

TEST REPORT

| | |
|------------------------|---|
| EUT Description | WLAN and BT, 2x2 PCIe M.2 1216 adapter card |
| Brand Name | Intel® |
| Model Name | BE201D2WP |
| FCC ID | PD9BE201D2P |
| Date of Test Start/End | 2024-06-05 / 2024-06-25 |
| Features | 2x2 WiFi - Bluetooth® (see section 5) |

| | |
|----------------------|--|
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| | |
|---------------------|---|
| Reference Standards | FCC CFR Title 47 Part 15 C FCC CFR Title 47 Part 15 E (see section 1) |
|---------------------|---|

| | |
|----------------------------|---|
| Test Report identification | 240521-02.TR20 |
| Revision Control | Rev. 00 This test report revision replaces any previous test report revision. (see section 8) |

The test results relate only to the samples tested.
Reference to accreditation shall be used only by full reproduction of test report.

Issued by _____ Reviewed by _____

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1. Standards, reference documents and applicable test methods

| | |
|-----|---|
| FCC | <ol style="list-style-type: none"> 1. FCC Title 47 CFR part 15 – Subpart C – §15.209 Radiated emission limits; general requirements. 2023-10-01 Edition 2. FCC Title 47 CFR part 15 - Subpart C – §15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz. 2023-10-01 Edition 3. FCC Title 47 CFR part 15 – Subpart E – Unlicensed National Information Infrastructure Devices. 2023-10-01 Edition 4. FCC OET KDB 558074 D01 v05r02 - Guidance for compliance measurements on digital transmission system, frequency hopping spread spectrum system, and hybrid system devices operating under section 15.247 of the FCC rules. 5. FCC OET KDB 789033 D02 v02r01 General U-NII Test Procedures New Rules – Guidelines for compliance testing of Unlicensed National Information Infrastructure (U-NII) Devices (Part 15, Subpart E). 6. FCC OET KDB 291074 D01 v01 - General Requirements 7. FCC OET KDB 291074 D02 v01 - EMC Measurement 8. FCC OET KDB 291074 D03 v01 - QA General Questions and Answers 9. FCC OET KDB 291074 D04 v01 – UN5GHz Checklist v01 10. FCC OET KDB 662911 D01 v02r01 - Emissions Testing of Transmitters with Multiple Outputs in the Same Band. 11. FCC OET KDB 987594 D01 U-NII 6GHz General Requirements v02r01 12. FCC OET KDB 987594 D02 U-NII 6 GHz EMC Measurement v02r01 13. FCC OET KDB 987594 D03 U-NII 6 GHz QA v02 14. ANSI C63.10-2020 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices. |
|-----|---|

2. General conditions, competences and guarantees.

- ✓ Tests performed under FCC standards identified in section 1 are covered by A2LA accreditation.
- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is an ISO/IEC 17025:2017 laboratory accredited by the American Association for Laboratory Accreditation (A2LA) with the certificate number 3478.01.
- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is an Accredited Test Firm recognized by the FCC, with Designation Number FR0011.
- ✓ Intel WRF Lab only provides testing services and is committed to providing reliable, unbiased test results and interpretations.
- ✓ Intel WRF Lab is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.
- ✓ Intel WRF Lab has developed calibration and proficiency programs for its measurement equipment to ensure correlated and reliable results to its customers.
- ✓ This report is only referred to the item that has undergone the test.
- ✓ This report does not imply an approval of the product by the Certification Bodies or competent Authorities.

