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# Test report

## 311245-4TRFWL

Date of issue: May 10, 2017

Applicant:

Siemens Canada Ltd.

Product:

Multiprotocol Intelligent Node with LTE and Wi-Fi

Model:

RX1400

FCC ID:

VG5RX1400

IC Registration Number:

4997A-VG5RX1400

Specifications:

- FCC 47 CFR Part 15 Subpart E, §15.407(h)

  Unlicensed National Information Infrastructure Devises
  (2) Dynamic Frequency Selection (DFS)

- RSS-247 Issue 2, February 2017, Section 6.3

  Licence-Exempt Local Area Network (LE-LAN) Devices. Dynamic Frequency Selection (DFS) for Devices Operating in the Bands 5250–5350 MHz, 5470–5600 MHz and 5650–5725 MHz

Test location

| | |
|---|---|
| Company name | Nemko Canada Inc. |
| Address | 303 River Road |
| City | Ottawa |
| Province | Ontario |
| Postal code | K1V 1H2 |
| Country | Canada |
| Telephone | +1 613 737 9680 |
| Facsimile | +1 613 737 9691 |
| Toll free | +1 800 563 6336 |
| Website | www.nemko.com |
| Site number | FCC: 176392 (3 m semi anechoic chamber) |

| | |
|---|---|
| Tested by | Andrey Adelberg, Senior Wireless/EMC Specialist |
| Reviewed by | Kevin Rose, Wireless/EMC Specialist |
| Date | May 10, 2017 |
| Signature of the reviewer |  |

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.
This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contain in this report are within Nemko Canada's ISO/IEC 17025 accreditation.

Copyright notification

# Table of contents

# **Section 1.** Report summary

## 1.1 Applicant and manufacturer

| | |
|---|---|
| Company name | Siemens Canada Ltd. |
| Address | 300 Applewood Cres |
| City | Concord |
| Province/State | Ontario |
| Postal/Zip code | L4K 5C7 |
| Country | Canada |

## 1.2 Test specifications

| | |
|---|---|
| FCC 47 CFR Part 15, Subpart E, Clause 15.407 | Unlicensed National Information Infrastructure Devises |
| RSS-247 Issue 2, February 2017, Section 6.3 | DFS for Licence-Exempt Local Area Network (LE-LAN) Devices |

## 1.3 Test methods

| | |
|---|---|
| 789033 D02 General U-NII Test Procedures New Rules v01r03 | Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E |
| 905462 D03 Client Without DFS New Rules v01r02 | U-NII client devices without radar detection capability |
| 905462 D02 UNII DFS Compliance Procedures New Rules v02 | Compliance measurement procedures for unlicensed – national information infrastructure devices operating in the 5250–5350 MHz and 5470–5725 MHz bands incorporating dynamic frequency selection |

## 1.4 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was completed against all relevant requirements of the test standard. Results obtained indicate that the product under test complies in full with the requirements tested. The test results relate only to the items tested.

See “Summary of test results” for full details.

## 1.5 Exclusions

None.

## 1.6 Test report revision history

| Revision # | Details of changes made to test report |
|---|---|
| TRF | Original report issued |

# **Section 2.** Summary of test results

## 2.1 FCC §15.407(h)(2), test results

| KDB Section | Test description | Verdict |
|---|---|---|
| 5.2 | DFS detection threshold | Pass |
| 7.8.1 | U-NII detection bandwidth | Pass |
| 7.8.2.1 | Initial Channel Availability Check (CAC) time | Pass |
| 7.8.2.2 | In-service monitoring, radar burst at the beginning of the CAC | Pass |
| 7.8.2.3 | In-service monitoring, radar burst at the end of the CAC | Pass |
| 7.8.3 | Channel move time | Pass |
| 7.8.3 | Channel closing transmission time | Pass |
| 7.8.3 | Non-occupancy period | Pass |
| 7.8.4.1 | Statistical performance with short pulse radar test | Pass |
| 7.8.4.2 | Statistical performance with long pulse radar test | Pass |
| 7.8.4.3 | Statistical performance with frequency hopping radar test | Pass |

Note: None

## 2.2 RSS-247 Issue 2, test results

| Section | Test description | Verdict |
|---|---|---|
| RSS-247 6.3.1 | DFS radar signal detection threshold | Pass |
| KDB Section 7.8.1 | U-NII detection bandwidth | Pass |
| RSS-247 6.3.2 (b) | Initial Channel Availability Check (CAC) time | Pass |
| RSS-247 6.3.2 (a) | In-service monitoring, radar burst at the beginning of the CAC | Pass |
| RSS-247 6.3.2 (a) | In-service monitoring, radar burst at the end of the CAC | Pass |
| RSS-247 6.3.2 (c) | Channel move time | Pass |
| RSS-247 6.3.2 (d) | Channel closing transmission time | Pass |
| RSS-247 6.3.2 (e) | Non-occupancy period | Pass |
| KDB Section7.8.4.1 | Statistical performance with short pulse radar test | Pass |
| KDB Section7.8.4.2 | Statistical performance with long pulse radar test | Pass |
| KDB Section7.8.4.3 | Statistical performance with frequency hopping radar test | Pass |

Note: None

# **Section 3.** Equipment under test (EUT) details

## 3.1 Sample information

| | |
|---|---|
| Receipt date | August 1, 2016 |
| Nemko sample ID number | 1 (48 $V_{DC}$), 2 (24 $V_{DC}$) and 3 (120 $V_{AC}$) |

## 3.2 EUT (Master) information

| | |
|---|---|
| Product name | Multiprotocol Intelligent Node with LTE and Wi-Fi |
| Model | RX1400 |
| Part number | 6GK60140AM230AA0-ZA02+C00+D00+E00+F00+G02+V00 (120 $V_{AC}$) – EUT (Master) |
| Part number variants | 6GK60140AM210AA0-ZA02+C00+D00+E00+F00+G02+V00 (24 $V_{DC}$)<br>6GK60140AM220AA0-ZA02+C00+D00+E00+F00+G02+V00 (48 $V_{DC}$) |
| Serial number | RUM/H805061787 (48 $V_{DC}$), RUM/H805061785 (24 $V_{DC}$), RUM/H805061788 (120 $V_{AC}$) |
| RF module information | Manufacturer: TI<br>P/N: WL1807MODGIMOCT<br>MAC FW version: 8.9.0.2.55<br>PHY version: 8.2.0.0.233 |

## 3.3 AUX (Client) information

| | |
|---|---|
| Product name | Multiprotocol Intelligent Node with LTE and Wi-Fi |
| Model | RX1400 |
| Part number | 6GK60140AM210AA0-ZA02+C00+D00+E00+F00+G02+V00 (24 $V_{DC}$) |
| Serial number | RUM/H805061785 (24 $V_{DC}$) |
| RF module information | Manufacturer: TI<br>P/N: WL1807MODGIMOCT<br>MAC FW version: 8.9.0.2.55<br>PHY version: 8.2.0.0.233 |

## 3.4 Technical information

| | |
|---|---|
| Operating band | 5250–5350 MHz, 5470–5725 MHz |
| Operating frequencies | (U-NII-2A for 20 MHz channels): 5260–5230 MHz, (U-NII-2C for 20 MHz channels): 5500–5700 MHz,<br>(U-NII-2A for 40 MHz channels): 5270–5310 MHz, (U-NII-2C for 40 MHz channels): 5510–5670 MHz |
| Modulation type | 802.11a, 802.11n HT20, 802.11n HT40 |
| Channel bandwidth | 20 MHz, 40 MHz |
| Power requirements | 120 $V_{AC}$ 60 Hz |
| RF power Max (W), Conducted | (U-NII-2A for 20 MHz channels): 0.0139, (U-NII-2C for 20 MHz channels): 0.0187<br>(U-NII-2A for 40 MHz channels): 0.0069, (U-NII-2C for 40 MHz channels): 0.0090 |
| Antenna information | See table below. The EUT uses a unique antenna coupling/ non-detachable antenna to the intentional radiator. |
| DFS type | EUT was assessed as a Master device. |

***Table 3.4-1:*** *Antenna[1] information*

| Model number | Directivity | Gain, dBi |
|---|---|---|
| ANT793-8DJ (FCC only) | Directional | 18[2] |
| ANT793-8DP (FCC only) | Directional | 13.5[3] |
| ANT795-6DC (FCC only) | Directional | 9 |
| ANT793-6DG (FCC only) | Directional | 9 |
| ANT795-6MN (FCC only) | Omni-directional | 8 |
| ANT793-6DT (FCC only) | Omni-directional | 8 |
| ANT795-6MT (FCC only) | Omni-directional | 7 |
| ANT793-4MN | Omni-directional | 6 |
| ANT795-4MA | Omni-directional | 5 |
| ANT795-4MC | Omni-directional | 5 |
| ANT795-4MD | Omni-directional | 5 |
| ANT793-6MN | Omni-directional | 5 |
| ANT795-4MX | Omni-directional | 2.5 |

Notes: [1]The EUT is professionally installed

[2]Connected via 10 m cable, 6X1875-5CN10, 8.8 dB loss. Total gain 9.2 dBi

[3]Connected via 5 m cable, 6X1875-5CH50, 4.4 dB loss. Total gain 9.1 dBi

## 3.5 Product description and theory of operation

The RUGGEDCOM RX1400 is a multi-protocol intelligent node that combines Ethernet switch, routing and firewall functionality with various wide area connectivity options. The RX1400 switch, with its rugged metal housing, is designed for DIN rail, panel or rack mounting. The device has IP40 degree protection, does not use internal fans for cooling and supports a −40 to 85 °C (−40 to 185 °F) extended temperature range.

Wireless Interfaces

WWAN module (Contains FCC ID: N7NMC7355 / IC: 2417C-MC7355):

- LTE: 700- B13, B17, 800/900/1800/2100/2600 MHz
- UMTS/HSPA+: 850/900/1900/2100 MHz
- Quad-Band EDGE/GPRS/GSM

GNSS

WLAN Access Point and Client: WLAN Direct® (multi-channel, multi-role) dual band transceiver support of IEEE 802.11a/b/g/n for 2.4 GHz 2×2 MIMO and 5 GHz SISO, 20 MHz and 40 MHz channels

Ethernet Interfaces

- 4 × 10/100Base-T RJ45 ports Serial Interfaces with Isolation

Optical SFP Pluggable Transceivers

- 2 × 1000 Mbit/s ports

Serial Interface with isolation

- 2 × RS232/422/485 ports

Other Interfaces

- Isolated built-in power input
- RS232 console port for local management/ diagnostics on the device
- SMA connectors for RF interfaces

Power Supply

- 12 to 24 $V_{DC}$
- ±12 to 24 $V_{DC}$
- ±48 $V_{DC}$
- HI VAC/VDC

## 3.6 EUT exercise details

EUT was controlled from laptop using web GUI and CLI commands.
Channel loading of at least 17% was achieved by using *iperf* session between master and slave devices.

# **Section 4.** Engineering considerations

## 4.1 Modifications incorporated in the EUT

There were no modifications performed to the EUT during this assessment.

## 4.2 Technical judgment

None

## 4.3 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

# **Section 5.** Test conditions

## 5.1 Atmospheric conditions

| | |
|---|---|
| Temperature | 15–30 °C |
| Relative humidity | 20–75 % |
| Air pressure | 860–1060 mbar |

When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded and stated.

## 5.2 Power supply range

The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages ±5 %, for which the equipment was designed.

## 5.3 Uncertainty of measurement

Nemko Canada Inc. has calculated measurement uncertainty and is documented in EMC/MUC/001 “Uncertainty in EMC measurements.” Measurement uncertainty was calculated using the methods described in CISPR 16-4 Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC measurements; as well as described in UKAS LAB34: The expression of Uncertainty in EMC Testing. Measurement uncertainty calculations assume a coverage factor of K=2 with 95% certainty.

# **Section 6.** Test equipment

## 6.1 Test equipment list

***Table 6.1-1:*** *Equipment list*

| Equipment | Manufacturer | Model no. | Asset no. | Cal cycle | Next cal. |
|---|---|---|---|---|---|
| DFS test box | Aeroflex | PXI | FA002628 | 1 year | Jan. 14/18 |
| Spectrum analyzer | Rohde & Schwarz | FSU | FA001877 | 1 year | Apr. 15/17 |

# **Section 7.** Test rules and requirements

## 7.1 FCC 15.407(h)(2) Radar Detection Function of Dynamic Frequency Selection (DFS)

(2) Radar Detection Function of Dynamic Frequency Selection (DFS). U-NII devices operating with any part of its 26 dB emission bandwidth in the 5.25–5.35 GHz and 5.47–5.725 GHz bands shall employ a DFS radar detection mechanism to detect the presence of radar systems and to avoid co-channel operation with radar systems. Operators shall only use equipment with a DFS mechanism that is turned on when operating in these bands. The device must sense for radar signals at 100 percent of its emission bandwidth. The minimum DFS detection threshold for devices with a maximum e.i.r.p. of 200 mW to 1 W (23–30 dBm) is −64 dBm. For devices that operate with less than 200 mW (23 dBm) e.i.r.p. and a power spectral density of less than 10 dBm in a 1 MHz band, the minimum detection threshold is −62 dBm. The detection threshold is the received power averaged over 1 microsecond referenced to a 0 dBi antenna. For the initial channel setting, the manufacturers shall be permitted to provide for either random channel selection or manual channel selection.

(i) Operational Modes. The DFS requirement applies to the following operational modes:

(A) The requirement for channel availability check time applies in the master operational mode.

(B) The requirement for channel move time applies in both the master and slave operational modes.

(ii) Channel Availability Check Time. A U-NII device shall check if there is a radar system already operating on the channel before it can initiate a transmission on a channel and when it has to move to a new channel. The U-NII device may start using the channel if no radar signal with a power level greater than the interference threshold values listed in paragraph (h)(2) of this section, is detected within 60 seconds.

(iii) Channel Move Time. After a radar's presence is detected, all transmissions shall cease on the operating channel within 10 seconds. Transmissions during this period shall consist of normal traffic for a maximum of 200 ms after detection of the radar signal. In addition, intermittent management and control signals can be sent during the remaining time to facilitate vacating the operating channel.

(iv) Non-occupancy Period. A channel that has been flagged as containing a radar system, either by a channel availability check or in-service monitoring, is subject to a non-occupancy period of at least 30 minutes. The non-occupancy period starts at the time when the radar system is detected.

***Table 7.1-1:*** *DFS Response Requirement Values*

| Parameter | Value |
|---|---|
| Non-occupancy period | Minimum 30 minutes |
| Channel Availability Check Time | 60 seconds |
| Channel Move Time | 10 seconds[1] |
| Channel Closing Transmission Time | 200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period[1 and 2] |
| U-NII Detection Bandwidth | Minimum 100% of the 99% power bandwidth[3] |

Notes:

[1] The instant that the *Channel Move Time* and the *Channel Closing Transmission Time* begins is as follows:

- For the Short pulse radar Test Signals this instant is the end of the Burst.
- For the Frequency Hopping radar Test Signal, this instant is the end of the last radar Burst generated.
- For the Long Pulse radar Test Signal this instant is the end of the 12 second period defining the radar transmission.

[2] The *Channel Closing Transmission Time* is comprised of 200 milliseconds starting at the beginning of the *Channel Move Time* plus any additional intermittent control signals required to facilitate Channel changes (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.

[3] During the *U-NII Detection Bandwidth* detection test, radar type 0 is used and for each frequency step the minimum percentage of detection is 90%. Measurements are performed with no data traffic.

***Table 7.1-2:*** *Short Pulse Radar Test Waveforms*

| Radar type | Pulse width, µs | Pulse Repetition Interval (PRI), µs | Number of pulses | Minimum percentage of successful detection | Minimum number of trials |
|---|---|---|---|---|---|
| 0 | 1 | 1428 | 18 | See note | See note |
| 1 | 1 | **Test A:** 15 unique PRI values randomly selected from the list of 23 PRI values in table below<br><br>**Test B:** 15 unique PRI values randomly selected within the range of 518–3066 µs, with a minimum increment of 1 µs, excluding PRI values selected in Test A | Roundup{(1 ÷ 360) × (19 × $10^6$ ÷ $PRI_{\mu s}$)} | 60% | 30 |
| 2 | 1–5 | 150–230 | 23–29 | 60% | 30 |
| 3 | 6–10 | 200–500 | 16–18 | 60% | 30 |
| 4 | 11–20 | 200–500 | 12–16 | 60% | 30 |
| Aggregate (Radar types 1–4) | | | | 80% | 120 |

Note: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.

***Table 7.1-3:*** *Pulse Repetition Intervals Values for Test A*

| Pulse Repetition Frequency number | Pulse Repetition Frequency, Pulses per second | Pulse Repetition Interval (PRI), µs |
|---|---|---|
| 1 | 1930.5 | 518 |
| 2 | 1818.7 | 538 |
| 3 | 1792.1 | 558 |
| 4 | 1730.1 | 578 |
| 5 | 1672.2 | 598 |
| 6 | 1618.1 | 618 |
| 7 | 1567.4 | 638 |
| 8 | 1519.8 | 658 |
| 9 | 1474.9 | 678 |
| 10 | 1432.7 | 698 |
| 11 | 1392.8 | 718 |
| 12 | 1355.0 | 738 |
| 13 | 1319.3 | 758 |
| 14 | 1285.3 | 778 |
| 15 | 1253.1 | 798 |
| 16 | 1222.5 | 818 |
| 17 | 1193.3 | 838 |
| 18 | 1165.6 | 858 |
| 19 | 1139.0 | 878 |
| 20 | 1113.6 | 898 |
| 21 | 1089.3 | 918 |
| 22 | 1066.1 | 938 |
| 23 | 326.2 | 3066 |

***Table 7.1-4:*** *Long Pulse Radar Test Waveforms*

| Radar type | Pulse width, µs | Chirp width, MHz | Pulse Repetition Interval (PRI), µs | Number of pulses per burst | Number of bursts | Minimum percentage of successful detection | Minimum number of trials |
|---|---|---|---|---|---|---|---|
| 5 | 50–100 | 5–20 | 1000–2000 | 1–3 | 8–20 | 80% | 30 |

***Table 7.1-5:*** *Frequency Hopping Radar Test Waveforms*

| Radar type | Pulse width, µs | Pulse Repetition Interval (PRI), µs | Pulses per hop | Hopping rate, kHz | Hopping sequence length, ms | Minimum percentage of successful detection | Minimum number of trials |
|---|---|---|---|---|---|---|---|
| 6 | 1 | 333 | 9 | 0.333 | 300 | 70% | 30 |

***Table 7.1-6:*** *Summary of the requirements*

| Description | Radar type | Requirement | Notes |
|---|---|---|---|
| 5.2 DFS Detection Threshold | Type 0 | −64 dBm | Any BW |
| 7.8.1 U-NII Detection Bandwidth | Type 0–4 (any) | 100 % of 99 % BW | 10 trials for each BW |
| 7.8.2.1 Initial Channel Availability Check (CAC) Time | Type 0–4 (any) | ≥60 s | Any BW |
| 7.8.2.2 Radar Burst at the Beginning of the CAC | Type 0–4 (any) | No Tx | Any BW |
| 7.8.2.3 Radar Burst at the End of the CAC | Type 0–4 (any) | No Tx | Any BW |
| 7.8.3 Channel Move Time | Type 0 | ≤10 s | Widest BW |
| 7.8.3 Channel Closing Transmission Time | Type 0 | ≤260 ms | Widest BW |
| 7.8.3 Non-Occupancy Period | Type 0 | >30 min | |
| 7.8.4 Statistical Performance Check: | Type 1–6 (all) | | Each BW; Each 20 MHz channels + center |
| 7.8.4.1 Short Pulse Radar Test | Type 1–4 (all) | 60% detection | 30 trials (for each type) |
| 7.8.4.2 Long Pulse Radar Test | Type 5 | 80% detection | 30 trials |
| 7.8.4.3 Frequency hopping Radar Test | Type 6 | 70% detection | 30 trials |

## 7.2 RSS-247 6.3 Radar Detection Function of Dynamic Frequency Selection (DFS)

Industry Canada requires the use of either the FCC KDB Procedure 905462 or the DFS test procedure in the ETSI EN 301 893 for demonstrating compliance with the DFS radar detection requirements set out in this section.

