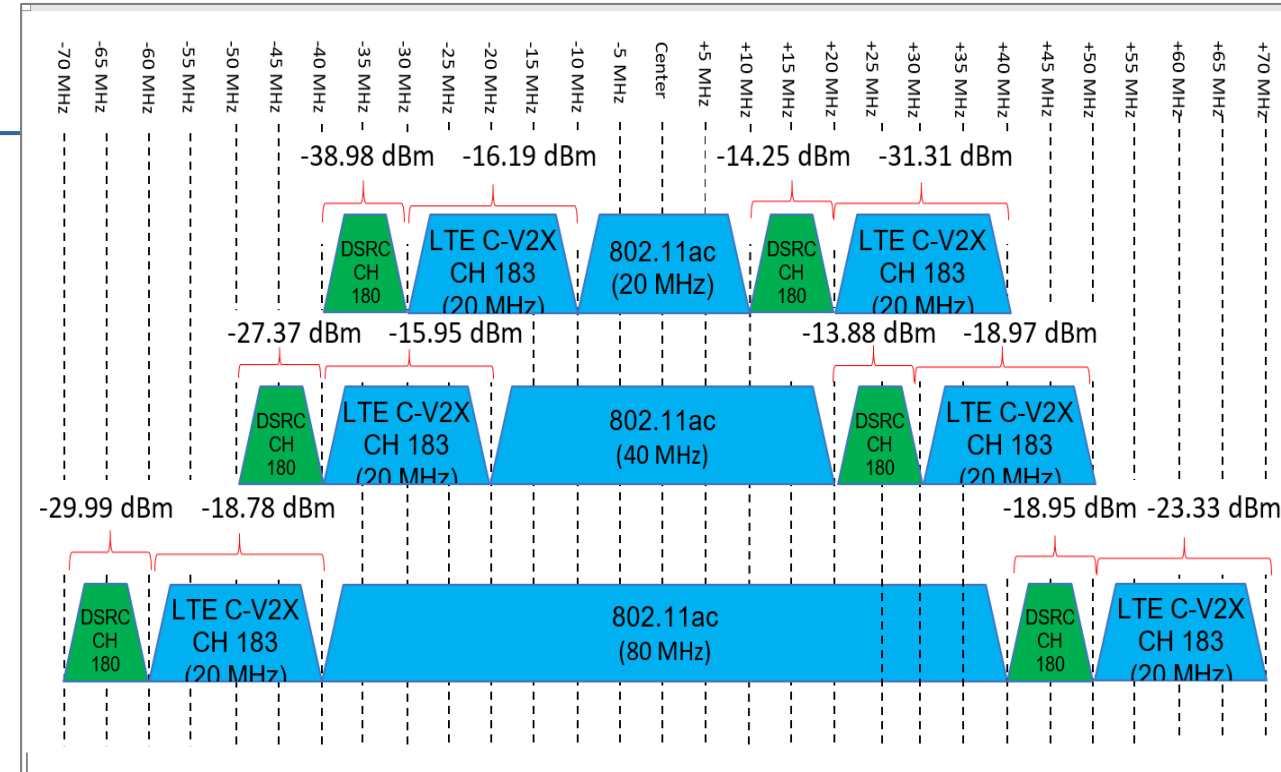


QUESTION-RESPONSES

- **Participants Question 6:** There are concerns regarding C-V2X interference issues next to unlicensed use in other areas of spectrum. Can you speak to this point?

- **Jim Arnold:**

- Still awaiting FCC's final First Report and Order to understand the final Wi-Fi parameters.
- Potential exists for energy leakage from unlicensed Wi-Fi devices above and below the upper 30 MHz of the safety band.
- Our analysis suggests that transportation safety will be affected due to significant adjacent channel interference between the different radio services.
- Report is located at: <https://www.transportation.gov/research-and-technology/preliminary-technical-assessment-out-channel-interference-out-band-emissions>.



