



What's New With Unlicensed National Information Infrastructure (U-NII)

First R&O + More to Come

TCB Workshop

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U-NII First R&O

**First Report & Order (First R&O): FCC 14-30 of
March 31, 2014**

<http://www.fcc.gov/document/5-ghz-u-nii-ro> or

http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-14-30A1.pdf

After public comments, reply comments, and internal deliberation. The First R&O Adopts new rules to increase the Security of devices and enhances the existing spectrum.

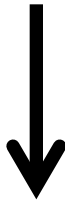
Includes a Transition Period for Manufacturers to comply with the new rules.



U-NII First R&O (¶ 9-10)

Proposed New Bands—U-NII-2B and 4 Bands

● Deferring action on these bands



| | | | | | | | |
|-----------------------|--|-----------------------|--|-----------------------|----------------------|--|----------|
| FIRST R&O RULES | U-NII-1 (100 MHz) <i>Outdoor use</i> | U-NII-2A (100 MHz) | None U-NII band (120 MHz) | U-NII-2C (255 MHz) | U-NII-3 (125 MHz) | None U-NII Band (75 MHz) | |
| | 250 mW for <i>Mobile /Portable Client devices</i> | 250 mW | Technical Rules If Any to be decided next R&O | 250 mW | 1 W | Technical Rules If Any to be decided next R&O | |
| | 5.150GHz | 5.250GHz | 5.350GHz | 5.470GHz | 5.725GHz | 5.850GHz | 5.925GHz |



U-NII First R&O (¶ 22-46)

U-NII-1

● Access Points

- Removes indoor restriction.
- Power: 50 mW → 1 W .
- PSD: 4 dBm/MHz → 17 dBm/MHz .

Non- Point to Point: 21 dBm EIRP above a 30 degree elevation angle.

Point to Point: 23 dBi antenna allowed before a power reduction.

Indoor: 6 dBi antenna allowed before a power reduction.



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|--------------|----------------------|-----------------------|--|-----------------------|----------------------|--|----------|
| R&O RULES | U-NII-1 (100 MHz) | U-NII-2A (100 MHz) | None U-NII-2B (120 MHz) | U-NII-2C (255 MHz) | U-NII-3 (125 MHz) | None U-NII-4 (75 MHz) | |
| | 1 W Outdoor use | 250 mW | Technical Rules If Any to be decided next R&O | 250 mW | 1 W | Technical Rules If Any to be decided next R&O | |
| | 5.150GHz | 5.250GHz | 5.350GHz | 5.470GHz | 5.725GHz | 5.850GHz | 5.925GHz |



U-NII First R&O (¶ 22-46)

U-NII-1

● Mobile and Portable Client Devices

- Power: 50 mW → 250 mW
- PSD: 4 dBm/MHz → 11 dBm/MHz
- 6 dBi antenna allowed before a power reduction.



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|-----------------------|--|-------------------------------------|---|-------------------------------------|---------------------------------|--|
| FIRST R&O RULES | U-NII-1 (100 MHz) <i>Outdoor use</i> 250 mW for Mobile /Portable Client devices | U-NII-2A (100 MHz) 250 mW | None U-NII band (120 MHz) Technical Rules to be decided next R&O | U-NII-2C (255 MHz) 250 mW | U-NII-3 (125 MHz) 1 W | None U-NII Band (75 MHz) Technical Rules to be decided next R&O |
| | 5.150GHz | 5.250GHz | 5.350GHz | 5.470GHz | 5.725GHz | 5.850GHz |



U-NII First R&O (¶ 48-67): Interference Avoidance & Mitigation

- Requires security features to prevent reprogramming.
 - No change to U-NII by unauthorized parties (country code, frequency range, modulation type, maximum output power).
- Explicitly requires U-NII-2 equipment to operate with the DFS on.
- Sensing requirements.
 - Changes from 80% to 100% of emissions bandwidth.



Interference Avoidance & Mitigation Continued

- Removes the restriction for certification in the U-NII-2C band under the interim certification procedures.
 - Manufacturers have the option of using the new rule to or the interim procedures for up to twelve months.
- 50 MHz of spectrum is available for U-NII use again.