If any part of an operating device's emission bandwidth falls in the bands 5250–5350 MHz, 5470–5600 MHz or 5650–5725 MHz, the device shall comply with the following:

**1) DFS radar signal detection threshold**

Devices shall employ a DFS radar detection mechanism to detect the presence of radar systems and to avoid co-channel operation with radar systems. The device must detect radar signals within its entire emission bandwidth. The minimum DFS radar signal detection threshold is described below in Table below.

***Table 7.2-1:*** *DFS Detection Threshold for Master Devices and Slave Devices with Radar Detection*

| Devices' e.i.r.p. information | DFS Threshold |
|---|---|
| Devices with an e.i.r.p. < 200 mW AND a Power Spectral Density < 10 dBm/MHz | −62 dBm |
| Devices with 200 mW ≤ e.i.r.p. ≤ 1 W | −64 dBm |

Note: The detection threshold power is the received power, averaged over a 1-microsecond reference to a 0 dBi antenna.

**2) Operational requirements**

The requirement for channel availability check time applies in the master operational mode. The requirement for channel move time applies in both the master and slave operational modes. The requirement for in-service monitoring does not apply to slave devices without radar detection.

i. ***In-service monitoring:*** an LE-LAN device shall be able to monitor the operating channel to check that a co-channel radar has not moved or started operation within range of the LE-LAN device. During in-service monitoring, the LE-LAN radar detection function continuously searches for radar signals between normal LE-LAN transmissions.
ii. ***Channel availability check time:*** the device shall check whether there is a radar system already operating on the channel before it initiates a transmission on a channel and when it moves to a channel. The device may start using the channel if no radar signal with a power level greater than the interference threshold value specified in Section 6.3(1) above is detected within 60 seconds.
iii. ***Channel move time:*** after a radar signal is detected, the device shall cease all transmissions on the operating channel within 10 seconds.
iv. ***Channel closing transmission time:*** is comprised of 200 ms starting at the beginning of the channel move time plus any additional intermittent control signals required to facilitate a channel move (an aggregate of 60 ms) over the remaining 10-second period of the channel move time.
v. ***Non-occupancy period:*** a channel that has been flagged as containing a radar signal, either by a channel availability check or in-service monitoring, is subject to a 30-minute non-occupancy period where the channel cannot be used by the LE-LAN device. The non-occupancy period starts from the time that the radar signal is detected.

# Section 8. Testing data

## 8.1 Dynamic Frequency Selection (DFS) detection threshold

### 8.1.1 Definitions and limits

The minimum DFS detection threshold for devices with a maximum e.i.r.p. of 200 mW to 1 W (23–30 dBm) is −64 dBm. For devices that operate with less than 200 mW (23 dBm) e.i.r.p. and a power spectral density of less than 10 dBm in a 1 MHz band, the minimum detection threshold is −62 dBm. The detection threshold is the received power averaged over 1 microsecond referenced to a 0 dBi antenna. For the initial channel setting, the manufacturers shall be permitted to provide for either random channel selection or manual channel selection.

### 8.1.2 Test summary

| | | | |
|---|---|---|---|
| Test date | April 21, 2017 | Temperature | 23 °C |
| Test engineer | Andrey Adelberg | Air pressure | 1004 mbar |
| Verdict | Pass | Relative humidity | 41 % |

### 8.1.3 Observations, settings and special notes

This test was performed once on the widest channel BW, which is 40 MHz with the use of Radar type 0.
Maximum EIRP is less than 23 dBm, therefore detection threshold limit was −62 dBm. 1 dB was added to compensate for variations in measurement equipment. The testing was performed conducted at the antenna port (similar to 0 dBi antenna gain).

### 8.1.4 Test data

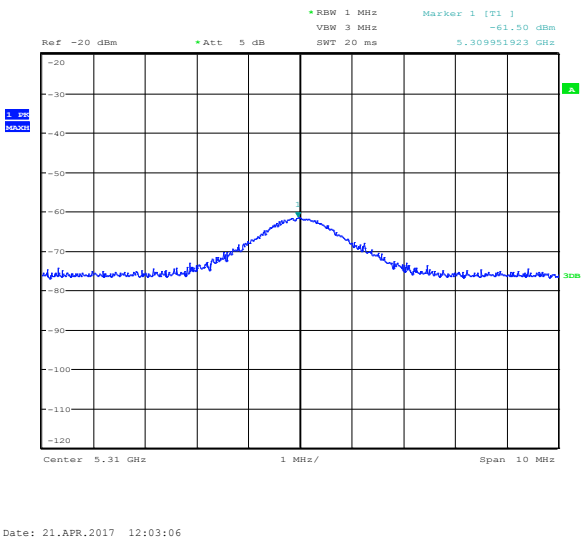


***Figure 8.1-1:*** *Detection threshold measurements on U-NII-2A band, Type 0*

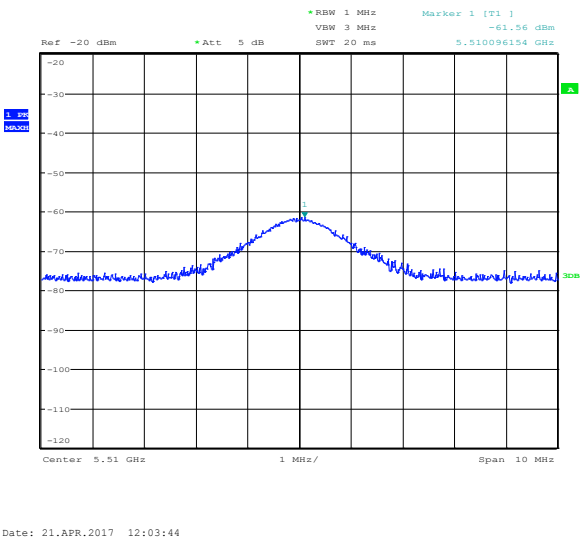


***Figure 8.1-2:*** *Detection threshold measurements on U-NII-2C band, Type 0*

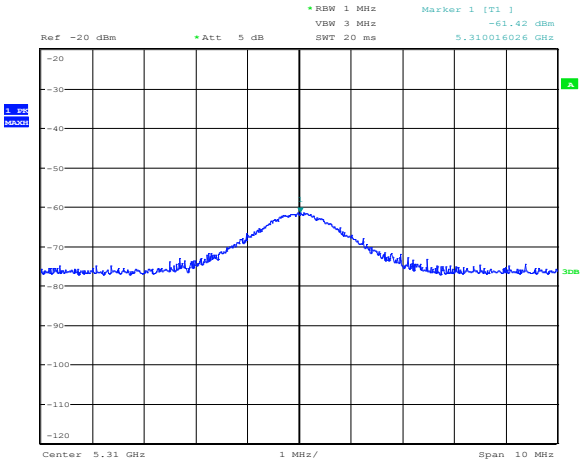


***Figure 8.1-3:*** *Detection threshold measurements on U-NII-2A band, Type 1*

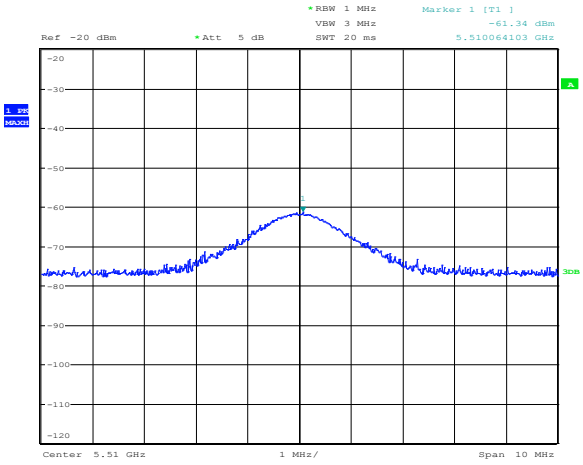


***Figure 8.1-4:*** *Detection threshold measurements on U-NII-2C band, Type 1*

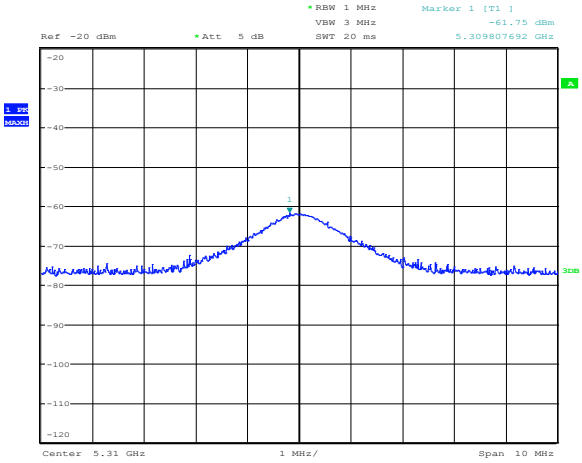


***Figure 8.1-5:*** *Detection threshold measurements on U-NII-2A band, Type 2*

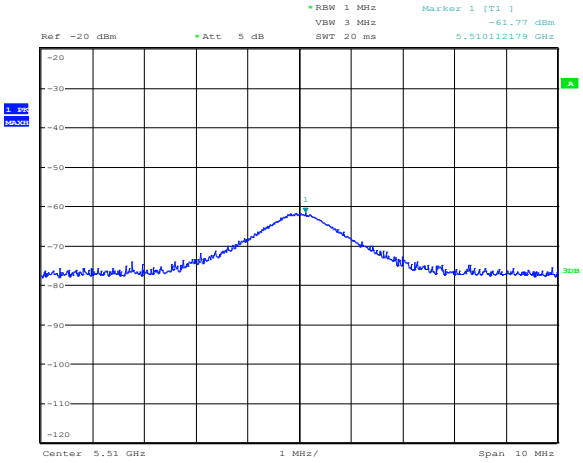


***Figure 8.1-6:*** *Detection threshold measurements on U-NII-2C band, Type 2*

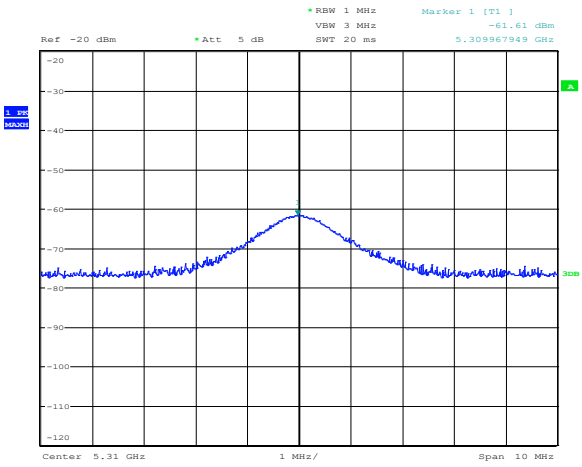


***Figure 8.1-7:*** *Detection threshold measurements on U-NII-2A band, Type 3*

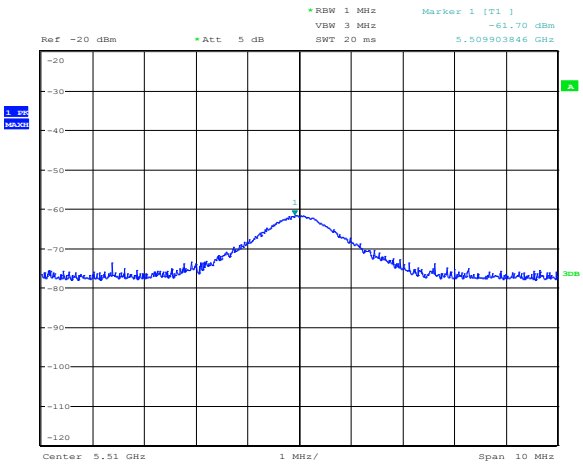


***Figure 8.1-8:*** *Detection threshold measurements on U-NII-2C band, Type 3*

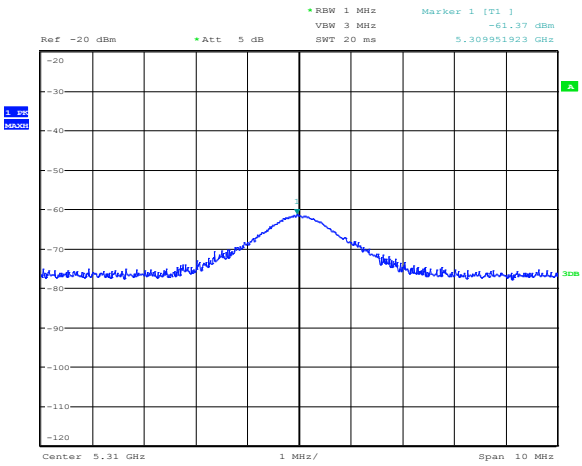


***Figure 8.1-9:*** *Detection threshold measurements on U-NII-2A band, Type 4*

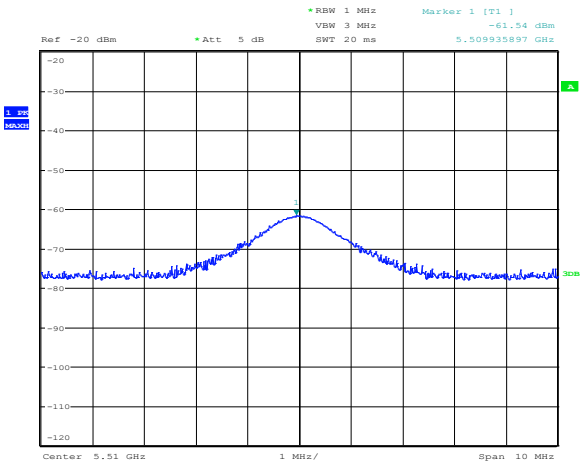


***Figure 8.1-10:*** *Detection threshold measurements on U-NII-2C band, Type 4*

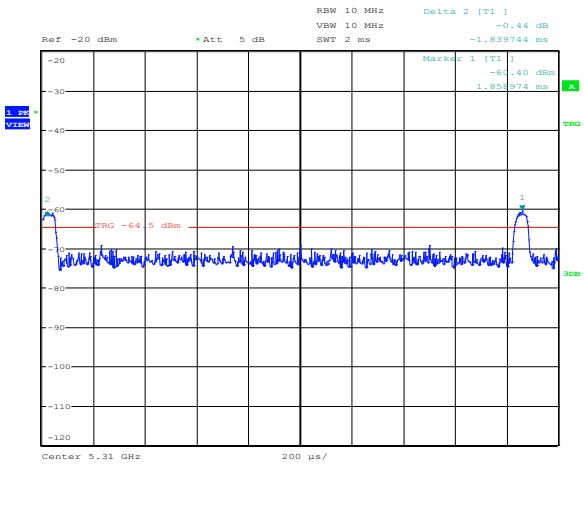


***Figure 8.1-11:*** *Detection threshold measurements on U-NII-2A band, Type 3*

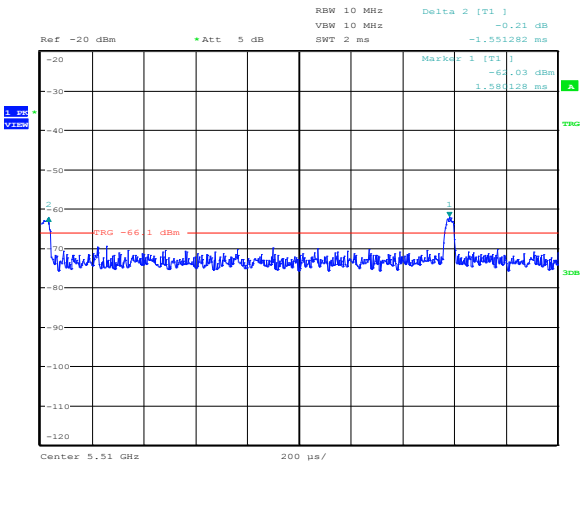


***Figure 8.1-12:*** *Detection threshold measurements on U-NII-2C band, Type 3*

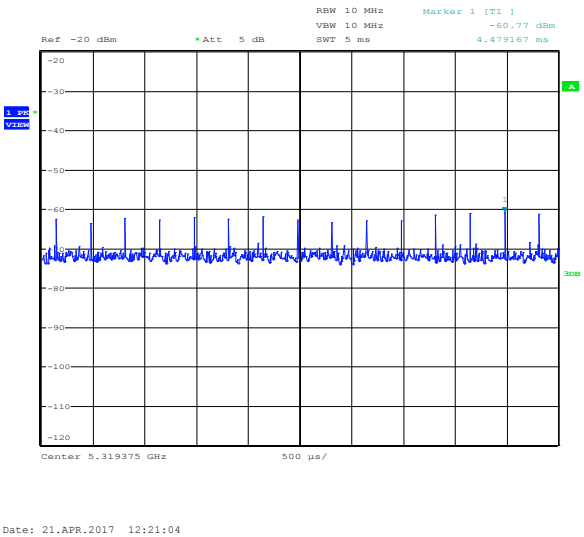


***Figure 8.1-13:*** *Detection threshold measurements on U-NII-2A band, Type 4*

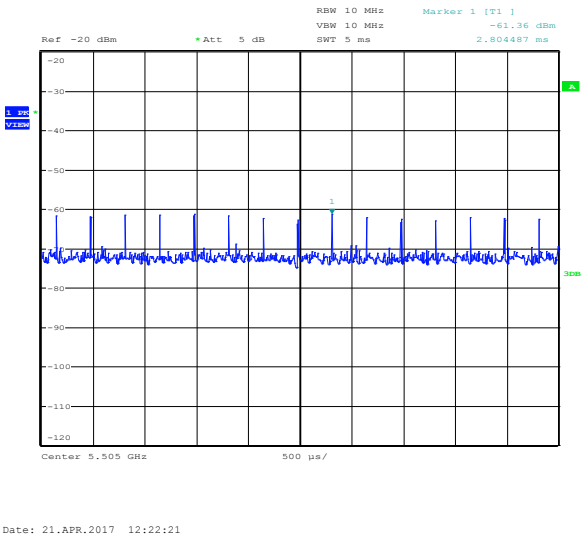


***Figure 8.1-14:*** *Detection threshold measurements on U-NII-2C band, Type 4*

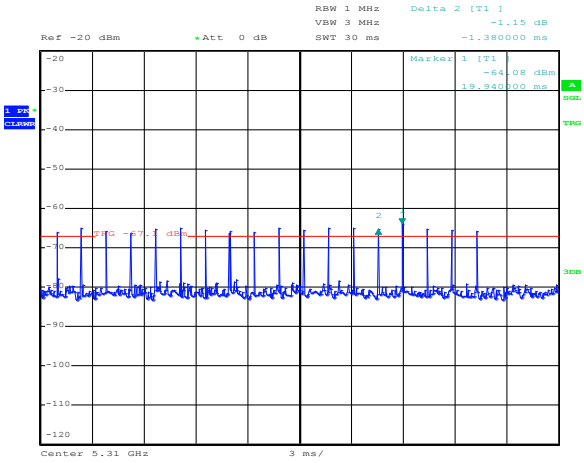


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***Figure 8.1-15:*** *Radar waveform burst view on U-NII-2A band, Type 0*