QUESTION-RESPONSES

- **Participants Question 7:** What is the ability of LTE-CV2X to support safety-of-life applications in just 30 MHz? Will the Department take a similar role in testing LTE-CV2X, similar to its role with DSRC?
- **Jonathan Walker:**
 - We are technology neutral—but we care about safety performance of new technologies.
 - The Department is testing LTE-CV2X radio performance to answer your—and our—questions.
 - Test conditions will mimic challenging transportation environments, including non-line-of-sight (one of the transformative elements of V2X communications).
 - Testing will look at removal of *basic safety message priority* to understand if there are issues—this is a question in the Further NPRM.
 - Testing will look at unlicensed Wi-Fi interference
 - Due to the coronavirus pandemic, we hope to conduct testing around Spring/Summer 2021.



QUESTION-RESPONSES

- **Participants Question 8:** How can the Department accelerate the learning curve for deployers with regard to LTE-CV2X? Are there any lessons learned from existing sites?
- **John Harding:**
 - DSRC learning will, we believe, will translate to LTE-CV2X.
 - May be lessons to gather around site engineering and functional characteristics as well as antenna placement.
 - We will investigate during LTE-CV2X testing + some State and local sites beginning to install and trial this technology will produce lessons for us.
 - We will be glad to receive information from this community about any other testing sites.



QUESTION-RESPONSES

- **Participants Question 9:** How do we ensure that the remaining 30 MHz are not reallocated in the future?

- **Jonathan Walker:**
 - This is not something DOT can ensure, but we will remain engaged in informing FCC
 - But, Spectrum needs to be used!
 - Awaiting FCC rules for the 30 MHz that will come with Second Report and Order based on their upcoming Further NPRM (i.e., FCC has not provided a timeline on the Second Report and Order).
 - We continue to seek answers and strategies—and we encourage your input!
(5.9GHzSpectrum@dot.gov)



QUESTION-RESPONSES

- **Participants Question 10:** A key benefit brought through V2X communications is the ability for vehicles and infrastructure to communicate and improve overall and more region-wide safety, public safety, and mobility. Given the limited time period, can US DOT take any steps to incentivize the deployment of V2I applications that work both from an OEM and State and local agency perspective?

- **John Harding:**
 - The OEMs, State and local DOTs, and others are engaged in V2I software applications:
 - Traffic Optimization for Signalized Corridors (TOSCO)
 - Reference Connected Intersection
 - Cooperative Driving Automation
 - FHWA and private industry studying automation-to-infrastructure exchanges: cooperative driving, cooperative maneuvering and cooperative perception through complex intersections.
 - Connected Vehicle environments use a hybrid of communication options. But, V2X communications are a critical tool in crash reduction—V2X can address more but also enhance today's radars, cameras, or LIDAR technologies.