U-NII First R&O(¶ 76-86)

Dynamic Frequency Selection (DFS)

- Sensing
 - Sensing requirements
 - 100% of emissions bandwidth
 - Adjacent channel sensing NOT required
 - Relaxed sensing threshold (-62 dBm)
 - Permit when EIRP < 200 mW and
 - **PSD < 10 dBm/ MHz**
- New Bin 1 radar waveforms.
- Eliminates uniform channel spreading requirement.
- Does not require demonstration of channel loading with MPEG test file.



U-NII First R&O(¶87-123)

5.8-GHz 15.247 DTS Merges Into U-NII-3

- Extend the U-NII-3 band by 25 MHz to match 15.247 band.
- 1watt limit with 6 dBi antenna and no bandwidth dependence.
- Minimum 500 kHz 6 dB bandwidth.
- Fixed point-to-point allowed without reduction to power or PSD for high gain systems.
- PSD limit = 30 dBm / 500 kHz (reference bandwidth)
- **Keeps** 15.407 Unwanted emissions limit(Below -17 dBm/MHz within 10 MHz of band edge, below -27 dBm/MHz beyond 10 MHz of the band edge. 15.209 general emission limits below 1 GHz.)
- Measurement bandwidth can be 300 kHz
- Removes 5.8 GHz DTS from 15.247 (Frequency hopping remains)[Effective After **12 months**]



U-NII First R&O(87-123)

5.8-GHz 15.247 DTS Merges Into U -NII 3

Will simplify testing:



| | | | | | | | |
|-----------|--|--|---|--|---|--------|---|
| OLD RULES | No DFS U-NII-1 (100 MHz) 50 mW Indoor Only | DFS U-NII-2A (100 MHz) 250 mW | U-NII-2B U-NII band (120 MHz) No Technical Rules | DFS U-NII-2C (255 MHz) 250 mW | No DFS U-NII-3 (100 MHz) 1 W | 25 MHz | U-NII-4 U-NII Band (75 MHz) No Technical Rules |
| | | | | | | | Part 15.247 Rules (125 MHz) |

| | | | | | | |
|-----------------|--|-------------------------------------|---|-------------------------------------|---------------------------------|--|
| FIRST R&O RULES | U-NII-1 (100 MHz) <i>Outdoor use</i> <i>250 mW for Mobile /Portable Client devices</i> <i>1 W for AP's</i> | U-NII-2A (100 MHz) 250 mW | None U-NII band (120 MHz) Technical Rules to be decided next R&O | U-NII-2C (255 MHz) 250 mW | U-NII-3 (125 MHz) 1 W | None U-NII Band (75 MHz) Technical Rules to be decided next R&O |
|-----------------|--|-------------------------------------|---|-------------------------------------|---------------------------------|--|

5.150GHz

5.250GHz

5.350GHz

5.470GHz

5.725GHz

5.850GHz

5.925GHz



U-NII First R&O(¶ 124-125) Rule Cleanup

- **Power and PSD:** average over interval of continuous transmission (not peak)
 - Maximum conducted output power
 - Removes references to “detector response times” and “true peak”
 - “Peak power spectral density” -> “Maximum Power Spectral Density”
- **Peak excursion:** this requirement was removed as it was determined to be no longer necessary.
- **§15.215:** Emission bandwidth of U-NII devices may span across multiple U-NII sub-bands.



U-NII First R&O(¶ 126-134)

Transition Periods

- **Grandfathering-** Existing devices will be grandfathered for the life of the equipment. Applies to devices which are operating in field, do not cause interference, and are not modified.
- **12 month transition** – applications for certification of U-NII devices must meet the new and modified rules after 12 months.
- **24 month transition** – the manufacture, marketing, sale and importation of non-compliant devices must cease after 2 years.
- **Class II permissive change** – allowed for old equipment for up to 2 years under the old rules.
- **Class II permissive change** – allowed indefinitely if such changes would result in compliance with the new or modified rules.



Questions and Answers

Thanks!