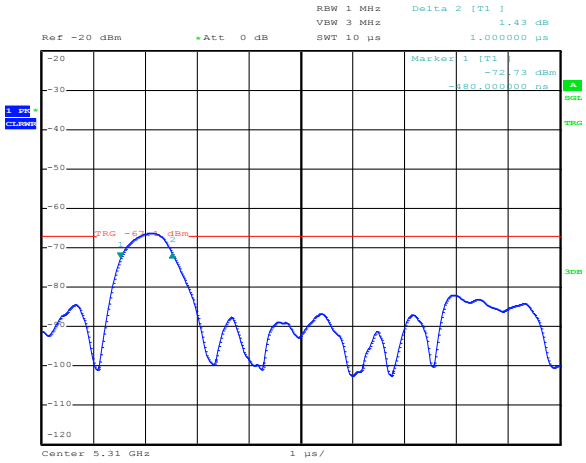


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***Figure 8.1-16:*** *Pulse width on U-NII-2A band, Type 0*

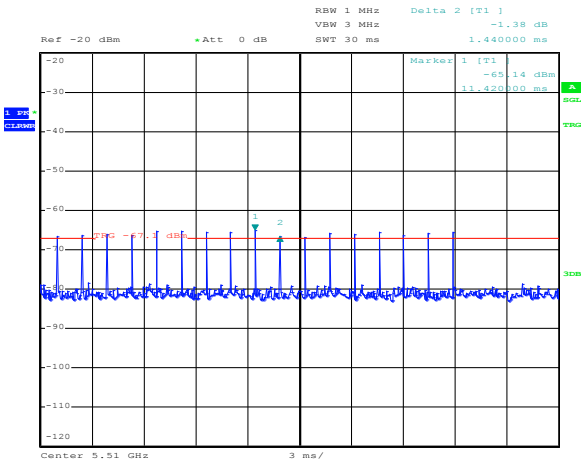


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***Figure 8.1-17:*** *Radar waveform burst view on U-NII-2C band, Type 0*

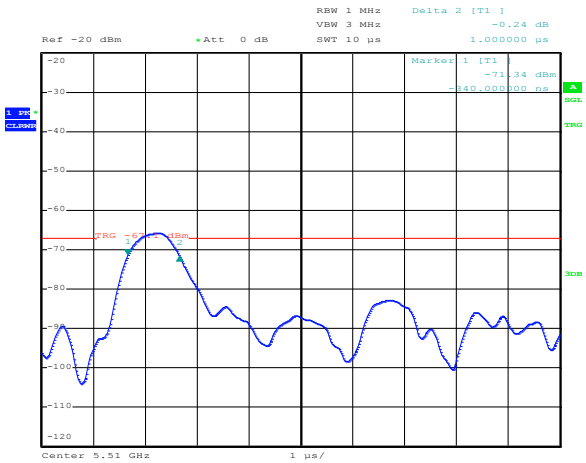


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***Figure 8.1-18:*** *Pulse width on U-NII-2C band, Type 0*

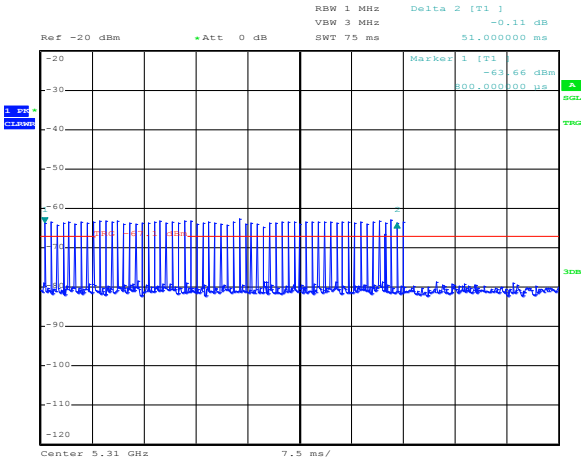


***Figure 8.1-19:*** *Radar waveform burst view on U-NII-2A band, sample Type 1 waveform*

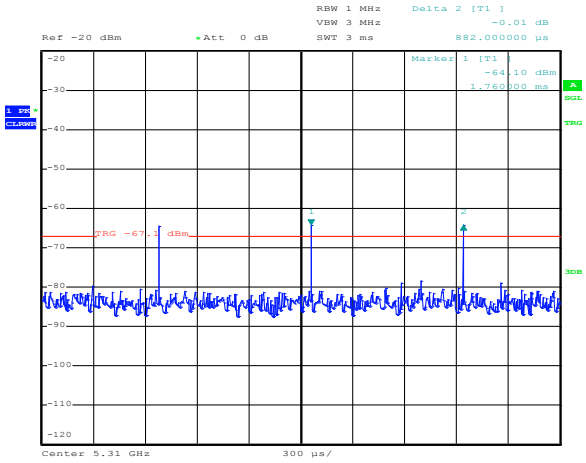


***Figure 8.1-20:*** *Pulse repetition view on U-NII-2A band, sample Type 1 waveform*

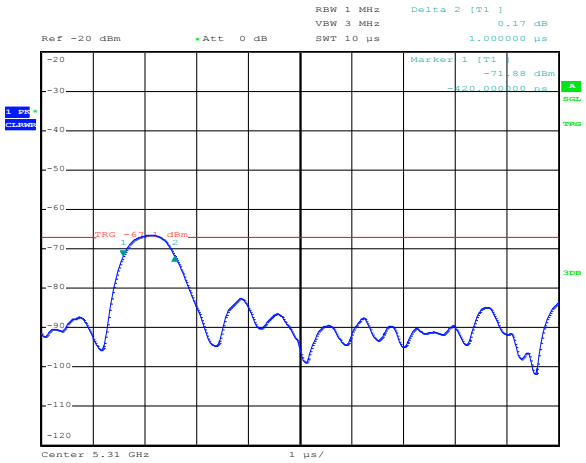


***Figure 8.1-21:*** *Pulse width view on U-NII-2A band, sample Type 1 waveform*

***Table 8.1-1:*** *Sample waveform parameters*

| Type | Pulse width, µs | PRI, µs | No. of pulses |
|---|---|---|---|
| 1 | 1 | 878 | 61 |

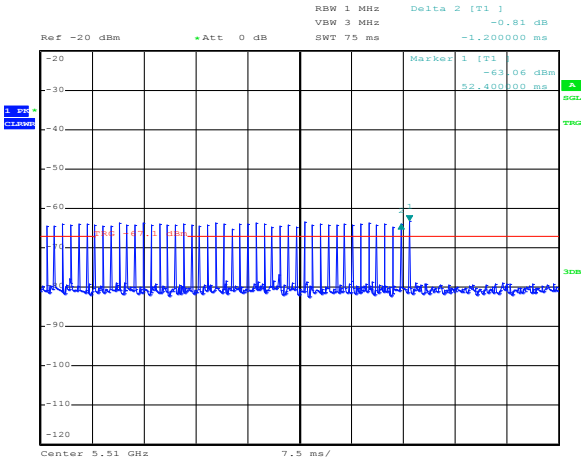


***Figure 8.1-22:*** *Radar waveform burst view on U-NII-2C band, sample Type 1 waveform*

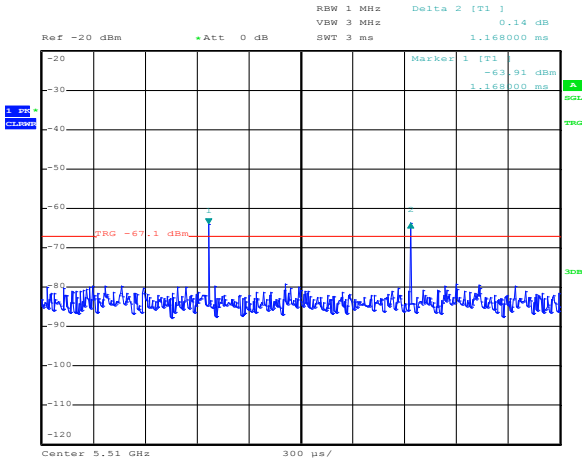


***Figure 8.1-23:*** *Pulse repetition view on U-NII-2C band, sample Type 1 waveform*

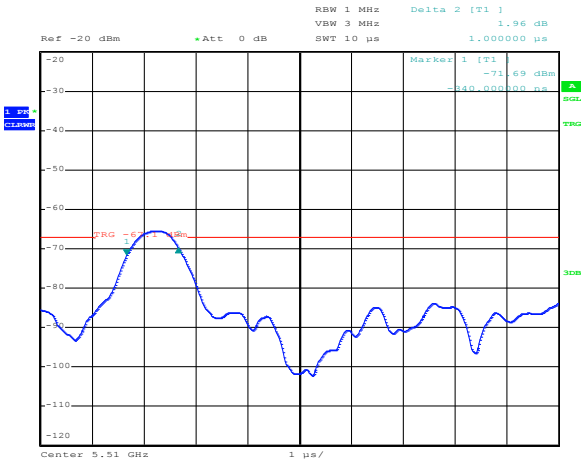


***Figure 8.1-24:*** *Pulse width view on U-NII-2C band, sample Type 1 waveform*

***Table 8.1-2:*** *Sample waveform parameters*

| Type | Pulse width, µs | PRI, µs | No. of pulses |
|---|---|---|---|
| 1 | 1 | 1164 | 46 |

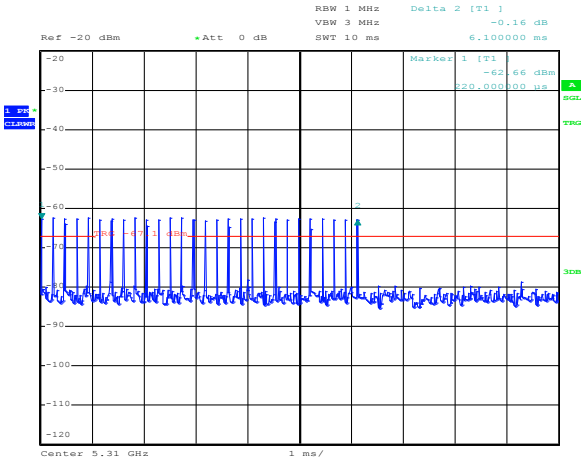


***Figure 8.1-25:*** *Radar waveform burst view on U-NII-2A band, sample Type 2 waveform*

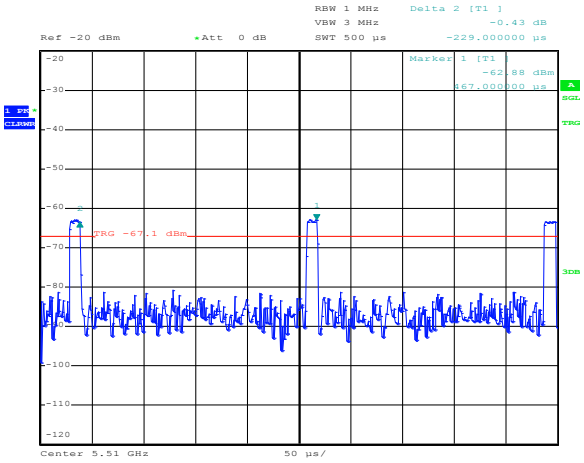


***Figure 8.1-26:*** *Pulse repetition view on U-NII-2A band, sample Type 2 waveform*

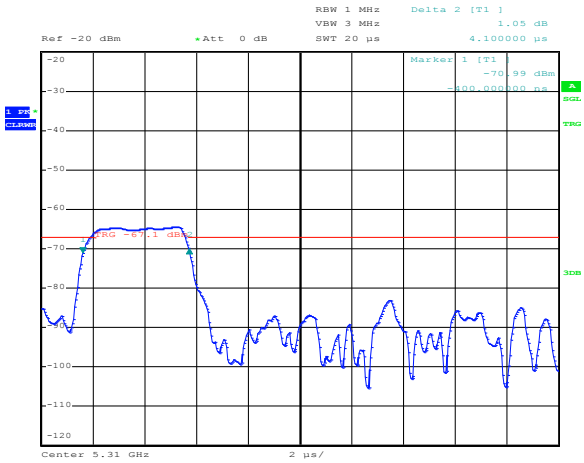


***Figure 8.1-27:*** *Pulse width view on U-NII-2A band, sample Type 2 waveform*

***Table 8.1-3:*** *Sample waveform parameters*

| Type | Pulse width, µs | PRI, µs | No. of pulses |
|---|---|---|---|
| 2 | 4.1 | 225 | 29 |

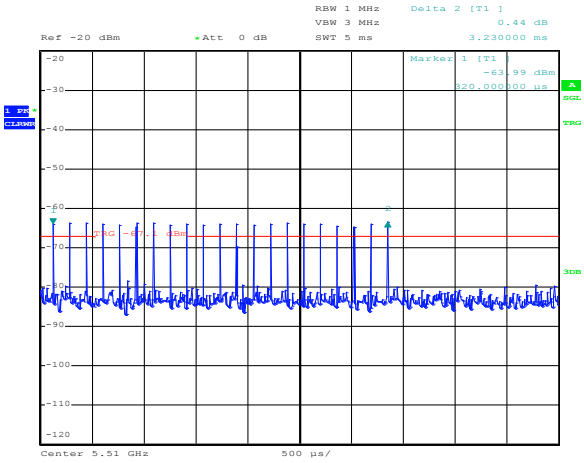


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***Figure 8.1-28:*** *Radar waveform burst view on U-NII-2C band, sample Type 2 waveform*

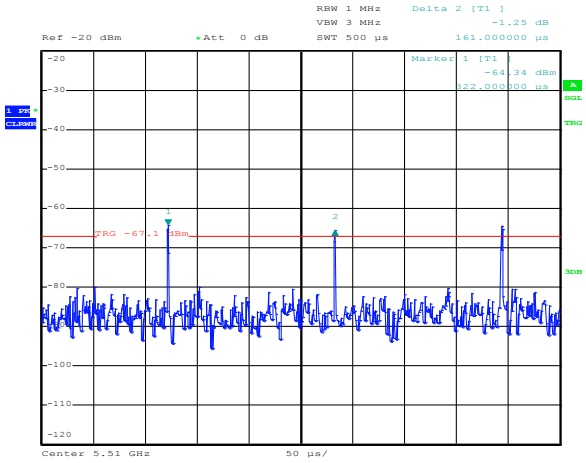


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***Figure 8.1-29:*** *Pulse repetition view on U-NII-2C band, sample Type 2 waveform*

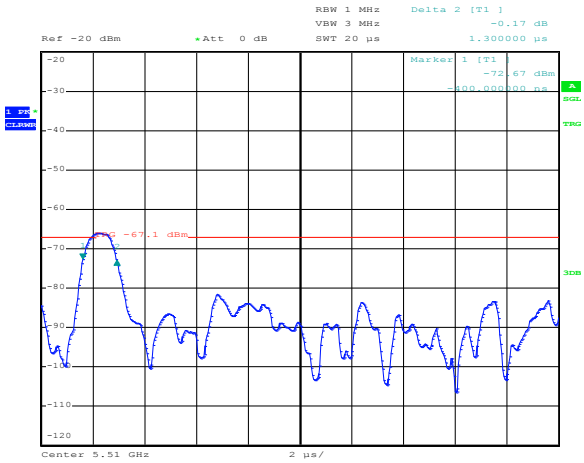


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***Figure 8.1-30:*** *Pulse width view on U-NII-2C band, sample Type 2 waveform*

***Table 8.1-4:*** *Sample waveform parameters*

| Type | Pulse width, µs | PRI, µs | No. of pulses |
|---|---|---|---|
| 2 | 1.3 | 161 | 23 |

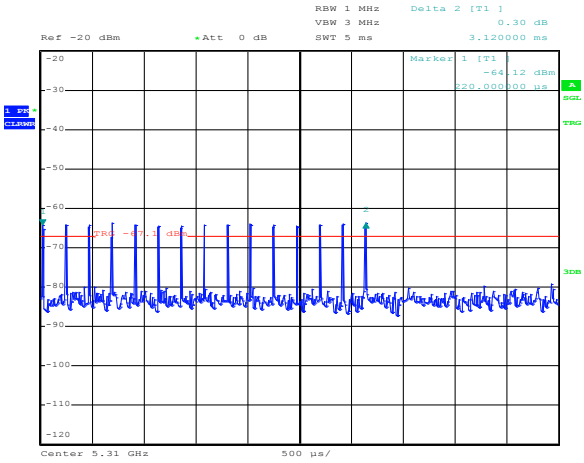


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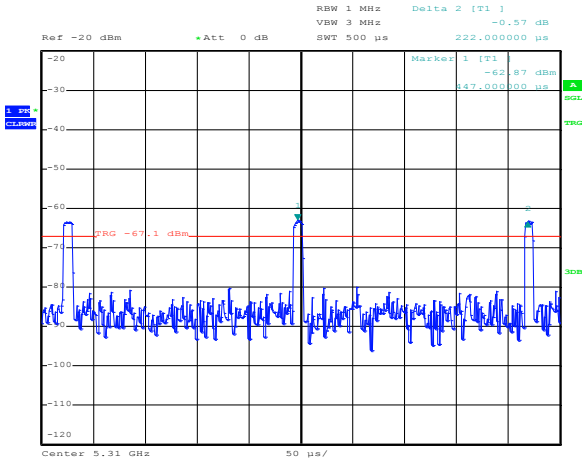
***Figure 8.1-31:*** *Radar waveform burst view on U-NII-2A band, sample Type 3 waveform*