3. Environmental Conditions

✓ At the site where the measurements were performed the following limits were not exceeded during the tests:

| | |
|-------------|----------------|
| Temperature | 22.2°C ± 1.1°C |
| Humidity | 54.7% ± 4.5% |

4. Test samples

| Sample | Control # | Description | Model | Serial # | Date of receipt | Note |
|--------|---------------|--------------------|----------------|--------------|-----------------|--|
| #01 | 240521-02.S05 | Wifi 7 Module | BE201D2WP | F8FE5ECDC9B3 | 2024-05-22 | Used for Radiated Spurious Emissions tests |
| | 220225-03.S07 | Microwave Absorber | Eccosorb BSR-1 | - | 2022-03-14 | |
| | 231109-03.S48 | Adaptor | PCB00866-00_A | 124627 | 2023-11-24 | |
| | 200611-03.S31 | Extender | ADEXELEC | - | 2020-08-19 | |
| | 200504-04.S07 | Laptop | Latitude 5401 | BVHLK13 | 2020-06-02 | |
| | 220117-04.S30 | Antenna 2.4GHz | ANT24-S624-00 | - | 2022-04-29 | |
| | 220117-04.S31 | Antenna 2.4GHz | ANT24-S624-00 | - | 2022-04-29 | |
| | 220117-04.S34 | Antenna 5GHz | ANT24-S855-00 | - | 2022-04-29 | |
| | 220117-04.S35 | Antenna 5GHz | ANT24-S855-00 | - | 2022-04-29 | |
| | 220117-04.S39 | Antenna 6GHz | ANT24-S865-00 | - | 2022-04-29 | |
| | 220117-04.S40 | Antenna 6GHz | ANT24-S865-00 | - | 2022-04-29 | |
| | 231120-05.S21 | WiFi 7 Module | BE201D2WP | F8FE5CDCA49 | 2024-02-07 | |
| | 180001-01.S21 | Socket | 1216SD to M.2 | - | 2021-06-07 | |
| #02 | 240521-02.S04 | Wifi 7 Module | BE201D2WP | F8FE5ECDCA08 | 2024-05-22 | Used for Radiated Spurious Emissions tests |
| | 220225-03.S07 | Microwave Absorber | Eccosorb BSR-1 | - | 2022-03-14 | |
| | 231109-03.S47 | Adaptor | PCB00866-00_A | 124727 | 2023-11-24 | |
| | 220915-09.S01 | Extender | ADEXELEC | - | 2022-04-06 | |
| | 200611-03.S30 | Laptop | Latitude 5401 | 6DJLK13 | 2020-08-19 | |
| | 220117-04.S30 | Antenna 2.4GHz | ANT24-S624-00 | - | 2022-04-29 | |
| | 220117-04.S31 | Antenna 2.4GHz | ANT24-S624-00 | - | 2022-04-29 | |
| | 220117-04.S34 | Antenna 5GHz | ANT24-S855-00 | - | 2022-04-29 | |
| | 220117-04.S35 | Antenna 5GHz | ANT24-S855-00 | - | 2022-04-29 | |
| | 220117-04.S39 | Antenna 6GHz | ANT24-S865-00 | - | 2022-04-29 | |
| | 220117-04.S40 | Antenna 6GHz | ANT24-S865-00 | - | 2022-04-29 | |
| | 231120-05.S20 | WiFi 7 Module | BE201D2WP | F8FE5CDCA49 | 2024-02-07 | |
| | 180001-01.S21 | Socket | 1216SD to M.2 | - | 2021-06-07 | |

5. EUT Features

The herein information is provided by the customer.

Intel WRF Lab declines any responsibility for the accuracy of the stated customer provided information, especially if it has any impact on the correctness of test results presented in this report.

