Spectrum Proceedings & Part 15 Waivers

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Spectrum Developments

- OET has day-to-day responsibilities for Frequency Allocations and Equipment Authorization (Part 2), Experimental (Part 5), Unlicensed Device (Part 15) and Industrial, Scientific, and Medical Equipment (ISM) (Part 18).
  - The Policy and Rules Division is directly responsible for conducting proceedings that modify the rules and procedures, including spectrum availability, related to these areas.

- Implementing new services or providing additional spectrum for existing services typically require modifications to the Table of Frequency Allocations.
  - The Policy and Rules Division conducts proceedings to implement new allocations and closely collaborates with other bureaus that are responsible for individual service rules.
The FCC is taking action to make additional spectrum available for 5G services.

- **High-band**: Concluded 5G spectrum auction for the 28 GHz & 24 GHz bands. Auction for the upper 37/39/47 GHz bands is complete and we are in the process of issuing the licenses.

- **Mid-band**: Repurposing activities to make a large contiguous block of mid-band spectrum available for commercial use, 3.45-3.55 GHz band and neighboring 3.5 GHz and 3.7 GHz bands offers 530 megahertz of mid-band spectrum for 5G.

- **Low-band**: The FCC is acting to improve use of low-band spectrum with targeted changes to the 600 MHz, 800 MHz, and 900 MHz bands.

- **Unlicensed**: Recognizing that unlicensed operations will be an important component for 5G, the agency is creating new opportunities for the next generation of Wi-Fi in the 5.9 GHz and 6 GHz and above 95 GHz band.

- **More to come**
3.45-3.55 GHz Band
GN Docket No. 19-348

- 3.45-3.55 GHz band currently allocated for Federal Radiolocation Service
- Second Report and Order adopted March 17, 2021
- Summary of 2nd R&O:
  - Reallocate 100 megahertz of spectrum in the 3.45 GHz band for non-federal flexible use wireless services
  - Establish a framework for the 3.45 GHz band that will enable robust commercial use by an array of service providers, while also ensuring that federal incumbents are still protected from harmful interference where and when they require continued access to the band
    - Protection provided within designated cooperative planning areas and periodic use areas
  - Technical rules
    - Power level consistent with other flexible use band
    - Two-step emission mask; similar to CBRS
  - Collectively, the 3.45 GHz band and the neighboring 3.5 GHz and 3.7 GHz bands represent 530 megahertz of contiguous mid-band spectrum for 5G
  - Auction scheduled for October 2021
Three Reports and Orders adopted in 2015, 2016 and 2018

Sharing 150 MHz in 3550-3700 MHz for flexible use between new mobile broadband and incumbent DoD Radar, and Commercial FSS.

Summary of the band:

- March 2021, the Commission released a public notice and certified Key Bridge as the newest SAS administrators. Currently there are six certified SAS admins operate in the country.
- The next stage is to review the second wave of SAS administrator applicants. These are RED Technologies, Fairspectrum, and Nokia.
- CBRS equipment certification: more than one-hundred CBSDs (Category A and B) from more than 40 different manufacturers have been approved by the FCC lab.
- Auction 105 concluded raising a total of $4.58B
3.7-4.2 GHz Band (C-Band)
GN Docket No. 18-122

- Report and Order adopted February 28, 2020
- Repurposed lower 300 megahertz from fixed satellite service and fixed service to flexible use for mobile broadband

Summary of changes:
- Add mobile allocation to 3.7-4.0 GHz band.
- Transition 280 megahertz, plus a 20-megahertz guard band, from incumbent use to flexible-use through public auction.
  - 3.7-3.8 GHz transition in 46 of top 50 markets – December 2021
  - All spectrum across entire U.S. – December 2023
- Require FSS operations to relocate to 4.0-4.2 GHz band.
- Provide incumbent FSS and FS licensees with reimbursement of reasonable relocation costs, paid by flexible-use licensees.
- Adopt service and technical rules for flexible-use licensees in the 280 megahertz of spectrum designated for transition to flexible-use.
- On February 17, 2021, Auction 107 concluded raising a total of $81,114,481,921 in net bids with 21 bidders winning a total of 5,684 licenses. (see AU Docket No. 20-25).