Date: 25.APR.2017 10:59:00

***Figure 8.1-32:*** *Pulse repetition view on U-NII-2A band, sample Type 3 waveform*

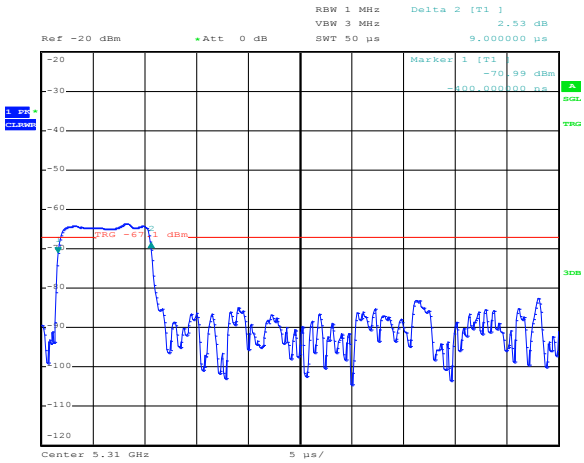



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***Figure 8.1-33:*** *Pulse width view on U-NII-2A band, sample Type 3 waveform*

***Table 8.1-5:*** *Sample waveform parameters*

| Type | Pulse width, µs | PRI, µs | No. of pulses |
|---|---|---|---|
| 3 | 9 | 222 | 16 |

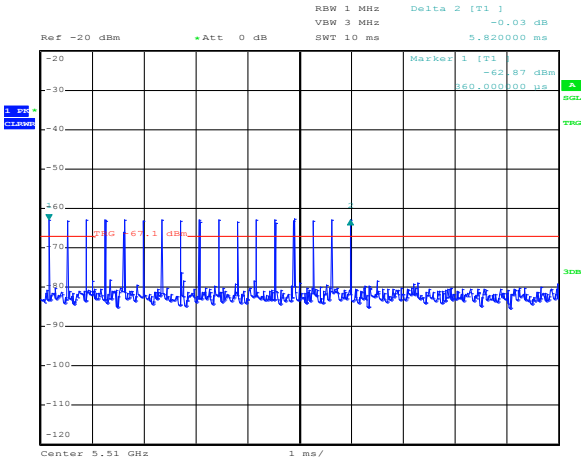


***Figure 8.1-34:*** *Radar waveform burst view on U-NII-2C band, sample Type 3 waveform*

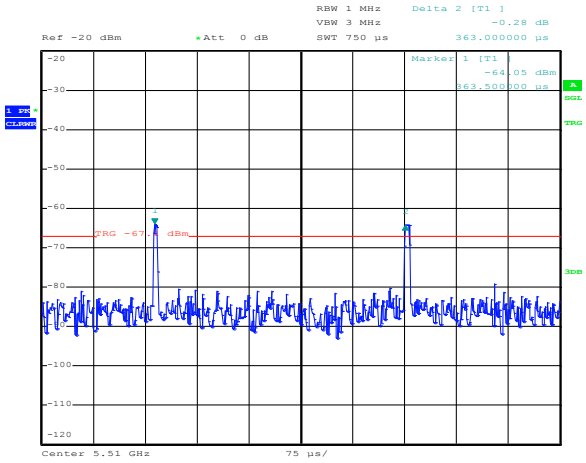


***Figure 8.1-35:*** *Pulse repetition view on U-NII-2C band, sample Type 3 waveform*

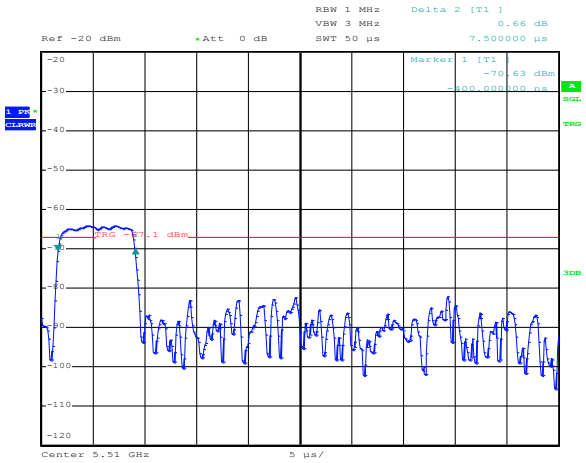


***Figure 8.1-36:*** *Pulse width view on U-NII-2C band, sample Type 3 waveform*

***Table 8.1-6:*** *Sample waveform parameters*

| Type | Pulse width, µs | PRI, µs | No. of pulses |
|---|---|---|---|
| 3 | 7.5 | 363 | 18 |

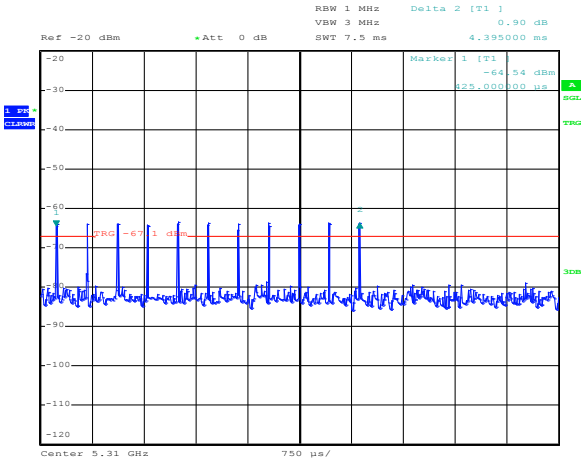


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***Figure 8.1-37:*** *Radar waveform burst view on U-NII-2A band, sample Type 4 waveform*

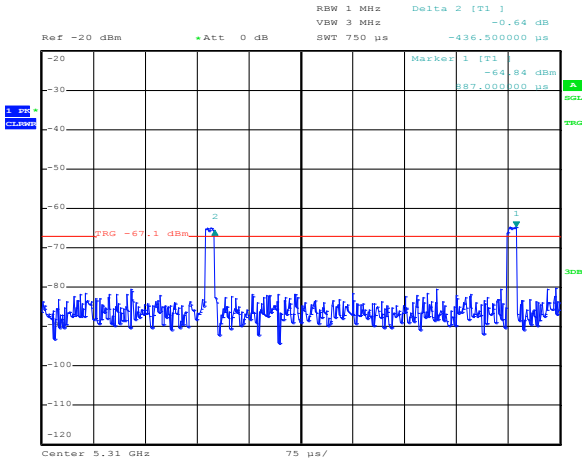


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***Figure 8.1-38:*** *Pulse repetition view on U-NII-2A band, sample Type 4 waveform*

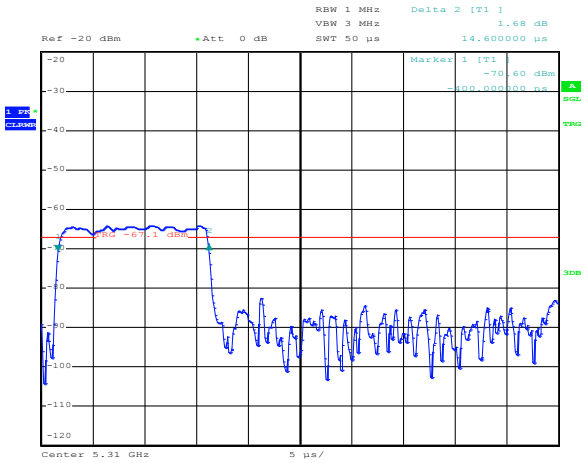


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***Figure 8.1-39:*** *Pulse width view on U-NII-2A band, sample Type 4 waveform*

***Table 8.1-7:*** *Sample waveform parameters*

| Type | Pulse width, µs | PRI, µs | No. of pulses |
|---|---|---|---|
| 4 | 14.6 | 437 | 12 |

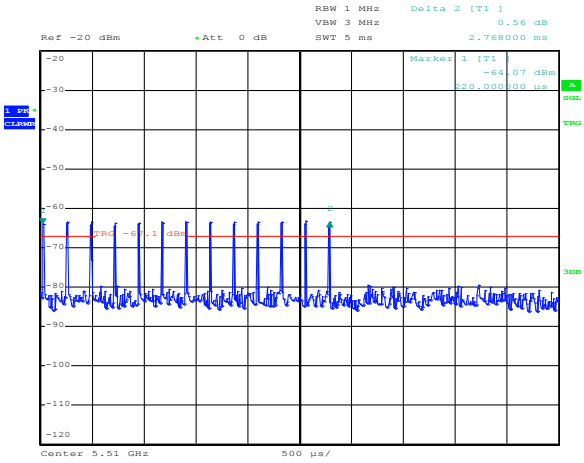


***Figure 8.1-40:*** *Radar waveform burst view on U-NII-2C band, sample Type 4 waveform*

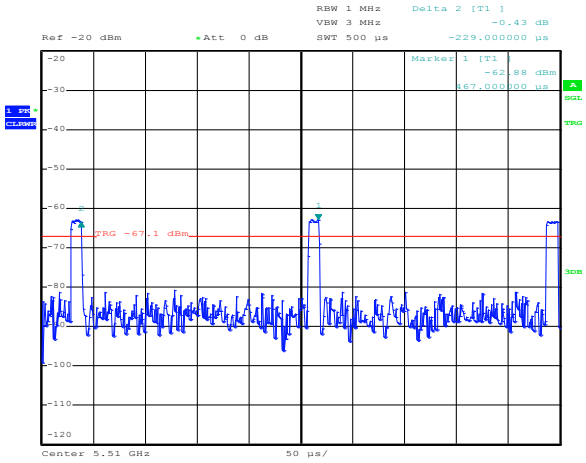


***Figure 8.1-41:*** *Pulse repetition view on U-NII-2C band, sample Type 4 waveform*

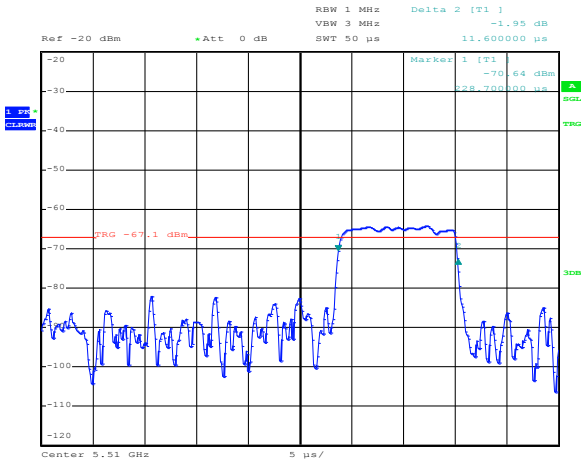


***Figure 8.1-42:*** *Pulse width view on U-NII-2C band, sample Type 4 waveform*

***Table 8.1-8:*** *Sample waveform parameters*

| Type | Pulse width, µs | PRI, µs | No. of pulses |
|---|---|---|---|
| 4 | 11.6 | 229 | 14 |

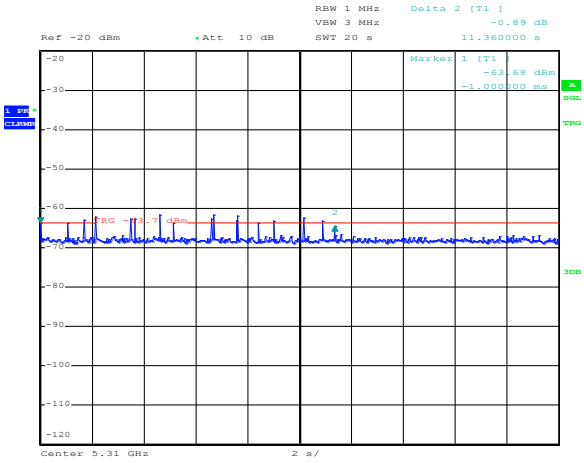


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***Figure 8.1-43:*** *Radar waveform burst view on U-NII-2A band, sample Type 5 waveform*

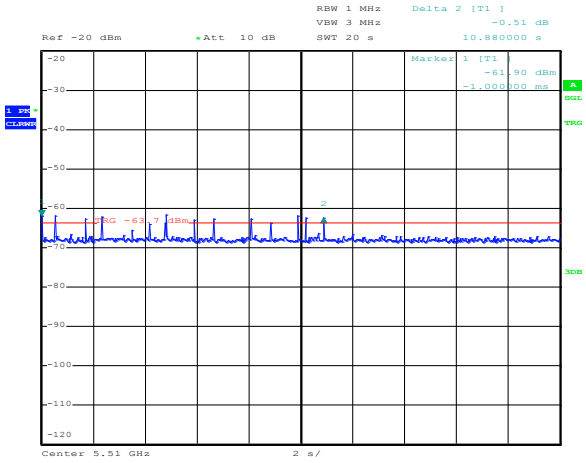


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***Figure 8.1-44:*** *Radar waveform burst view on U-NII-2C band, sample Type 5 waveform*

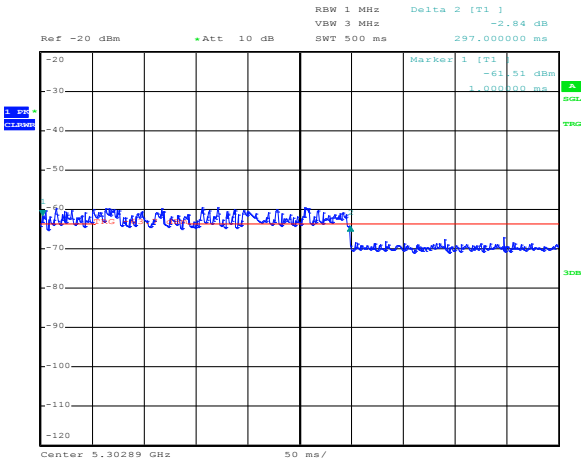


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***Figure 8.1-45:*** *Radar waveform burst view on U-NII-2A band, sample Type 6 waveform*

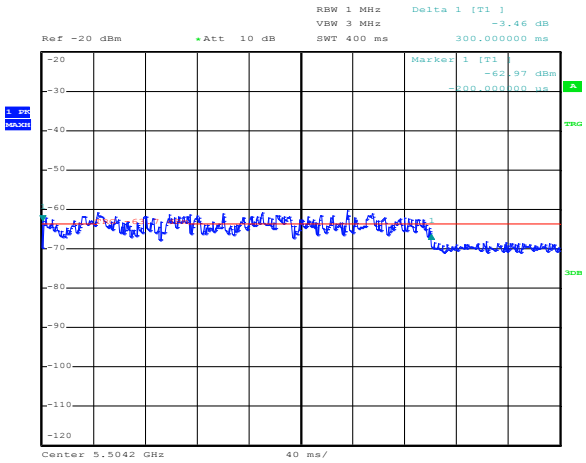


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***Figure 8.1-46:*** *Radar waveform burst view on U-NII-2C band, sample Type 6 waveform*

## 8.2 U-NII detection bandwidth

### 8.2.1 Definitions and limits

Minimum U-NII detection bandwidth is 100% of the U-NII 99% transmission power bandwidth.

### 8.2.2 Test summary

| | | | |
|---|---|---|---|
| Test date | April 10, 2015 | Temperature | 21 °C |
| Test engineer | Andrey Adelberg | Air pressure | 1005 mbar |
| Verdict | Pass | Relative humidity | 30 % |

### 8.2.3 Observations, settings and special notes

Starting at the center frequency of the UUT operating Channel, the radar frequency was increased in 5 MHz steps, the test sequence was repeated until the detection rate fell below the U-NII Detection Bandwidth criterion.
This measurement was repeated than in 1 MHz steps at frequencies 5 MHz below where the detection rate began to fall. This highest frequency (denoted as $F_H$) at which detection is greater than or equal to the U-NII Detection Bandwidth criterion was recorded. Recording the detection rate at frequencies above $F_H$ is not required to demonstrate compliance.
Also this measurement was repeated in 1 MHz steps at frequencies 5 MHz below where the detection rate began to fall. This lowest frequency (denoted as $F_L$) at which detection is greater than or equal to the U-NII Detection Bandwidth criterion was recorded. Recording the detection rate at frequencies below $F_L$ is not required to demonstrate compliance.
Radar type 0 was applied. Measurements were performed with no data traffic.

### 8.2.4 Test data

***Table 8.2-1:*** *Detection bandwidth verification summary for U-NII-2A band*

| Modulation | $F_L$, MHz | $F_H$, MHz | Detection bandwidth, MHz | 99% transmission power bandwidth, MHz |
|---|---|---|---|---|
| 802.11n HT20 | 5290 | 5310 | 20 | 18.11 |
| 802.11n HT40 | 5292 | 5329 | 37 | 36.79 |

***Table 8.2-2:*** *Detection bandwidth test results for 802.11n HT20, U-NII-2A band*

| Frequency, MHz | Trial 1 | Trial 2 | Trial 3 | Trial 4 | Trial 5 | Trial 6 | Trial 7 | Trial 8 | Trial 9 | Trial 10 | Rate, % | $F_L$, $F_H$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5289 | ☐ | ☐ | ☒ | ☐ | ☐ | ☐ | ☒ | ☐ | ☐ | ☐ | 20 | |
| 5290 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | $F_L$ |
| 5291 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5292 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5293 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5294 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5295 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5300 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5305 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5306 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5307 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5308 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5309 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5310 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | $F_H$ |
| 5311 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☒ | ☐ | 10 | |

***Table 8.2-3:*** *Detection bandwidth test results for 802.11n HT40, U-NII-2A band*

| Frequency, MHz | Trial 1 | Trial 2 | Trial 3 | Trial 4 | Trial 5 | Trial 6 | Trial 7 | Trial 8 | Trial 9 | Trial 10 | Rate, % | $F_L$, $F_H$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5291 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | 0 | |
| 5292 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | $F_L$ |
| 5290 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5295 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5300 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5305 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5310 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5315 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5320 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5325 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5326 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5327 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5328 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5329 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | $F_H$ |
| 5330 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | 0 | |

***Table 8.2-4:*** *Detection bandwidth verification summary for U-NII-2C band*

| Modulation | $F_L$, MHz | $F_H$, MHz | Detection bandwidth, MHz | 99% transmission power bandwidth, MHz |
|---|---|---|---|---|
| 802.11n HT20 | 5487 | 5513 | 26 | 18.19 |
| 802.11n HT40 | 5491 | 5530 | 39 | 36.79 |

***Table 8.2-5:*** *Detection bandwidth test results for 802.11n HT20, U-NII-2C band*

| Frequency, MHz | Trial 1 | Trial 2 | Trial 3 | Trial 4 | Trial 5 | Trial 6 | Trial 7 | Trial 8 | Trial 9 | Trial 10 | Rate, % | $F_L$, $F_H$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5486 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | 0 | |
| 5487 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | $F_L$ |
| 5488 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5489 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5490 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5495 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5500 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5510 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5511 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5512 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5513 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | $F_H$ |
| 5514 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☒ | ☐ | ☐ | 10 | |

***Table 8.2-6:*** *Detection bandwidth test results for 802.11n HT40, U-NII-2C band*

| Frequency, MHz | Trial 1 | Trial 2 | Trial 3 | Trial 4 | Trial 5 | Trial 6 | Trial 7 | Trial 8 | Trial 9 | Trial 10 | Rate, % | $F_L$, $F_H$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5490 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | 0 | |
| 5491 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | $F_L$ |
| 5492 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5493 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5494 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5495 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5500 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5505 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5510 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5515 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5520 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5525 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | |
| 5530 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | 100 | $F_H$ |
| 5531 | ☐ | ☐ | ☐ | ☐ | ☐ | ☒ | ☐ | ☐ | ☐ | ☐ | 10 | |

## 8.3 Statistical performance for short pulse radars

### 8.3.1 Definitions and limits

For Radar types 1–4 (short pulse radars) minimum percentage of successful detection is 60 %. The aggregate limit is 80 %.