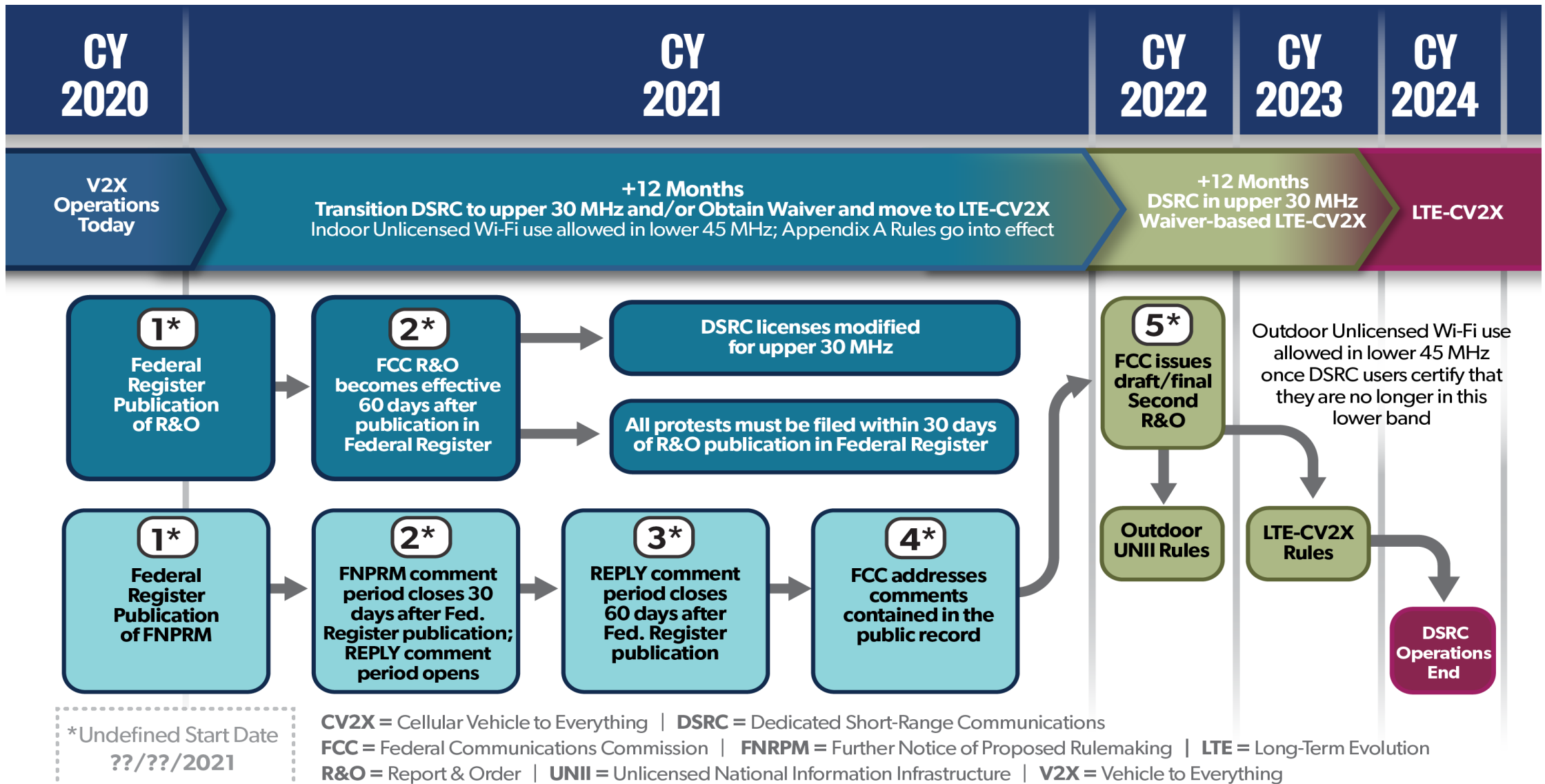
QUESTION-RESPONSES

- **Participants Question 11:** When does the one year clock for DSRC to vacate channel 172 begin?

- **Suzanne Sloan:**
 - This First R&O needs to be published in the Federal Register and then this First R&O is effective within 60 days of its publication
 - With publication, sites have 12 months to move from lower 45 MHz and transition into upper 30 MHz—where DSRC can still be used for another twelve months.
 - Sites can make transition when ready during this first year; during these 24 months:
 - Sites using LTE-CV2X will need a waiver; a new waiver process due from FCC 30 days after the publication in the Federal Register.
 - If current sites licenses do not include upper 30 MHz channels, FCC will automatically modify your license within 60 days after publication of the R&O. If concerns exist, a site has 30 days after R&O publication to contest license modification.
 - LTE-CV2X and unlicensed Wi-Fi are not to interfere with DSRC during these 24 months.
 - Indoor unlicensed Wi-Fi use in lower 45 MHz begins 60 days of the Federal Register publication.
 - Outdoor unlicensed begins in lower 45 MHz after this first 12-month period, and after DSRC moves into the upper 30 MHz.



Report & Order (R&O) and Further Notice of Proposed Rulemaking (FNPRM) Timeline



For More Information

**For all presentation materials,
visit the U.S. DOT
Safety Band website:**

www.transportation.gov/content/safety-band

Send technical questions to:
5.9GHzSpectrum@dot.gov