- Petitions for Reconsideration remain pending
Open Radio Access Network (ORAN) GN Docket No. 21-63

- Notice of Inquiry on the opportunities and potential challenges presented by open and virtualized radio access networks (adopted March 17, 2021)
- FCC seeks comment on:
  - The current status of Open RAN development and deployment in networks in the US and abroad
  - What steps should be taken by the FCC, federal partners, industry, academia, and others to accelerate the timeline for Open RAN standards development
  - Challenges or other considerations related to the deployment, security, reliability, integration, and testing of systems based on Open RAN specifications
  - The costs and benefits associated with Open RAN development and deployment
  - Comments April 28, 2021, and reply comments May 28, 2021
• 12 GHz band is 500 megahertz of mid-band spectrum between 12.2-12.7
• Currently licensed to two DBS operators but NGSO and MVDDS services can operate on secondary basis
• NPRM adopted January 15, 2021 seeks comment on:
  • Whether it is possible to add mobile service throughout the 12 GHz band without causing harmful interference to incumbent licensees
  • Whether there are technical parameters that would allow additional terrestrial shared used of the band, methods for assigning flexible use rights in the band, and potential sharing mechanisms for the band if coexistence among the incumbent services and new flexible use service is technically feasible
  • Whether the public interest benefits of maintaining the current allocations and framework for the band outweigh the potential benefits of accommodating new services in the band.
  • Comments April 7, 2021 and reply comments May 7, 2021
• Scheduled for April 22, 2021 Commission meeting

• Summary of Order and FNPRM
  • Propose to add a secondary non-Federal Space Operation allocation to the 2200-2290 MHz band through use of an Allocation Table footnote (pre-launch testing and space launch operations in four 5MHz sub-bands).

• Summary of FNPRM
  • Seeks comment on:
    • Adopting primary non-Federal allocations in the 420-430 MHz, 2025-2110 MHz, and 5650-5925 MHz bands for use during commercial space launches.
    • Adding a non-Federal Mobile allocation to the 2200-2290 MHz band and upgrading the non-Federal Space Operation allocation from secondary to primary
    • Propose service rules for commercial space launch operations in all these frequency bands.
    • Seek additional comment on proposals in the 2013 NPRM to provide Federal agencies access to commercial satellites in the C-band, Ku-band, and Ka-band.
• 5.9 GHz band (5.850-5.925 GHz) formerly reserved for Dedicated Short Range Communication (DSRC) Service

• Report and Order adopted November 18, 2020

• Summary of R&O changes:
  • Repurpose lower 45 megahertz of the band (5.850-5.895 GHz) for indoor unlicensed operations.
  • Designate C-V2X as the technology standard for safety-related transportation and vehicular communications in the reserved upper 30 megahertz of the band (5.895-5.925 GHz).
  • ITS services will vacate the lower 45 megahertz of the band within one year after R&O effective date.

• Further Notice of Proposed Rulemaking
  • Seek comment on the transition of all ITS operations to C-V2X-based technology, the codification of C-V2X technical parameters in the Commission’s rules, protection of federal radiolocation system from outdoor unlicensed use, and authorizing unlicensed full-power operations (including outdoors) in the lower 45 megahertz.
### 5.9 GHz Unlicensed

ET Docket 19-138

#### 5.9 GHz device power levels*

<table>
<thead>
<tr>
<th>Device Class</th>
<th>Operating Bands</th>
<th>Maximum EIRP</th>
<th>Power Spectral Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indoor Access Point</td>
<td>5.850-5.895 GHz</td>
<td>36 dBm</td>
<td>20 dBm/MHz</td>
</tr>
<tr>
<td>Client Connected to Indoor Access Point</td>
<td>5.725-5.895 GHz (U-NII-3 &amp; U-NII-4)</td>
<td>30 dBm</td>
<td>14 dBm/MHz</td>
</tr>
<tr>
<td>Subordinate Connected to Indoor Access Point</td>
<td>5.725-5.895 GHz (U-NII-3 &amp; U-NII-4)</td>
<td>36 dBm</td>
<td>20 dBm/MHz</td>
</tr>
</tbody>
</table>

*The rules adopted in the First Report and Order and the license modification become effective 60 days after the date of publication.
6 GHz Unlicensed
ET Docket 18-295