### 8.3.2 Test summary

| | | | |
|---|---|---|---|
| Test date | April 10, 2015 | Temperature | 21 °C |
| Test engineer | Andrey Adelberg | Air pressure | 1005 mbar |
| Verdict | Pass | Relative humidity | 30 % |

### 8.3.3 Observations, settings and special notes

The percentage of successful detection is calculated by:

$$\frac{Total\ waveform\ detections}{Total\ waveform\ trials} \times 100\% = Percentage\ of\ successful\ detection\ Radar\ waveform\ N = P_d N$$

In addition an aggregate minimum percentage of successful detection across all Short Pulse Radar Types 1–4 is required and is calculated as follows:

$$\frac{P_d 1 + P_d 2 + P_d 3 + P_d 4}{4}$$

For 802.11 devices it is suggested to select frequencies in each of the bonded 20 MHz channels and the channel center frequency.

***Table 8.3-1:*** *Radar frequency applications*

| Operational band | Frequency on Trials 1–10, MHz | Frequency on Trials 11–20 MHz | Frequency on Trials 21–30, MHz |
|---|---|---|---|
| U-NII-2A, 802.11n HT20 | 5292 | 5300 | 5308 |
| U-NII-2A, 802.11n HT40 | 5297 | 5310 | 5324 |
| U-NII-2C, 802.11n HT20 | 5490 | 5500 | 5510 |
| U-NII-2C, 802.11n HT40 | 5496 | 5510 | 5525 |

### 8.3.4 Test data

***Table 8.3-2:*** *Summary of the short radar detection probability results for 802.11n HT20 in U-NII-2A band*

| Radar type | Detection probability ($P_d$), % | Minimum Limit, % | Margin, % |
|---|---|---|---|
| 1 | 100 | 60 | 40 |
| 2 | 100 | 60 | 40 |
| 3 | 100 | 60 | 40 |
| 4 | 100 | 60 | 40 |
| Aggregate | 100 | 80 | 20 |

***Table 8.3-3:*** *Summary of the short radar detection probability results for 802.11ac VHT40 in U-NII-2A band*

| Radar type | Detection probability ($P_d$), % | Minimum Limit, % | Margin, % |
|---|---|---|---|
| 1 | 100 | 60 | 40 |
| 2 | 100 | 60 | 40 |
| 3 | 100 | 60 | 40 |
| 4 | 100 | 60 | 40 |
| Aggregate | 100 | 80 | 20 |

***Table 8.3-4:*** *Summary of the short radar detection probability results for 802.11n HT20 in U-NII-2C band*

| Radar type | Detection probability ($P_d$), % | Minimum Limit, % | Margin, % |
|---|---|---|---|
| 1 | 100 | 60 | 40 |
| 2 | 96.67 | 60 | 36.67 |
| 3 | 100 | 60 | 40 |
| 4 | 100 | 60 | 40 |
| Aggregate | 91.17 | 80 | 11.17 |

***Table 8.3-5:*** *Summary of the short radar detection probability results for 802.11ac VHT40 in U-NII-2C band*

| Radar type | Detection probability ($P_d$), % | Minimum Limit, % | Margin, % |
|---|---|---|---|
| 1 | 100 | 60 | 40 |
| 2 | 100 | 60 | 40 |
| 3 | 100 | 60 | 40 |
| 4 | 100 | 60 | 40 |
| Aggregate | 100 | 80 | 20 |

***Table 8.3-6:*** *Radar type 1 trials' details and detection results for 802.11n HT20 in U-NII-2A band, channel 60, 5300 MHz*

| Trial number | Pulses/Bursts | Pulse width, µs | PRI, µs | Detected |
|---|---|---|---|---|
| 1 | 102 | 1 | 518 | ☒ |
| 2 | 101 | 1 | 526 | ☒ |
| 3 | 95 | 1 | 558 | ☒ |
| 4 | 92 | 1 | 578 | ☒ |
| 5 | 89 | 1 | 598 | ☒ |
| 6 | 86 | 1 | 618 | ☒ |
| 7 | 83 | 1 | 638 | ☒ |
| 8 | 78 | 1 | 678 | ☒ |
| 9 | 74 | 1 | 718 | ☒ |
| 10 | 70 | 1 | 758 | ☒ |
| 11 | 68 | 1 | 778 | ☒ |
| 12 | 67 | 1 | 798 | ☒ |
| 13 | 62 | 1 | 858 | ☒ |
| 14 | 61 | 1 | 878 | ☒ |
| 15 | 58 | 1 | 910 | ☒ |
| 16 | 57 | 1 | 937 | ☒ |
| 17 | 57 | 1 | 938 | ☒ |
| 18 | 50 | 1 | 1061 | ☒ |
| 19 | 46 | 1 | 1164 | ☒ |
| 20 | 28 | 1 | 1904 | ☒ |
| 21 | 26 | 1 | 2076 | ☒ |
| 22 | 24 | 1 | 2265 | ☒ |
| 23 | 23 | 1 | 2311 | ☒ |
| 24 | 22 | 1 | 2430 | ☒ |
| 25 | 21 | 1 | 2575 | ☒ |
| 26 | 21 | 1 | 2610 | ☒ |
| 27 | 20 | 1 | 2727 | ☒ |
| 28 | 19 | 1 | 2850 | ☒ |
| 29 | 19 | 1 | 2890 | ☒ |
| 30 | 18 | 1 | 3066 | ☒ |

***Table 8.3-7:*** *Radar type 1 trials' details and detection results for 802.11n HT40 in U-NII-2A band, channel 62, 5310 MHz*

| Trial number | Pulses/Bursts | Pulse width, µs | PRI, µs | Detected |
|---|---|---|---|---|
| 1 | 95 | 1 | 558 | ☒ |
| 2 | 92 | 1 | 578 | ☒ |
| 3 | 89 | 1 | 598 | ☒ |
| 4 | 86 | 1 | 618 | ☒ |
| 5 | 80 | 1 | 663 | ☒ |
| 6 | 78 | 1 | 678 | ☒ |
| 7 | 77 | 1 | 693 | ☒ |
| 8 | 76 | 1 | 698 | ☒ |
| 9 | 72 | 1 | 738 | ☒ |
| 10 | 70 | 1 | 758 | ☒ |
| 11 | 68 | 1 | 778 | ☒ |
| 12 | 68 | 1 | 782 | ☒ |
| 13 | 67 | 1 | 798 | ☒ |
| 14 | 63 | 1 | 838 | ☒ |
| 15 | 62 | 1 | 858 | ☒ |
| 16 | 61 | 1 | 878 | ☒ |
| 17 | 59 | 1 | 898 | ☒ |
| 18 | 45 | 1 | 1190 | ☒ |
| 19 | 44 | 1 | 1205 | ☒ |
| 20 | 36 | 1 | 1471 | ☒ |
| 21 | 35 | 1 | 1512 | ☒ |
| 22 | 30 | 1 | 1772 | ☒ |
| 23 | 30 | 1 | 1810 | ☒ |
| 24 | 26 | 1 | 2061 | ☒ |
| 25 | 23 | 1 | 2320 | ☒ |
| 26 | 23 | 1 | 2323 | ☒ |
| 27 | 22 | 1 | 2442 | ☒ |
| 28 | 22 | 1 | 2459 | ☒ |
| 29 | 19 | 1 | 2852 | ☒ |
| 30 | 18 | 1 | 3066 | ☒ |

***Table 8.3-8:*** *Radar type 1 trials' details and detection results for 802.11n HT20 in U-NII-2C band, channel 100, 5500 MHz*

| Trial number | Pulses/Bursts | Pulse width, µs | PRI, µs | Detected |
|---|---|---|---|---|
| 1 | 99 | 1 | 538 | ☒ |
| 2 | 95 | 1 | 558 | ☒ |
| 3 | 92 | 1 | 578 | ☒ |
| 4 | 90 | 1 | 592 | ☒ |
| 5 | 89 | 1 | 598 | ☒ |
| 6 | 83 | 1 | 638 | ☒ |
| 7 | 78 | 1 | 678 | ☒ |
| 8 | 72 | 1 | 738 | ☒ |
| 9 | 70 | 1 | 758 | ☒ |
| 10 | 68 | 1 | 778 | ☒ |
| 11 | 68 | 1 | 784 | ☒ |
| 12 | 67 | 1 | 798 | ☒ |
| 13 | 65 | 1 | 822 | ☒ |
| 14 | 64 | 1 | 830 | ☒ |
| 15 | 63 | 1 | 842 | ☒ |
| 16 | 62 | 1 | 858 | ☒ |
| 17 | 59 | 1 | 898 | ☒ |
| 18 | 58 | 1 | 918 | ☒ |
| 19 | 57 | 1 | 938 | ☒ |
| 20 | 55 | 1 | 964 | ☒ |
| 21 | 53 | 1 | 1012 | ☒ |
| 22 | 45 | 1 | 1174 | ☒ |
| 23 | 45 | 1 | 1196 | ☒ |
| 24 | 43 | 1 | 1240 | ☒ |
| 25 | 35 | 1 | 1515 | ☒ |
| 26 | 32 | 1 | 1674 | ☒ |
| 27 | 21 | 1 | 2542 | ☒ |
| 28 | 20 | 1 | 2679 | ☒ |
| 29 | 20 | 1 | 2777 | ☒ |
| 30 | 18 | 1 | 3066 | ☒ |

***Table 8.3-9:*** *Radar type 1 trials' details and detection results for 802.11n HT40 in U-NII-2C band, channel 102, 5510 MHz*

| Trial number | Pulses/Bursts | Pulse width, µs | PRI, µs | Detected |
|---|---|---|---|---|
| 1 | 102 | 1 | 518 | ☒ |
| 2 | 99 | 1 | 538 | ☒ |
| 3 | 95 | 1 | 558 | ☒ |
| 4 | 94 | 1 | 563 | ☒ |
| 5 | 92 | 1 | 578 | ☒ |
| 6 | 89 | 1 | 598 | ☒ |
| 7 | 86 | 1 | 618 | ☒ |
| 8 | 83 | 1 | 638 | ☒ |
| 9 | 79 | 1 | 675 | ☒ |
| 10 | 76 | 1 | 698 | ☒ |
| 11 | 70 | 1 | 758 | ☒ |
| 12 | 67 | 1 | 798 | ☒ |
| 13 | 65 | 1 | 818 | ☒ |
| 14 | 63 | 1 | 838 | ☒ |
| 15 | 62 | 1 | 858 | ☒ |
| 16 | 61 | 1 | 873 | ☒ |
| 17 | 61 | 1 | 878 | ☒ |
| 18 | 58 | 1 | 918 | ☒ |
| 19 | 51 | 1 | 1051 | ☒ |
| 20 | 47 | 1 | 1142 | ☒ |
| 21 | 34 | 1 | 1574 | ☒ |
| 22 | 28 | 1 | 1913 | ☒ |
| 23 | 26 | 1 | 2098 | ☒ |
| 24 | 24 | 1 | 2238 | ☒ |
| 25 | 24 | 1 | 2271 | ☒ |
| 26 | 19 | 1 | 2823 | ☒ |
| 27 | 19 | 1 | 2834 | ☒ |
| 28 | 18 | 1 | 2956 | ☒ |
| 29 | 18 | 1 | 3002 | ☒ |
| 30 | 18 | 1 | 3045 | ☒ |

***Table 8.3-10:*** *Radar type 2 trials' details and detection results for 802.11n HT20 in U-NII-2A band, channel 60, 5300 MHz*

| Trial number | Pulses/Bursts | Pulse width, µs | PRI, µs | Detected |
|---|---|---|---|---|
| 1 | 28 | 1.1 | 187 | ☒ |
| 2 | 23 | 1.3 | 161 | ☒ |
| 3 | 24 | 1.5 | 171 | ☒ |
| 4 | 23 | 1.5 | 209 | ☒ |
| 5 | 26 | 1.5 | 214 | ☒ |
| 6 | 28 | 1.8 | 190 | ☒ |
| 7 | 29 | 1.9 | 167 | ☒ |
| 8 | 29 | 2.2 | 173 | ☒ |
| 9 | 25 | 2.5 | 150 | ☒ |
| 10 | 26 | 2.5 | 203 | ☒ |
| 11 | 23 | 2.6 | 208 | ☒ |
| 12 | 24 | 2.8 | 202 | ☒ |
| 13 | 29 | 2.8 | 218 | ☒ |
| 14 | 26 | 3.1 | 152 | ☒ |
| 15 | 28 | 3.1 | 177 | ☒ |
| 16 | 28 | 3.4 | 199 | ☒ |
| 17 | 24 | 3.7 | 191 | ☒ |
| 18 | 26 | 3.7 | 199 | ☒ |
| 19 | 23 | 3.9 | 153 | ☒ |
| 20 | 29 | 3.0 | 226 | ☒ |
| 21 | 23 | 4.1 | 162 | ☒ |
| 22 | 29 | 4.1 | 225 | ☒ |
| 23 | 26 | 4.2 | 226 | ☒ |
| 24 | 24 | 4.3 | 175 | ☒ |
| 25 | 26 | 4.3 | 211 | ☒ |
| 26 | 29 | 4.5 | 184 | ☒ |
| 27 | 27 | 4.8 | 189 | ☒ |
| 28 | 24 | 4.9 | 168 | ☒ |
| 29 | 26 | 4.9 | 179 | ☒ |
| 30 | 23 | 5.0 | 160 | ☒ |

***Table 8.3-11:*** *Radar type 2 trials' details and detection results for 802.11n HT40 in U-NII-2A band, channel 62, 5310 MHz*

| Trial number | Pulses/Bursts | Pulse width, µs | PRI, µs | Detected |
|---|---|---|---|---|
| 1 | 24 | 1.6 | 157 | ☒ |
| 2 | 25 | 1.6 | 162 | ☒ |
| 3 | 24 | 1.6 | 169 | ☒ |
| 4 | 24 | 1.6 | 206 | ☒ |
| 5 | 24 | 1.0 | 225 | ☒ |
| 6 | 29 | 2.4 | 154 | ☒ |
| 7 | 29 | 2.6 | 192 | ☒ |
| 8 | 23 | 2.7 | 222 | ☒ |
| 9 | 26 | 2.8 | 184 | ☒ |
| 10 | 23 | 2.9 | 166 | ☒ |
| 11 | 24 | 3.2 | 157 | ☒ |
| 12 | 28 | 3.6 | 185 | ☒ |
| 13 | 27 | 3.6 | 212 | ☒ |
| 14 | 23 | 3.8 | 175 | ☒ |
| 15 | 27 | 3.8 | 178 | ☒ |
| 16 | 29 | 3.8 | 190 | ☒ |
| 17 | 23 | 3.9 | 208 | ☒ |
| 18 | 24 | 3.0 | 202 | ☒ |
| 19 | 27 | 4.1 | 218 | ☒ |
| 20 | 29 | 4.3 | 171 | ☒ |
| 21 | 28 | 4.3 | 188 | ☒ |
| 22 | 28 | 4.4 | 216 | ☒ |
| 23 | 29 | 4.4 | 222 | ☒ |
| 24 | 25 | 4.6 | 159 | ☒ |
| 25 | 24 | 4.6 | 161 | ☒ |
| 26 | 25 | 4.6 | 179 | ☒ |
| 27 | 27 | 4.9 | 158 | ☒ |
| 28 | 29 | 4.0 | 150 | ☒ |
| 29 | 27 | 4.0 | 179 | ☒ |
| 30 | 29 | 5.0 | 177 | ☒ |

***Table 8.3-12:*** *Radar type 2 trials' details and detection results for 802.11n HT20 in U-NII-2C band, channel 100, 5500 MHz*

| Trial number | Pulses/Bursts | Pulse width, µs | PRI, µs | Detected |
|---|---|---|---|---|
| 1 | 24 | 1.6 | 157 | ☒ |
| 2 | 25 | 1.6 | 162 | ☒ |
| 3 | 24 | 1.6 | 169 | ☒ |
| 4 | 24 | 1.6 | 206 | ☒ |
| 5 | 24 | 1.0 | 225 | ☒ |
| 6 | 29 | 2.4 | 154 | ☒ |
| 7 | 29 | 2.6 | 192 | ☒ |
| 8 | 23 | 2.7 | 222 | ☒ |
| 9 | 26 | 2.8 | 184 | ☒ |
| 10 | 23 | 2.9 | 166 | ☒ |
| 11 | 24 | 3.2 | 157 | ☒ |
| 12 | 28 | 3.6 | 185 | ☒ |
| 13 | 27 | 3.6 | 212 | ☒ |
| 14 | 23 | 3.8 | 175 | ☒ |
| 15 | 27 | 3.8 | 178 | ☒ |
| 16 | 29 | 3.8 | 190 | ☒ |
| 17 | 23 | 3.9 | 208 | ☒ |
| 18 | 24 | 3.0 | 202 | ☒ |
| 19 | 27 | 4.1 | 218 | ☒ |
| 20 | 29 | 4.3 | 171 | ☒ |
| 21 | 28 | 4.3 | 188 | ☒ |
| 22 | 28 | 4.4 | 216 | ☒ |
| 23 | 29 | 4.4 | 222 | ☒ |
| 24 | 25 | 4.6 | 159 | ☒ |
| 25 | 24 | 4.6 | 161 | ☒ |
| 26 | 25 | 4.6 | 179 | ☐ |
| 27 | 27 | 4.9 | 158 | ☒ |
| 28 | 29 | 4.0 | 120 | ☒ |
| 29 | 27 | 4.0 | 179 | ☒ |
| 30 | 29 | 5.0 | 177 | ☒ |

***Table 8.3-13:*** *Radar type 2 trials' details and detection results for 802.11n HT40 in U-NII-2C band, channel 102, 5510 MHz*

| Trial number | Pulses/Bursts | Pulse width, µs | PRI, µs | Detected |
|---|---|---|---|---|
| 1 | 26 | 1.1 | 215 | ☒ |
| 2 | 28 | 1.4 | 209 | ☒ |
| 3 | 24 | 1.5 | 164 | ☒ |
| 4 | 23 | 2.3 | 166 | ☒ |
| 5 | 23 | 2.3 | 168 | ☒ |
| 6 | 29 | 2.3 | 172 | ☒ |
| 7 | 28 | 2.5 | 163 | ☒ |
| 8 | 28 | 2.7 | 221 | ☒ |
| 9 | 29 | 2.8 | 165 | ☒ |
| 10 | 28 | 2.9 | 173 | ☒ |
| 11 | 27 | 3.1 | 163 | ☒ |
| 12 | 27 | 3.2 | 192 | ☒ |
| 13 | 23 | 3.4 | 181 | ☒ |
| 14 | 26 | 3.4 | 222 | ☒ |
| 15 | 29 | 3.6 | 153 | ☒ |
| 16 | 27 | 3.6 | 159 | ☒ |
| 17 | 23 | 3.7 | 196 | ☒ |
| 18 | 23 | 4.1 | 150 | ☒ |
| 19 | 23 | 4.1 | 173 | ☒ |
| 20 | 23 | 4.1 | 189 | ☒ |
| 21 | 24 | 4.2 | 190 | ☒ |
| 22 | 29 | 4.2 | 220 | ☒ |
| 23 | 28 | 4.4 | 220 | ☒ |
| 24 | 23 | 4.4 | 224 | ☒ |
| 25 | 27 | 4.4 | 224 | ☒ |
| 26 | 27 | 4.6 | 172 | ☒ |
| 27 | 24 | 4.6 | 184 | ☒ |
| 28 | 32 | 4.8 | 176 | ☒ |
| 29 | 27 | 4.9 | 158 | ☒ |
| 30 | 24 | 4.0 | 185 | ☒ |

***Table 8.3-14:*** *Radar type 3 trial's details and detection results for 802.11n HT20 in U-NII-2A band, channel 60, 5300 MHz*

| Trial number | Pulses/Bursts | Pulse width, µs | PRI, µs | Detected |
|---|---|---|---|---|
| 1 | 17 | 6.1 | 345 | ☒ |
| 2 | 16 | 6.2 | 337 | ☒ |
| 3 | 18 | 6.3 | 268 | ☒ |
| 4 | 16 | 6.3 | 330 | ☒ |
| 5 | 16 | 6.3 | 334 | ☒ |
| 6 | 18 | 6.7 | 409 | ☒ |
| 7 | 17 | 6.8 | 263 | ☒ |
| 8 | 16 | 6.9 | 283 | ☒ |
| 9 | 17 | 6.9 | 431 | ☒ |
| 10 | 17 | 7.1 | 241 | ☒ |
| 11 | 17 | 7.1 | 451 | ☒ |
| 12 | 18 | 7.4 | 255 | ☒ |
| 13 | 16 | 7.5 | 286 | ☒ |
| 14 | 18 | 7.5 | 363 | ☒ |
| 15 | 17 | 7.8 | 484 | ☒ |
| 16 | 17 | 7.0 | 324 | ☒ |
| 17 | 18 | 8.1 | 333 | ☒ |
| 18 | 17 | 8.5 | 445 | ☒ |
| 19 | 17 | 8.6 | 431 | ☒ |
| 20 | 17 | 8.7 | 393 | ☒ |
| 21 | 17 | 9.1 | 248 | ☒ |
| 22 | 17 | 9.1 | 278 | ☒ |
| 23 | 18 | 9.1 | 467 | ☒ |
| 24 | 16 | 9.2 | 366 | ☒ |
| 25 | 16 | 9.3 | 323 | ☒ |
| 26 | 18 | 9.4 | 482 | ☒ |
| 27 | 18 | 9.0 | 200 | ☒ |
| 28 | 18 | 9.0 | 219 | ☒ |
| 29 | 16 | 9.0 | 222 | ☒ |
| 30 | 18 | 9.0 | 352 | ☒ |

***Table 8.3-15:*** *Radar type 3 trial's details and detection results for 802.11n HT40 in U-NII-2A band, channel 62, 5310 MHz*

| Trial number | Pulses/Bursts | Pulse width, µs | PRI, µs | Detected |
|---|---|---|---|---|
| 1 | 17 | 6.3 | 424 | ☒ |
| 2 | 18 | 6.3 | 437 | ☒ |
| 3 | 18 | 6.7 | 246 | ☒ |
| 4 | 16 | 6.9 | 449 | ☒ |
| 5 | 18 | 6.0 | 448 | ☒ |
| 6 | 17 | 7.2 | 347 | ☒ |
| 7 | 18 | 7.3 | 220 | ☒ |
| 8 | 17 | 7.3 | 470 | ☒ |
| 9 | 16 | 7.8 | 385 | ☒ |
| 10 | 17 | 7.8 | 451 | ☒ |
| 11 | 17 | 8.2 | 378 | ☒ |
| 12 | 16 | 8.3 | 286 | ☒ |
| 13 | 18 | 8.3 | 332 | ☒ |
| 14 | 16 | 8.4 | 273 | ☒ |
| 15 | 17 | 8.4 | 355 | ☒ |
| 16 | 16 | 8.5 | 272 | ☒ |
| 17 | 17 | 8.7 | 214 | ☒ |
| 18 | 16 | 8.7 | 254 | ☒ |
| 19 | 16 | 8.9 | 474 | ☒ |
| 20 | 16 | 8.0 | 233 | ☒ |
| 21 | 17 | 8.0 | 265 | ☒ |
| 22 | 16 | 8.0 | 322 | ☒ |
| 23 | 17 | 9.1 | 404 | ☒ |
| 24 | 16 | 9.2 | 258 | ☒ |
| 25 | 18 | 9.4 | 370 | ☒ |
| 26 | 17 | 9.5 | 279 | ☒ |
| 27 | 16 | 9.7 | 263 | ☒ |
| 28 | 17 | 9.7 | 332 | ☒ |
| 29 | 17 | 9.9 | 260 | ☒ |
| 30 | 17 | 10.0 | 313 | ☒ |

***Table 8.3-16:*** *Radar type 3 trial's details and detection results for 802.11n HT20 in U-NII-2C band, channel 100, 5500 MHz*

| Trial number | Pulses/Bursts | Pulse width, µs | PRI, µs | Detected |
|---|---|---|---|---|
| 1 | 18 | 6.1 | 352 | ☒ |
| 2 | 17 | 6.2 | 420 | ☒ |
| 3 | 17 | 6.3 | 239 | ☒ |
| 4 | 16 | 6.3 | 493 | ☒ |
| 5 | 18 | 6.4 | 261 | ☒ |
| 6 | 18 | 6.6 | 464 | ☒ |
| 7 | 18 | 6.8 | 283 | ☒ |
| 8 | 16 | 6.8 | 447 | ☒ |
| 9 | 18 | 6.9 | 219 | ☒ |
| 10 | 16 | 7.1 | 286 | ☒ |
| 11 | 17 | 7.1 | 446 | ☒ |
| 12 | 16 | 7.2 | 274 | ☒ |
| 13 | 18 | 7.3 | 211 | ☒ |
| 14 | 17 | 7.3 | 303 | ☒ |
| 15 | 18 | 7.3 | 432 | ☒ |
| 16 | 17 | 7.3 | 499 | ☒ |
| 17 | 18 | 7.4 | 488 | ☒ |
| 18 | 17 | 7.7 | 255 | ☒ |
| 19 | 18 | 7.7 | 295 | ☒ |
| 20 | 16 | 8.4 | 384 | ☒ |
| 21 | 18 | 8.4 | 465 | ☒ |
| 22 | 17 | 8.9 | 261 | ☒ |
| 23 | 18 | 8.0 | 225 | ☒ |
| 24 | 18 | 9.2 | 369 | ☒ |
| 25 | 18 | 9.2 | 432 | ☒ |
| 26 | 18 | 9.5 | 339 | ☒ |
| 27 | 17 | 9.6 | 327 | ☒ |
| 28 | 16 | 9.6 | 342 | ☒ |
| 29 | 18 | 9.7 | 218 | ☒ |
| 30 | 18 | 9.0 | 366 | ☒ |

***Table 8.3-17:*** *Radar type 3 trial's details and detection results for 802.11n HT40 in U-NII-2C band, channel 102, 5510 MHz*

| Trial number | Pulses/Bursts | Pulse width, µs | PRI, µs | Detected |
|---|---|---|---|---|
| 1 | 17 | 6.1 | 247 | ☒ |
| 2 | 18 | 6.2 | 248 | ☒ |
| 3 | 17 | 6.2 | 367 | ☒ |
| 4 | 18 | 6.9 | 209 | ☒ |
| 5 | 18 | 6.0 | 278 | ☒ |
| 6 | 18 | 6.0 | 335 | ☒ |
| 7 | 18 | 7.4 | 279 | ☒ |
| 8 | 17 | 7.5 | 244 | ☒ |
| 9 | 17 | 7.5 | 300 | ☒ |
| 10 | 17 | 7.6 | 429 | ☒ |
| 11 | 16 | 7.0 | 358 | ☒ |
| 12 | 16 | 8.1 | 351 | ☒ |
| 13 | 18 | 8.7 | 210 | ☒ |
| 14 | 17 | 8.8 | 445 | ☒ |
| 15 | 16 | 8.9 | 307 | ☒ |
| 16 | 18 | 8.9 | 337 | ☒ |
| 17 | 18 | 8.9 | 368 | ☒ |
| 18 | 16 | 8.0 | 275 | ☒ |
| 19 | 17 | 8.0 | 485 | ☒ |
| 20 | 18 | 9.1 | 363 | ☒ |
| 21 | 18 | 9.2 | 444 | ☒ |
| 22 | 18 | 9.3 | 366 | ☒ |
| 23 | 16 | 9.1 | 210 | ☒ |
| 24 | 16 | 9.1 | 443 | ☒ |
| 25 | 16 | 9.7 | 253 | ☒ |
| 26 | 18 | 9.7 | 489 | ☒ |
| 27 | 17 | 9.9 | 233 | ☒ |
| 28 | 16 | 9.9 | 404 | ☒ |
| 29 | 17 | 9.0 | 259 | ☒ |
| 30 | 16 | 9.0 | 438 | ☒ |

***Table 8.3-18:*** *Radar type 4 trial's details and detection results for 802.11n HT20 in U-NII-2A band, channel 60, 5300 MHz*

| Trial number | Pulses/Bursts | Pulse width, µs | PRI, µs | Detected |
|---|---|---|---|---|
| 1 | 14 | 11.6 | 229 | ☒ |
| 2 | 15 | 12.1 | 412 | ☒ |
| 3 | 13 | 12.4 | 397 | ☒ |
| 4 | 16 | 12.8 | 351 | ☒ |
| 5 | 15 | 12.9 | 367 | ☒ |
| 6 | 12 | 13.2 | 370 | ☒ |
| 7 | 13 | 13.8 | 433 | ☒ |
| 8 | 16 | 13.9 | 358 | ☒ |
| 9 | 15 | 14.4 | 303 | ☒ |
| 10 | 16 | 14.6 | 289 | ☒ |
| 11 | 12 | 14.6 | 437 | ☒ |
| 12 | 15 | 15.2 | 476 | ☒ |
| 13 | 12 | 15.6 | 480 | ☒ |
| 14 | 16 | 15.0 | 210 | ☒ |
| 15 | 13 | 16.5 | 486 | ☒ |
| 16 | 14 | 17.5 | 404 | ☒ |
| 17 | 14 | 17.6 | 461 | ☒ |
| 18 | 15 | 17.7 | 342 | ☒ |
| 19 | 15 | 17.8 | 402 | ☒ |
| 20 | 16 | 18.3 | 231 | ☒ |
| 21 | 15 | 18.5 | 466 | ☒ |
| 22 | 12 | 18.7 | 280 | ☒ |
| 23 | 12 | 18.7 | 459 | ☒ |
| 24 | 14 | 18.8 | 468 | ☒ |
| 25 | 14 | 19.1 | 432 | ☒ |
| 26 | 15 | 19.2 | 244 | ☒ |
| 27 | 16 | 19.4 | 424 | ☒ |
| 28 | 13 | 19.6 | 307 | ☒ |
| 29 | 12 | 19.6 | 448 | ☒ |
| 30 | 12 | 20.0 | 290 | ☒ |

***Table 8.3-19:*** *Radar type 4 trial's details and detection results for 802.11n HT40 in U-NII-2A band, channel 62, 5310 MHz*

| Trial number | Pulses/Bursts | Pulse width, µs | PRI, µs | Detected |
|---|---|---|---|---|
| 1 | 12 | 11.1 | 292 | ☒ |
| 2 | 14 | 11.5 | 246 | ☒ |
| 3 | 16 | 11.5 | 477 | ☒ |
| 4 | 12 | 11.6 | 353 | ☒ |
| 5 | 13 | 11.8 | 304 | ☒ |
| 6 | 13 | 11.9 | 336 | ☒ |
| 7 | 12 | 12.5 | 207 | ☒ |
| 8 | 12 | 12.7 | 460 | ☒ |
| 9 | 16 | 14.2 | 242 | ☒ |
| 10 | 16 | 14.8 | 224 | ☒ |
| 11 | 14 | 15.2 | 345 | ☒ |
| 12 | 16 | 15.4 | 413 | ☒ |
| 13 | 13 | 15.5 | 291 | ☒ |
| 14 | 15 | 15.5 | 427 | ☒ |
| 15 | 16 | 15.6 | 302 | ☒ |
| 16 | 16 | 15.6 | 378 | ☒ |
| 17 | 15 | 15.7 | 267 | ☒ |
| 18 | 16 | 15.7 | 290 | ☒ |
| 19 | 14 | 15.8 | 317 | ☒ |
| 20 | 16 | 16.4 | 407 | ☒ |
| 21 | 15 | 16.5 | 369 | ☒ |
| 22 | 15 | 16.6 | 215 | ☒ |
| 23 | 13 | 16.6 | 467 | ☒ |
| 24 | 16 | 16.7 | 206 | ☒ |
| 25 | 14 | 17.6 | 494 | ☒ |
| 26 | 15 | 17.9 | 431 | ☒ |
| 27 | 15 | 17.0 | 253 | ☒ |
| 28 | 14 | 18.1 | 346 | ☒ |
| 29 | 15 | 18.9 | 360 | ☒ |
| 30 | 15 | 19.9 | 464 | ☒ |

***Table 8.3-20:*** *Radar type 4 trial's details and detection results for 802.11n HT20 in U-NII-2C band, channel 100, 5500 MHz*

| Trial number | Pulses/Bursts | Pulse width, µs | PRI, µs | Detected |
|---|---|---|---|---|
| 1 | 14 | 11.3 | 344 | ☒ |
| 2 | 13 | 11.5 | 419 | ☒ |
| 3 | 13 | 11.6 | 439 | ☒ |
| 4 | 13 | 11.7 | 457 | ☒ |
| 5 | 14 | 11.7 | 484 | ☒ |
| 6 | 16 | 12.2 | 300 | ☒ |
| 7 | 12 | 12.4 | 277 | ☒ |
| 8 | 15 | 12.7 | 352 | ☒ |
| 9 | 16 | 12.0 | 257 | ☒ |
| 10 | 15 | 13.1 | 387 | ☒ |
| 11 | 15 | 13.9 | 468 | ☒ |
| 12 | 15 | 13.0 | 324 | ☒ |
| 13 | 15 | 14.1 | 253 | ☒ |
| 14 | 12 | 14.6 | 444 | ☒ |
| 15 | 14 | 16.4 | 290 | ☒ |
| 16 | 13 | 16.5 | 310 | ☒ |
| 17 | 14 | 16.8 | 280 | ☒ |
| 18 | 16 | 16.9 | 435 | ☒ |
| 19 | 16 | 16.0 | 399 | ☒ |
| 20 | 16 | 17.1 | 369 | ☒ |
| 21 | 13 | 17.2 | 327 | ☒ |
| 22 | 14 | 17.7 | 460 | ☒ |
| 23 | 12 | 17.0 | 467 | ☒ |
| 24 | 15 | 18.3 | 241 | ☒ |
| 25 | 16 | 18.3 | 449 | ☒ |
| 26 | 14 | 19.1 | 395 | ☒ |
| 27 | 15 | 19.2 | 241 | ☒ |
| 28 | 15 | 19.7 | 313 | ☒ |
| 29 | 12 | 19.9 | 476 | ☒ |
| 30 | 15 | 20.0 | 425 | ☒ |

***Table 8.3-21:*** *Radar type 4 trial's details and detection results for 802.11n HT40 in U-NII-2C band, channel 102, 5510 MHz*

| Trial number | Pulses/Bursts | Pulse width, µs | PRI, µs | Detected |
|---|---|---|---|---|
| 1 | 13 | 11.1 | 416 | ☒ |
| 2 | 12 | 11.3 | 428 | ☒ |
| 3 | 13 | 11.6 | 409 | ☒ |
| 4 | 15 | 11.0 | 463 | ☒ |
| 5 | 16 | 12.1 | 369 | ☒ |
| 6 | 15 | 12.3 | 429 | ☒ |
| 7 | 14 | 12.7 | 291 | ☒ |
| 8 | 13 | 13.4 | 286 | ☒ |
| 9 | 13 | 13.5 | 200 | ☒ |
| 10 | 13 | 13.8 | 472 | ☒ |
| 11 | 14 | 13.9 | 231 | ☒ |
| 12 | 13 | 14.4 | 417 | ☒ |
| 13 | 13 | 14.4 | 451 | ☒ |
| 14 | 16 | 14.7 | 462 | ☒ |
| 15 | 14 | 14.9 | 390 | ☒ |
| 16 | 12 | 15.1 | 333 | ☒ |
| 17 | 15 | 15.1 | 496 | ☒ |
| 18 | 16 | 15.3 | 347 | ☒ |
| 19 | 16 | 15.9 | 286 | ☒ |
| 20 | 13 | 16.1 | 466 | ☒ |
| 21 | 14 | 16.9 | 416 | ☒ |
| 22 | 16 | 16.0 | 397 | ☒ |
| 23 | 15 | 17.1 | 310 | ☒ |
| 24 | 13 | 17.6 | 216 | ☒ |
| 25 | 14 | 17.6 | 272 | ☒ |
| 26 | 14 | 17.6 | 351 | ☒ |
| 27 | 14 | 18.3 | 435 | ☒ |
| 28 | 16 | 18.5 | 465 | ☒ |
| 29 | 12 | 19.6 | 219 | ☒ |
| 30 | 12 | 19.0 | 276 | ☒ |

## 8.4 Statistical performance for long pulse radars

### 8.4.1 Definitions and limits

For Radar type 5 (long pulse radars) minimum percentage of successful detection is 80 %.