• Expanded unlicensed device rules in 1200 megahertz of spectrum:
  • In the 5.925-6.425 GHz and 6.525-6.875 GHz bands, access points can transmit indoors and outdoors under control of an automated frequency coordination (AFC) system at full power, consistent with levels permitted in 5 GHz band (i.e., 30 dBm conducted power into a 6 dBi antenna).
  • In the 5.925-7.125 GHz band, access points can operate at lower power without an AFC system, restricted to indoor use only.
    • Restricted to maximum 5 dBm/MHz PSD
    • Maximum EIRP limited to 30 dBm
    • Devices must be supplied power from a wired connection, have an integrated antenna, may not be battery powered, and not have a weatherized enclosure

• Proposed to permit very low power operation (indoors and outdoors) across entire 6 GHz band
  • Also seeks comment on permitting higher power for non-AFC controlled indoor access points.
### 6 GHz device power levels

<table>
<thead>
<tr>
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<th>Maximum EIRP</th>
<th>Maximum EIRP Power Spectral Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard-Power Access Point (AFC Controlled)</td>
<td>U-NII-5 (5.925-6.425 GHz)</td>
<td>36 dBm</td>
<td>23 dBm/MHz</td>
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<tr>
<td></td>
<td>U-NII-7 (6.525-6.875 GHz)</td>
<td>30 dBm</td>
<td>17 dBm/MHz</td>
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<tr>
<td>Client Connected to Standard-Power Access Point</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low-Power Access Point (indoor only)</td>
<td>U-NII-5 (5.925-6.425 GHz)</td>
<td>30 dBm</td>
<td>5 dBm/MHz</td>
</tr>
<tr>
<td></td>
<td>U-NII-6 (6.425-6.525 GHz)</td>
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<td></td>
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<tr>
<td></td>
<td>U-NII-7 (6.525-6.875 GHz)</td>
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<tr>
<td></td>
<td>U-NII-8 (6.875-7.125 GHz)</td>
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<tr>
<td>Client Connected to Low-Power Access Point</td>
<td></td>
<td>24 dBm</td>
<td>-1 dBm/MHz</td>
</tr>
</tbody>
</table>
• Report and Order and Further Notice of Proposed Rulemaking adopted October 27, 2020

• Report and Order:
  • Increases maximum fixed device power from 10 watts to 16 watts EIRP in “less congested” areas (where at least half of TV channels are unused).
  • Increases HAAT limit for fixed devices from 250 meters to 500 meters in “less congested” areas, subject to a coordination procedure with TV broadcasters.
  • Eliminates limit on antenna height above ground in most cases.
  • Allows higher power mobile operations in “less congested” areas within defined “geo-fenced” areas.
  • Establishes new rules for narrowband IoT devices.

• Further Notice of Proposed Rulemaking:
  • Seeks comment on whether to permit the use of terrain-based propagation models for determining available TV channels.
  • Comments March 29, 2021 and reply comments on or before April 26, 2021.
Wireless Multi-Channel Audio System (WMAS) is an emerging technology that can enable more wireless microphones to operate per megahertz of spectrum.

Notice of Proposed Rulemaking to permit WMAS tentatively scheduled for vote April 22, 2021.

Proposals in publicly released draft:
- Allow WMAS under Part 74 (licensed) in the UHF and VHF TV bands, 600 MHz duplex gap, and in the 900 MHz, 1.4 GHz and 7 GHz bands.
- Allow WMAS to use a channel size of up to 6 megahertz.
- Require WMAS to operate with at least 3 audio channels per megahertz.
- Update Part 15 and Part 74 rules to require conventional wireless microphones to comply with emission mask and spurious emission limits in latest ETSI wireless microphone standard (2017 instead of 2011).
- Seek comment on whether to allow WMAS under Part 15 (unlicensed) in the TV bands and in the 600 MHz guard band and duplex gap.
Part 15 Waivers

- A radio frequency device that operates in accordance with the Part 15 unlicensed rules may not be marketed unless it has completed the appropriate equipment authorization process - certification for most intentional radiators.

- Certification will only be granted for a device that has demonstrated compliance with all applicable Commission rules.

- If a specific rule cannot be complied with, the responsible party may submit a request for waiver.
Waiver Process

• A request must demonstrate that there is good cause to waive the specific rule requirement.
  - If the staff determines that the request warrants further consideration, it typically will release a public notice establishing a period for public comment.