### 8.4.2 Test summary

| | | | |
|---|---|---|---|
| Test date | January 25, 2017 | Temperature | 23 °C |
| Test engineer | Andrey Adelberg | Air pressure | 1007 mbar |
| Verdict | Pass | Relative humidity | 40 % |

### 8.4.3 Observations, settings and special notes

The percentage of successful detection is calculated by:

$$\frac{Total\ waveform\ detections}{Total\ waveform\ trials} \times 100\%$$

The minimum number of trails is 30.

### 8.4.4 Test data

***Table 8.4-1:*** *Summary of the long radar detection probability results for 802.11n HT20 for U-NII-2A band*

| Radar type | Detection probability ($P_d$), % | Minimum Limit, % | Margin, % |
|---|---|---|---|
| 5 | 100 | 80 | 20 |

***Table 8.4-2:*** *Summary of the long radar detection probability results for 802.11n HT20 for U-NII-2C band*

| Radar type | Detection probability ($P_d$), % | Minimum Limit, % | Margin, % |
|---|---|---|---|
| 5 | 100 | 80 | 20 |

***Table 8.4-3:*** *Summary of the long radar detection probability results for 802.11n HT40 for U-NII-2A band*

| Radar type | Detection probability ($P_d$), % | Minimum Limit, % | Margin, % |
|---|---|---|---|
| 5 | 93.3 | 80.00 | 13.3 |

***Table 8.4-4:*** *Summary of the long radar detection probability results for 802.11n HT40 for U-NII-2C band*

| Radar type | Detection probability ($P_d$), % | Minimum Limit, % | Margin, % |
|---|---|---|---|
| 5 | 100 | 80.00 | 20 |

***Table 8.4-5:*** *Radar Type 5 detection probability test results for 802.11n HT20, U-NII-2A band*

| Trial | Chirp width, MHz | $F_L$, MHz | $F_H$, MHz | Radar pulse offset, MHz | Radar frequency, MHz | Detection |
|---|---|---|---|---|---|---|
| 0 | 5 | 5290 | 5310 | Center of channel | 5300.000 | ☒ |
| 1 | 18 | 5290 | 5310 | Center of channel | 5300.000 | ☒ |
| 2 | 5 | 5290 | 5310 | Center of channel | 5300.000 | ☒ |
| 3 | 20 | 5290 | 5310 | Center of channel | 5300.000 | ☒ |
| 4 | 11 | 5290 | 5310 | Center of channel | 5300.000 | ☒ |
| 5 | 6 | 5290 | 5310 | Center of channel | 5300.000 | ☒ |
| 6 | 14 | 5290 | 5310 | Center of channel | 5300.000 | ☒ |
| 7 | 9 | 5290 | 5310 | Center of channel | 5300.000 | ☒ |
| 8 | 17 | 5290 | 5310 | Center of channel | 5300.000 | ☒ |
| 9 | 11 | 5290 | 5310 | Center of channel | 5300.000 | ☒ |
| 10 | 9 | 5290 | 5310 | 3.6 | 5293.600 | ☒ |
| 11 | 8 | 5290 | 5310 | 3.2 | 5293.200 | ☒ |
| 12 | 13 | 5290 | 5310 | 5.2 | 5295.200 | ☒ |
| 13 | 6 | 5290 | 5310 | 2.4 | 5292.400 | ☒ |
| 14 | 8 | 5290 | 5310 | 3.2 | 5293.200 | ☒ |
| 15 | 8 | 5290 | 5310 | 3.2 | 5293.200 | ☒ |
| 16 | 16 | 5290 | 5310 | 6.4 | 5296.400 | ☒ |
| 17 | 15 | 5290 | 5310 | 6.0 | 5296.000 | ☒ |
| 18 | 19 | 5290 | 5310 | 7.6 | 5297.600 | ☒ |
| 19 | 16 | 5290 | 5310 | 6.4 | 5296.400 | ☒ |
| 20 | 20 | 5290 | 5310 | 8.0 | 5302.000 | ☒ |
| 21 | 10 | 5290 | 5310 | 4.0 | 5306.000 | ☒ |
| 22 | 13 | 5290 | 5310 | 5.2 | 5304.800 | ☒ |
| 23 | 14 | 5290 | 5310 | 5.6 | 5304.400 | ☒ |
| 24 | 19 | 5290 | 5310 | 7.6 | 5302.400 | ☒ |
| 25 | 13 | 5290 | 5310 | 5.2 | 5304.800 | ☒ |
| 26 | 18 | 5290 | 5310 | 7.2 | 5302.800 | ☒ |
| 27 | 6 | 5290 | 5310 | 2.4 | 5307.600 | ☒ |
| 28 | 19 | 5290 | 5310 | 7.6 | 5302.400 | ☒ |
| 29 | 10 | 5290 | 5310 | 4.0 | 5306.000 | ☒ |

Example of Radar frequencies calculation:
Chirp width of Radar signal is 13 MHz (Trial 12).
EUT $F_L$ = 5290.000 MHz
$F_{C\_Radar\_L}$ = 5290.000 + (0.4 × 13.000) = 5290.000 + 5.2 = 5295.200 MHz
Chirp width of Radar signal is 18 MHz (Trial 26).
EUT $F_H$ = 5310.000 MHz
$F_{C\_Radar\_H}$ = 5310.000 − (0.4 × 18.000) = 5310.000 − 7.200 = 5302.800 MHz

***Table 8.4-6:*** *Radar Type 5 detection probability test results for 802.11n HT40, U-NII-2A band*

| Trial | Chirp width, MHz | $F_L$, MHz | $F_H$, MHz | Radar pulse offset, MHz | Radar frequency, MHz | Detection |
|---|---|---|---|---|---|---|
| 0 | 6 | 5292 | 5329 | Center of channel | 5310.000 | ☒ |
| 1 | 15 | 5292 | 5329 | Center of channel | 5310.000 | ☒ |
| 2 | 9 | 5292 | 5329 | Center of channel | 5310.000 | ☒ |
| 3 | 17 | 5292 | 5329 | Center of channel | 5310.000 | ☒ |
| 4 | 9 | 5292 | 5329 | Center of channel | 5310.000 | ☒ |
| 5 | 13 | 5292 | 5329 | Center of channel | 5310.000 | ☒ |
| 6 | 19 | 5292 | 5329 | Center of channel | 5310.000 | ☒ |
| 7 | 18 | 5292 | 5329 | Center of channel | 5310.000 | ☒ |
| 8 | 17 | 5292 | 5329 | Center of channel | 5310.000 | ☒ |
| 9 | 8 | 5292 | 5329 | Center of channel | 5310.000 | ☒ |
| 10 | 17 | 5292 | 5329 | 6.8 | 5298.800 | ☒ |
| 11 | 12 | 5292 | 5329 | 4.8 | 5296.800 | ☒ |
| 12 | 18 | 5292 | 5329 | 7.2 | 5299.200 | ☒ |
| 13 | 14 | 5292 | 5329 | 5.6 | 5297.600 | ☒ |
| 14 | 9 | 5292 | 5329 | 3.6 | 5295.600 | ☐ |
| 15 | 13 | 5292 | 5329 | 5.2 | 5297.200 | ☒ |
| 16 | 18 | 5292 | 5329 | 7.2 | 5299.200 | ☒ |
| 17 | 16 | 5292 | 5329 | 6.4 | 5298.400 | ☒ |
| 18 | 17 | 5292 | 5329 | 6.8 | 5298.800 | ☒ |
| 19 | 8 | 5292 | 5329 | 3.2 | 5295.200 | ☐ |
| 20 | 12 | 5292 | 5329 | 4.8 | 5324.200 | ☒ |
| 21 | 10 | 5292 | 5329 | 4.0 | 5325.000 | ☒ |
| 22 | 20 | 5292 | 5329 | 8.0 | 5321.000 | ☒ |
| 23 | 17 | 5292 | 5329 | 6.8 | 5322.200 | ☒ |
| 24 | 13 | 5292 | 5329 | 5.2 | 5323.800 | ☒ |
| 25 | 20 | 5292 | 5329 | 8.0 | 5321.000 | ☒ |
| 26 | 18 | 5292 | 5329 | 7.2 | 5321.800 | ☒ |
| 27 | 12 | 5292 | 5329 | 4.8 | 5324.200 | ☒ |
| 28 | 8 | 5292 | 5329 | 3.2 | 5325.800 | ☒ |
| 29 | 6 | 5292 | 5329 | 2.4 | 5326.600 | ☒ |

Example of Radar frequencies calculation:
Chirp width of Radar signal is 14 MHz (Trial 13).
EUT $F_L$ = 5292.000 MHz
$F_{C\_Radar\_L}$ = 5292.000 + (0.4 × 14.000) = 5292.000 + 5.600 = 5297.600 MHz
Chirp width of Radar signal is 20 MHz (Trial 25).
EUT $F_H$ = 5329.000 MHz
$F_{C\_Radar\_H}$ = 5329.000 − (0.4 × 20.000) = 5329.00 – 8.000 = 5321.000 MHz

***Table 8.4-7:*** *Radar Type 5 detection probability test results for 802.11n HT20, U-NII-2C band*

| Trial | Chirp width, MHz | $F_L$, MHz | $F_H$, MHz | Radar pulse offset, MHz | Radar frequency, MHz | Detection |
|---|---|---|---|---|---|---|
| 0 | 20 | 5487 | 5513 | Center of channel | 5500.000 | ☒ |
| 1 | 18 | 5487 | 5513 | Center of channel | 5500.000 | ☒ |
| 2 | 12 | 5487 | 5513 | Center of channel | 5500.000 | ☒ |
| 3 | 13 | 5487 | 5513 | Center of channel | 5500.000 | ☒ |
| 4 | 7 | 5487 | 5513 | Center of channel | 5500.000 | ☒ |
| 5 | 9 | 5487 | 5513 | Center of channel | 5500.000 | ☒ |
| 6 | 17 | 5487 | 5513 | Center of channel | 5500.000 | ☒ |
| 7 | 8 | 5487 | 5513 | Center of channel | 5500.000 | ☒ |
| 8 | 12 | 5487 | 5513 | Center of channel | 5500.000 | ☒ |
| 9 | 5 | 5487 | 5513 | Center of channel | 5500.000 | ☒ |
| 10 | 19 | 5487 | 5513 | 7.6 | 5494.600 | ☒ |
| 11 | 15 | 5487 | 5513 | 6.0 | 5493.000 | ☒ |
| 12 | 20 | 5487 | 5513 | 8.0 | 5495.000 | ☒ |
| 13 | 19 | 5487 | 5513 | 7.6 | 5494.600 | ☒ |
| 14 | 5 | 5487 | 5513 | 2.0 | 5489.000 | ☒ |
| 15 | 19 | 5487 | 5513 | 7.6 | 5494.600 | ☒ |
| 16 | 5 | 5487 | 5513 | 2.0 | 5489.000 | ☒ |
| 17 | 18 | 5487 | 5513 | 7.2 | 5494.200 | ☒ |
| 18 | 10 | 5487 | 5513 | 4.0 | 5491.000 | ☒ |
| 19 | 7 | 5487 | 5513 | 2.8 | 5489.800 | ☒ |
| 20 | 8 | 5487 | 5513 | 3.2 | 5509.800 | ☒ |
| 21 | 13 | 5487 | 5513 | 5.2 | 5507.800 | ☒ |
| 22 | 12 | 5487 | 5513 | 4.8 | 5508.200 | ☒ |
| 23 | 19 | 5487 | 5513 | 7.6 | 5505.400 | ☒ |
| 24 | 13 | 5487 | 5513 | 5.2 | 5507.800 | ☒ |
| 25 | 18 | 5487 | 5513 | 7.2 | 5505.800 | ☒ |
| 26 | 9 | 5487 | 5513 | 3.6 | 5509.400 | ☒ |
| 27 | 14 | 5487 | 5513 | 5.6 | 5507.400 | ☒ |
| 28 | 14 | 5487 | 5513 | 5.6 | 5507.400 | ☒ |
| 29 | 10 | 5487 | 5513 | 4.0 | 5509.000 | ☒ |

Example of Radar frequencies calculation:
Chirp width of Radar signal is 5 MHz (Trial 14).
EUT $F_L$ = 5487.000 MHz
$F_{C\_Radar\_L}$ = 5487.000 + (0.4 × 5.000) = 5487.000 + 2.000 = 5489.000 MHz
Chirp width of Radar signal is 9 MHz (Trial 26).
EUT $F_H$ = 5513.000 MHz
$F_{C\_Radar\_H}$ = 5513.000 − (0.4 × 9.000) = 5513.000 − 3.600 = 5509.400 MHz

***Table 8.4-8:*** *Radar Type 5 detection probability test results for 802.11n HT40, U-NII-2C band*

| Trial | Chirp width, MHz | $F_L$, MHz | $F_H$, MHz | Radar pulse offset, MHz | Radar frequency, MHz | Detection |
|---|---|---|---|---|---|---|
| 0 | 7 | 5491 | 5530 | Center of channel | 5510.000 | ☒ |
| 1 | 19 | 5491 | 5530 | Center of channel | 5510.000 | ☒ |
| 2 | 17 | 5491 | 5530 | Center of channel | 5510.000 | ☒ |
| 3 | 20 | 5491 | 5530 | Center of channel | 5510.000 | ☒ |
| 4 | 11 | 5491 | 5530 | Center of channel | 5510.000 | ☒ |
| 5 | 5 | 5491 | 5530 | Center of channel | 5510.000 | ☒ |
| 6 | 7 | 5491 | 5530 | Center of channel | 5510.000 | ☒ |
| 7 | 19 | 5491 | 5530 | Center of channel | 5510.000 | ☒ |
| 8 | 9 | 5491 | 5530 | Center of channel | 5510.000 | ☒ |
| 9 | 10 | 5491 | 5530 | Center of channel | 5510.000 | ☒ |
| 10 | 8 | 5491 | 5530 | 3.2 | 5494.200 | ☒ |
| 11 | 19 | 5491 | 5530 | 7.6 | 5498.600 | ☒ |
| 12 | 19 | 5491 | 5530 | 7.6 | 5498.600 | ☒ |
| 13 | 16 | 5491 | 5530 | 6.4 | 5497.400 | ☒ |
| 14 | 18 | 5491 | 5530 | 7.2 | 5498.200 | ☒ |
| 15 | 6 | 5491 | 5530 | 2.4 | 5493.400 | ☒ |
| 16 | 15 | 5491 | 5530 | 6.0 | 5497.000 | ☒ |
| 17 | 10 | 5491 | 5530 | 4.0 | 5495.000 | ☒ |
| 18 | 9 | 5491 | 5530 | 3.6 | 5494.600 | ☒ |
| 19 | 8 | 5491 | 5530 | 3.2 | 5494.200 | ☒ |
| 20 | 18 | 5491 | 5530 | 7.2 | 5522.800 | ☒ |
| 21 | 14 | 5491 | 5530 | 5.6 | 5524.400 | ☒ |
| 22 | 9 | 5491 | 5530 | 3.6 | 5526.400 | ☒ |
| 23 | 8 | 5491 | 5530 | 3.2 | 5526.800 | ☒ |
| 24 | 18 | 5491 | 5530 | 7.2 | 5522.800 | ☒ |
| 25 | 5 | 5491 | 5530 | 2.0 | 5528.000 | ☒ |
| 26 | 18 | 5491 | 5530 | 7.2 | 5522.800 | ☒ |
| 27 | 6 | 5491 | 5530 | 2.4 | 5527.600 | ☒ |
| 28 | 17 | 5491 | 5530 | 6.8 | 5523.200 | ☒ |
| 29 | 10 | 5491 | 5530 | 4.0 | 5526.000 | ☒ |

Example of Radar frequencies calculation:
Chirp width of Radar signal is 6 MHz (Trial 15).
EUT $F_L$ = 5491.000 MHz
$F_{C\_Radar\_L}$ = 5491.000 + (0.4 × 6.000) = 5491.000 + 2.400 = 5493.400 MHz
Chirp width of Radar signal is 17 MHz (Trial 28).
EUT $F_H$ = 5530.000 MHz
$F_{C\_Radar\_H}$ = 5530.000 − (0.4 × 17.000) = 5530.00 – 6.800 = 5523.200 MHz

## 8.5 Statistical performance for frequency hopping radars

### 8.5.1 Definitions and limits

For Radar type 6 (frequency hopping radars) minimum percentage of successful detection is 70 %.

### 8.5.2 Test summary

| | | | |
|---|---|---|---|
| Test date | April 10, 2015 | Temperature | 21 °C |
| Test engineer | Andrey Adelberg | Air pressure | 1005 mbar |
| Verdict | Pass | Relative humidity | 30 % |

### 8.5.3 Observations, settings and special notes

The percentage of successful detection is calculated by:

$$\frac{Total\ waveform\ detections}{Total\ waveform\ trials} \times 100\%$$

The minimum number of trails is 30.
Pulses per hop is 9; Pulse Repetition Interval (PRI) is 333 µs; Pulse width is 1 µs

### 8.5.4 Test data

***Table 8.5-1:*** *Summary of the frequency hopping radar detection probability results for 802.11n HT20*

| Radar type | Band | Detection probability ($P_d$), % | Minimum Limit, % | Margin, % |
|---|---|---|---|---|
| 6 | U-NII-2A | 100.00 | 70.00 | 30.00 |
| 6 | U-NII-2C | 100.00 | 70.00 | 30.00 |

***Table 8.5-2:*** *Summary of the frequency hopping radar detection probability results for 802.11n HT40*

| Radar type | Band | Detection probability ($P_d$), % | Minimum Limit, % | Margin, % |
|---|---|---|---|---|
| 6 | U-NII-2A | 100.00 | 70.00 | 30.00 |
| 6 | U-NII-2C | 100.00 | 70.00 | 30.00 |

***Table 8.5-3:*** *Frequency hopping Radar type 6 results*

| Trial | Detections for 802.11n HT20, U-NII-2A band, channel 60, 5300 MHz | Detections for 802.11n HT40, U-NII-2A band, channel 62, 5310 MHz | Detections for 802.11n HT20, U-NII-2C band, channel 100, 5500 MHz | Detections for 802.11n HT40, U-NII-2C band, channel 102, 5510 MHz |
|---|---|---|---|---|
| 0 | ☒ | ☒ | ☒ | ☒ |
| 1 | ☒ | ☒ | ☒ | ☒ |
| 2 | ☒ | ☒ | ☒ | ☒ |
| 3 | ☒ | ☒ | ☒ | ☒ |
| 4 | ☒ | ☒ | ☒ | ☒ |
| 5 | ☒ | ☒ | ☒ | ☒ |
| 6 | ☒ | ☒ | ☒ | ☒ |
| 7 | ☒ | ☒ | ☒ | ☒ |
| 8 | ☒ | ☒ | ☒ | ☒ |
| 9 | ☒ | ☒ | ☒ | ☒ |
| 10 | ☒ | ☒ | ☒ | ☒ |
| 11 | ☒ | ☒ | ☒ | ☒ |
| 12 | ☒ | ☒ | ☒ | ☒ |
| 13 | ☒ | ☒ | ☒ | ☒ |
| 14 | ☒ | ☒ | ☒ | ☒ |
| 15 | ☒ | ☒ | ☒ | ☒ |
| 16 | ☒ | ☒ | ☒ | ☒ |
| 17 | ☒ | ☒ | ☒ | ☒ |
| 18 | ☒ | ☒ | ☒ | ☒ |
| 19 | ☒ | ☒ | ☒ | ☒ |
| 20 | ☒ | ☒ | ☒ | ☒ |
| 21 | ☒ | ☒ | ☒ | ☒ |
| 22 | ☒ | ☒ | ☒ | ☒ |
| 23 | ☒ | ☒ | ☒ | ☒ |
| 24 | ☒ | ☒ | ☒ | ☒ |
| 25 | ☒ | ☒ | ☒ | ☒ |
| 26 | ☒ | ☒ | ☒ | ☒ |
| 27 | ☒ | ☒ | ☒ | ☒ |
| 28 | ☒ | ☒ | ☒ | ☒ |
| 29 | ☒ | ☒ | ☒ | ☒ |

## 8.6 Channel closing transmission and move time

### 8.6.1 Definitions and limits

Maximum channel closing transmission time is 200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period.
Maximum channel move time is 10 seconds.

### 8.6.2 Test summary

| | | | |
|---|---|---|---|
| Test date | April 7, 2017 | Temperature | 23 °C |
| Test engineer | Andrey Adelberg | Air pressure | 1010 mbar |
| Verdict | Pass | Relative humidity | 37 % |

### 8.6.3 Observations, settings and special notes

The test was performed on the widest channel BW, which is 40 MHz with the use of Radar type 0.

### 8.6.4 Test data

***Table 8.6-1:*** *Channel closing transmission time results*

| Band | Measured closing transmission time, ms | Limit, ms | Margin, ms |
|---|---|---|---|
| U-NII-2A | 0.930 | 260.00 | 259.070 |
| U-NII-2C | 12.545 | 260.00 | 247.455 |

***Table 8.6-2:*** *Channel move time results*

| Band | Measured move time, s | Limit, s | Margin, s |
|---|---|---|---|
| U-NII-2A | 0.336 | 10.00 | 9.664 |
| U-NII-2C | 0.481 | 10.00 | 9.519 |

***Table 8.6-3:*** *Channel closing transmission and move time measurement results*

| Band | Region | Start, s | End, s | Measured, ms | Limit, ms |
|---|---|---|---|---|---|
| U-NII-2A | 0 | 0 | 0.2 | 0.448 | 200 |
| U-NII-2A | 1 | 0.2 | 10 | 0.482 | 60 |
| U-NII-2A | 2 | 10 | 12 | 0.000 | 0 |
| U-NII-2C | 0 | 0 | 0.2 | 11.661 | 200 |
| U-NII-2C | 1 | 0.2 | 10 | 0.884 | 60 |
| U-NII-2C | 2 | 10 | 12 | 0.000 | 0 |


***Figure 8.6-1:*** *Channel closing transmission and move time, U-NII-2A band*


***Figure 8.6-2:*** *Channel closing transmission and move time, U-NII-2C band*

## 8.7 Initial channel availability check time

### 8.7.1 Definitions and limits

The initial channel availability check (CAC) time tests that the EUT does not emit beacon, control, or data signals on the test channel until the power-up sequence has been completed and the U-NII device checks for Radar Waveforms for one minute on the test channel.

### 8.7.2 Test summary

| | | | |
|---|---|---|---|
| Test date | April 7, 2017 | Temperature | 23 °C |
| Test engineer | Andrey Adelberg | Air pressure | 1010 mbar |
| Verdict | Pass | Relative humidity | 37 % |

### 8.7.3 Observations, settings and special notes

None

### 8.7.4 Test data

***Table 8.7-1:*** *Initial CAC results*

| Band | Measured CAC, s | Minimum limit, s | Margin, s |
|---|---|---|---|
| U-NII-2A | 60 | 60 | 0 |
| U-NII-2C | 60 | 60 | 0 |

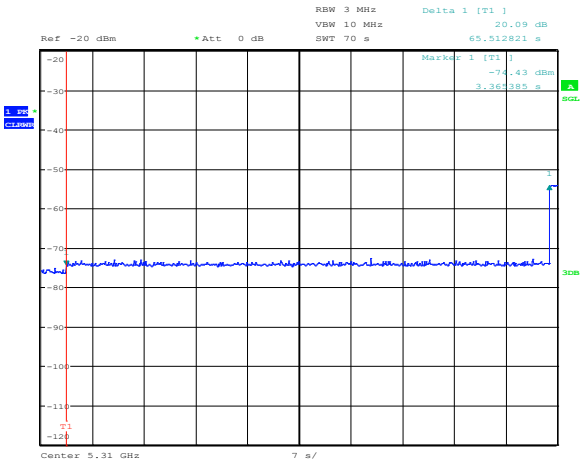



***Figure 8.7-1:*** *Initial CAC for U-NII-2A band*

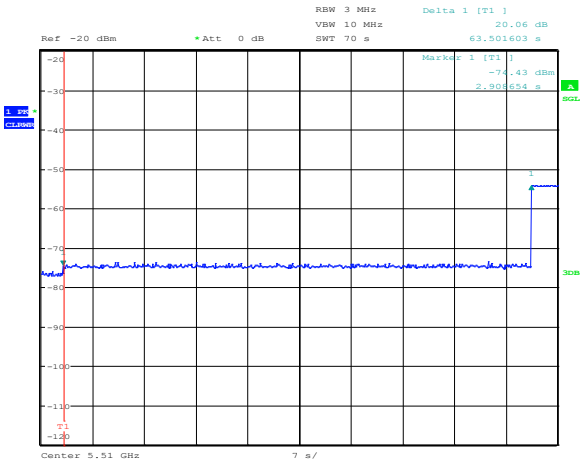



***Figure 8.7-2:*** *Initial CAC for U-NII-2C band*

## 8.8 In-service monitoring radar burst at the beginning of the CAC

### 8.8.1 Definitions and limits

This procedure is to verify successful radar detection on the test Channel during a period equal to the Channel Availability Check Time and avoidance of operation on that Channel when a radar Burst with a level equal to the DFS Detection Threshold + 1 dB occurs at the beginning (within first 6 seconds) of the Channel Availability Check Time.

### 8.8.2 Test summary

| | | | |
|---|---|---|---|
| Test date | April 21, 2017 | Temperature | 23 °C |
| Test engineer | Andrey Adelberg | Air pressure | 1010 mbar |
| Verdict | Pass | Relative humidity | 37 % |

### 8.8.3 Observations, settings and special notes

This test was performed once on the widest channel BW, which is 40 MHz with the use of Radar type 0.

### 8.8.4 Test data

***Table 8.8-1:*** *In-service monitoring radar burst at the beginning of the CAC*

| Band | Radar pulses delay from the beginning of CAC, s | Successful Radar detection and channel vacation |
|---|---|---|
| U-NII-2A | 5 | ☒ |
| U-NII-2C | 5 | ☒ |

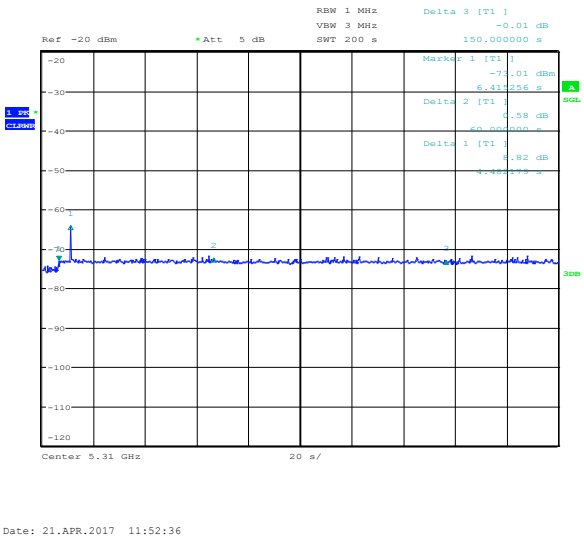



***Figure 8.8-1:*** *In-service monitoring radar burst at the beginning of the CAC for U-NII-2A band*

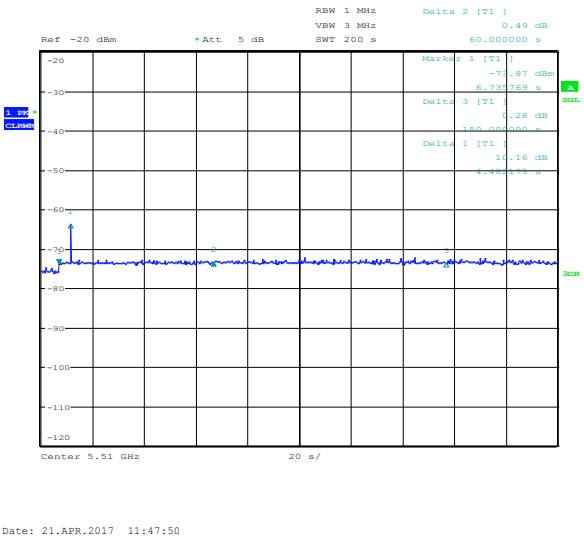



***Figure 8.8-2:*** *In-service monitoring radar burst at the beginning of the CAC for U-NII-2C band*

## 8.9 In-service monitoring radar burst at the end of the CAC

### 8.9.1 Definitions and limits

This procedure is to verify successful radar detection on the test Channel during a period equal to the Channel Availability Check Time and avoidance of operation on that Channel when a radar Burst with a level equal to the DFS Detection Threshold + 1 dB occurs at the end (within last 6 seconds) of the Channel Availability Check Time.

### 8.9.2 Test summary

| | | | |
|---|---|---|---|
| Test date | April 21, 2017 | Temperature | 23 °C |
| Test engineer | Andrey Adelberg | Air pressure | 1010 mbar |
| Verdict | Pass | Relative humidity | 37 % |

### 8.9.3 Observations, settings and special notes

This test was performed once on the widest channel BW, which is 40 MHz with the use of Radar type 0.

### 8.9.4 Test data

***Table 8.9-1:*** *In-service monitoring radar burst at the end of the CAC*

| Band | Radar pulses delay from the beginning of CAC, s | Successful Radar detection and channel vacation |
|---|---|---|
| U-NII-2A | 55 | ☒ |
| U-NII-2C | 55 | ☒ |

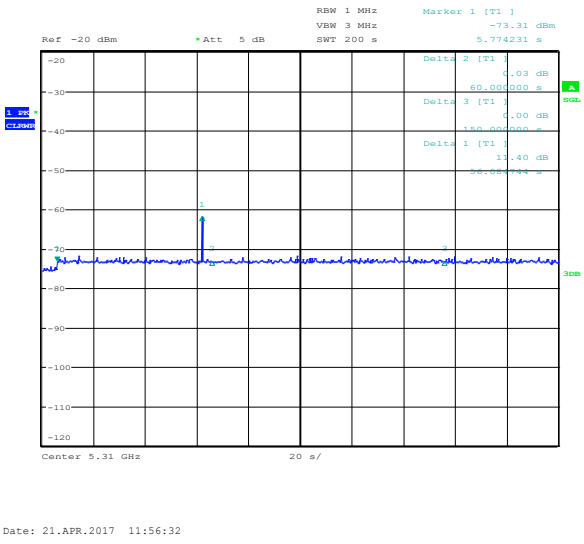



***Figure 8.9-1:*** *In-service monitoring radar burst at the end of the CAC for U-NII-2A band*

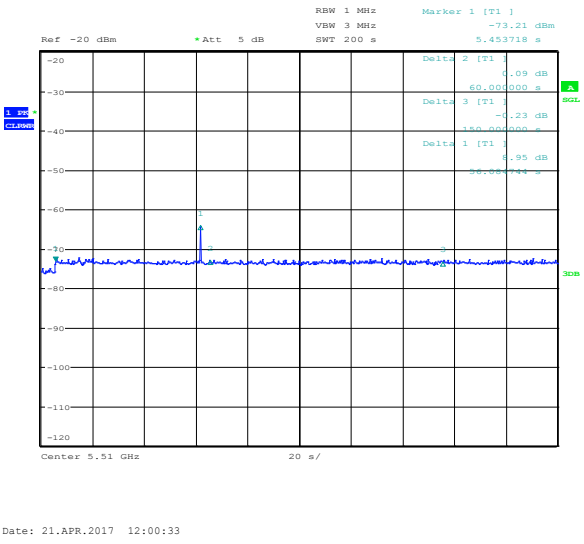



***Figure 8.9-2:*** *In-service monitoring radar burst at the end of the CAC for U-NII-2C band*

## 8.10 Non-occupancy period

### 8.10.1 Definitions and limits

Non-occupancy period minimum is 30 minutes.

### 8.10.2 Test summary

| | | | |
|---|---|---|---|
| Test date | April 10, 2017 | Temperature | 22 °C |
| Test engineer | Andrey Adelberg | Air pressure | 1006 mbar |
| Verdict | Pass | Relative humidity | 38 % |

### 8.10.3 Observations, settings and special notes

The EUT was monitored for more than 30 minutes following instant indicated with Marker 1 on the plots below (the end of Radar pulses) to verify that the EUT does not resume any transmissions on this Channel. This test was performed once on the widest channel BW, which is 40 MHz with the use of Radar type 0.

### 8.10.4 Test data

***Table 8.10-1:*** *Non-occupancy period results*

| Band | Measured Non-occupancy period, min | Minimum limit, min | Margin, min |
|---|---|---|---|
| U-NII-2A | 31.8 | 30 | At least 1.8 |
| U-NII-2C | 32.5 | 30 | At least 2.5 |

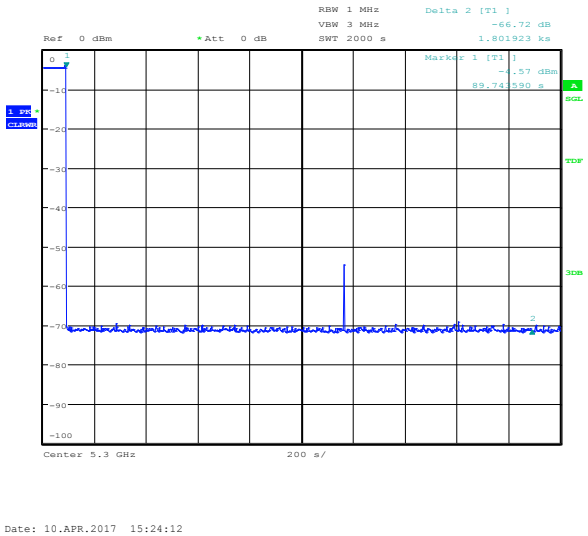



***Figure 8.10-1:*** *Non-occupancy period for U-NII-2A band*

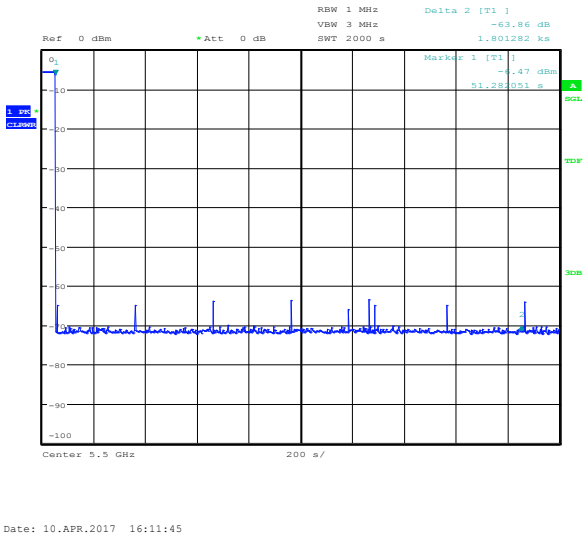
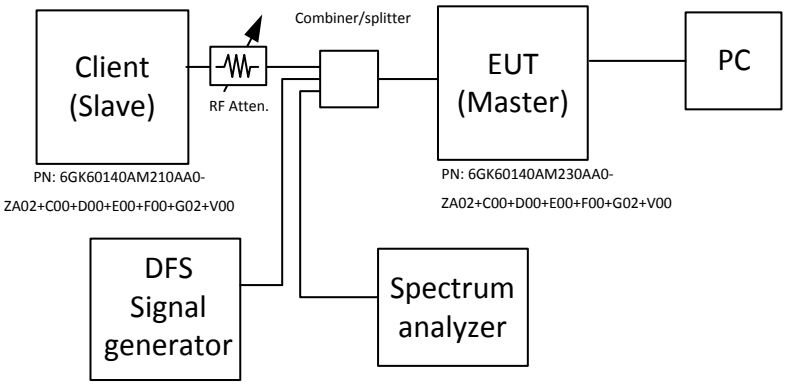



***Figure 8.10-2:*** *Non-occupancy period for U-NII-2C band*

# **Section 9.** Block diagram and photo of test set-up

## 9.1 Test set-up diagram




Master device was connected conducted via RF attenuator, through the combiner to the Client device. Path was calibrated so the receiving level at the EUT input port is as per standard requirement.
DFS test box was added to the RF chain system (Master/Client) using combiner. RF path loss was verified and the level of the Radar pulses at the EUT input was adjusted as per standard requirement.
EUT was connected to PC via Ethernet port. Channel selection, channel BW, iperf session were controlled from this PC.
EUT was configured to transmit on selected channel using iperf session with 17% load. Spectrum analyzer was connected to the link for observation purposes. Radar pulses were applied to the system. After successful detection PC Web interface GUI indication of the channel move was also verified visually on the screen of the spectrum analyzer.
Iperf was then stopped. EUT reset, verified completion of CAC. Transmission enabled.
System was ready for another round.

## 9.2 Test set-up photo