• The request will be granted or denied based upon review of the entire record.
  - When appropriate, grants may include special conditions intended to ensure that underlying purpose of the waived rule continues to be satisfied.

• Parties are expected to provide a copy of the granted waiver when submitting the application for certification.
Recent Waiver Grants and Filings

- Information about waiver filings and decisional documents may be found on the Commission’s website
  - The OET website includes headline links related to all Office activities: [www.fcc.gov/engineering-technology](http://www.fcc.gov/engineering-technology)
  - Commission and OET-level decisions may be found in the EDOCS system: [www.fcc.gov/edocs](http://www.fcc.gov/edocs)
  - Petitions and related comment may be found in the ECFS system: [www.fcc.gov/ecfs](http://www.fcc.gov/ecfs)
  - Decisions are referenced by FCC/DA #; Most proceedings may be found by Docket No.; Text/title search also available

- Recent waiver requests have reflected a variety of emerging technologies. Some examples include…
“Technology is providing new ways for families to help keep their children safe. That’s why I’m proud that the FCC can play a role in protecting kids from the avoidable danger of deadly heatstroke. With summer fast approaching, these waivers are a first step toward implementing a more permanent policy framework for promoting innovations like these life-saving auto safety technologies.” - Acting Chairwoman Jessica Rosenworcel
Motion Sensing Devices

Waiver Granted April 14, 2021, DA 21-407

Permits automotive in-cabin radar use at higher power than permitted by Section 15.255

Single Order addresses six similar waiver requests:
  • Vayyar Imaging (DA 21-407)
  • Valeo North America (DA 21-407)
  • Tesla (DA 21-407)
  • IEE Sensing (DA 21-407)
  • Infineon Technologies America (DA 21-407)
  • Brose North America (DA 21-407)

Motion Sensing Devices
Continued

• DA 21-407 Waiver Conditions:
  • Operate as a radar on new passenger motor vehicles in the 57-64 GHz band at a maximum +13 dBm EIRP, +10 dBm transmitter conducted output power, +13 dBm/MHz power spectral density, and a maximum transmit duty cycle of 10% in any 33 milliseconds (ms) interval.
  • Shall be restricted to factory installation in the interior cabin of new passenger motor vehicles as defined by 49 CFR § 571.3 (see the order).
  • Limited modular transmitter approval under 47 CFR § 15.212 (see the order)
  • Operations under this waiver may not be used to transmit data.
  • Users of these radars must be made aware through a disclosure in the vehicle Owner’s Manual or an equivalent means that that operation is subject to the conditions that no harmful interference is caused and that any interference must be accepted.
  • This waiver and its conditions shall apply only to radars intended for installation in passenger motor vehicles as described herein and are not to be considered to apply generally to any other radars or field disturbance sensors that will operate in different environments where further analysis would be necessary to assess the potential for impact to other authorized users.
  • The waiver conditions granted herein are not transferable to any third party via §2.933 or any other means of technology transfer.
  • Order is effective upon release
Identified need for further action in the 60 GHz band:

- **Additional pending waivers:** e.g. Acconeer AB (Open ET Docket No. 21-48) sensing device in the 57-64 GHz band to provide vehicle safety (presence detection, seat belt reminder) and security (intruder alarm) functions. Requests interpretation/waiver of Section 15.255(c)(3) (peak power level).

- **Technological Advisory Council Recommendation (Dec. 2020 Meeting)**
  - Start a rulemaking proceeding to examine 60 GHz rules in 47 C.F.R. 15.255 to address issues raised by waiver requests for field disturbance systems.
  - Power levels for radar applications, including potential for equivalent power levels to communication systems for LBT radar.
  - Coexistence mechanisms, including duty cycle requirements, DFS, and contention-based protocols.

- **DA 21-407 did not address Short-Range Interactive Motion (SRIMS) definition or limits of fixed use**
• **Rohde & Schwarz (DA 20-1025)** Security scanner system in the 70-80 GHz band designed to detect the presence of concealed metallic and non-metallic threats carried in or underneath the clothing of persons. Waivers of Sections 15.205 (restricted bands) and 15.209 (field strength limits) granted Sep. 2020.

• **Liberty Defense (Open ET Docket 19-217)** seeks waivers of rules related to measurements, ultra-wideband (UWB) operations and certain user restrictions (15.31, 15.503, 15.511 and 15.521) for its HEXWAVE weapons/threat detection system.
Ground Penetrating Radar (GPR), mapping, measuring & other uses

- **Robert Bosch (Open ET Docket No. 20-65)** parking lot occupancy sensor in the 2400-2483.5 MHz band. Requests waiver of Section 15.245(b) (frequency band for field disturbance sensors).

- **Zebra Technologies (Open ET Docket No. 20-17)** positioning system in the 7125-8500 MHz band for applications such as tracking players in sports venues and preventing accidents to airplane maintenance personnel. Requests waiver of Section 15.517(a) (indoor operation), 15.519(a)(1) (UWB technical requirements), or 15.250 (frequency range for wideband operation).

- **Wavesense (Open ET Docket No.19-241)** driver-assistance technology, which relies on UWB GPR to enable active lanekeeping in challenging environmental conditions; seeks waivers of certain operational and Federal coordination requirements (15.509 and 15.525)
Ground Penetrating Radar (GPR), mapping, measuring & industrial uses

• GSSI (Open ET Docket 19-155) request for waivers of the UWB rules to market up to 2000 evaluation kits for an UWB GPR intended to enable self-driving cars to read features of the roadbed beneath the pavement. (15.31, 15.503, and 15.509)

• Proceq (Open ET Docket 20-127) request for waivers of the UWB rules to test the safety, durability and sustainability of materials used in industrial settings. The request seeks to modify previously granted waiver to extend the operating frequency range from 200-6000 MHz to 30 MHz-8000 MHz.

• Leica (Open ET Docket No. 19-350) radar modules operating in the 60-64 GHz frequency band used on UAVs for hazard detection while in flight. Seeks waiver of the prohibition on-board aircraft in Section 15.255(b)(2). Waiver granted Jul. 2018.
Auspion now GuRu (Open ET Docket 19-83) request waiver of the Commission’s “local use” condition, as specified in the ISM definition, to allow its ISM system to operate at distances greater than 1 meter (3 feet) between the transmitter and receivers, as long as the transmitted power is directed to very precise locations, called “power spots,” where the receivers reside. GuRu’s “WiPod” system would operate in the 24 GHz Industrial, Scientific and Medical (ISM) frequency band (24.000-24.250 GHz) to provide power to, and/or charge, receivers located at various distances from the transmitter.
Railroad Safety

- **Metrom (DA 20-1186)** Waiver of the UWB rules for their AURA system designed to prevent collisions between trains, over-speed derailments, unauthorized train movement in work zones, and to minimize human error. (15.519(a), and 15.519(c)) granted Oct. 2020.

- **Piper (DA 20-1349)** Waiver of the UWB rules for their Enhanced Transit Location System (ETLS) designed to provide position information of trains, prevent train-to-train collisions and identifying unauthorized train movements in work zones. (15.519(a)(2) and 15.250(c)-(d)) granted Nov. 2020.
Hydroid (Open ET Docket No. ET 19-240) seeks a waiver to use directional gains in excess of 6 dBi, without reducing transmitter power, for two-way communications between vessels, and between shore points at fixed locations and vessels. (15.407(a)(3)).

Radwin LTD. (DA 20-1088) Waiver to permit the operation of its JET point-to-multipoint, beamforming fixed wireless base stations in the 5.15-5.25 GHz and 5.725-5.85 GHz bands with EIRP of up to 48 dBm (12 dB above the limit prescribed by the Commission’s rules). The waiver will permit its customers to provide better high-speed broadband service to subscribers so that they can stay connected and access essential services during the COVID-19 pandemic. Waiver granted Jul. 2020; extension granted Sep. 2020 (15.407(a)).
Medical devices


Medical devices Continued

• GE Healthcare (GEHC) (DA 20-489) To keep up with the demand created by COVID-19, GEHC requests limited waivers of the Commission's radio-frequency (RF) device equipment requirements to allow specific medical devices to be marketed, operated, and imported prior to such equipment receiving an equipment authorization grant. GEHC request waiver of certain provisions of title 47 of the Code of Federal Regulations (CFR) in part 2, part 15, part 18, and part 95 granted May 11, 2020.
Questions?

Thank you!