| | | | | |
|-------------------------------------|--------------------------------------|---------------|---------------|--|
| Brand Name | Intel® | | | |
| Model Name | BE201D2WP | | | |
| Software Version | DRTU.05726.99.0.86 | | | |
| Driver Version | 99.0.86.3 | | | |
| Prototype / Production | Production | | | |
| Supported Radios | 802.11b/g/n/ax/be | 2.4GHz | | |
| | 802.11a/n/ac/ax/be | 5.2GHz | | |
| | | 5.6GHz | | |
| | | 5.8GHz | | |
| | 802.11ax/be | 6.0GHz | | |
| | Bluetooth | 2.4GHz | | |
| Additional information | Transmitter | Chain A (1) | Chain B (2) | |
| | Manufacturer | Intel | Intel | |
| | Antenna type | Slot | Slot | |
| | Part Number | ANT24-S624-00 | ANT24-S624-00 | |
| | | ANT24-S855-00 | ANT24-S855-00 | |
| | | ANT24-S865-00 | ANT24-S865-00 | |
| | Declared Antenna gain (dBi) - 2.4GHz | 6.07 | 6.07 | |
| | Declared Antenna gain (dBi) – 5GHz | 7.84 | 7.84 | |
| Declared Antenna gain (dBi) – 6 GHz | 7.80 | 7.80 | | |

6. Remarks and comments

1. The low, mid, high channels were tested for each RF chain (A, B or A+B), bandwidth, modulation and sub-band. Only the worst case among the low, mid, and high channels per sub-band has been reported.
2. At customer request, Radiated tests were carried out at higher Tx Power vs nominal declared power.

7. Test Verdicts summary

The statement of conformity to applicable standards in the table below are based on the measured values, without taking into account the measurement uncertainties.

| | FCC part | Test name | Verdict |
|--------------------------------|---|---------------------------------|---------|
| 802.11 b/g/n/ax/be-2.4GHz | 15.247 (d) 15.209 | Spurious Emission (radiated) | P |
| BLE | 15.247 (d) 15.209 | Spurious Emission (radiated) | P |
| BT | 15.247 (d) 15.209 | Spurious Emission (radiated) | P |
| 802.11 a/n/ac/ax/be – U-NII-1 | 15.407 (b) (1) 15.209 | Spurious Emission (radiated) | P |
| 802.11 a/n/ac/ax/be – U-NII-2A | 15.407 (b) (2) 15.209 | Spurious Emission (radiated) | P |
| 802.11 a/n/ac/ax/be – U-NII-2C | 15.407 (b) (3) 15.209 | Spurious Emission (radiated) | P |
| 802.11 a/n/ac/ax/be – U-NII- 3 | 15.407 (b) (4) 15.209 | Spurious Emission (radiated) | P |
| 802.11 a/n/ac/ax/be – U-NII- 4 | 15.407 (b) (4) 15.209 | Spurious Emission (radiated) | P |
| 802.11 ax/be – UNII-5 to 8 | 15.209 15.35 (b) 15.407 (b) (5) (8) | Spurious Emission (radiated) | P |

P: Pass
F: Fail
NM: Not Measured
NA: Not Applicable

8. Document Revision History

| Revision # | Modified by | Revision Details |
|------------|-------------|------------------|
| Rev. 00 | R.SIMONINI | First Issue |

Annex A. Test & System Description

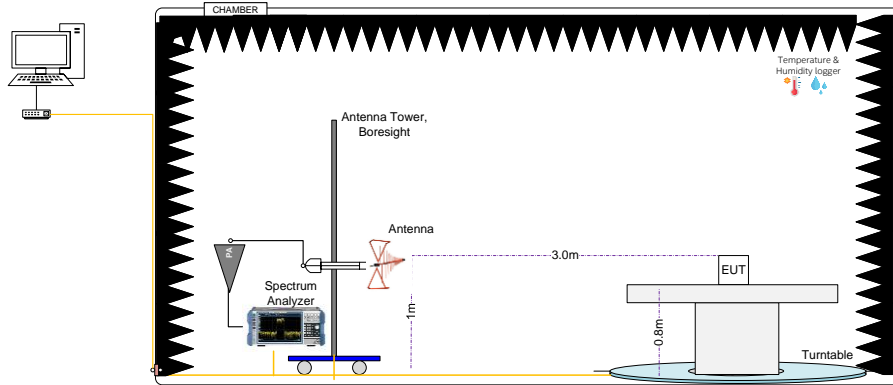
A.1 Measurement System

Measurements were performed using the following setups, made in accordance to the general provisions of FCC KDB 789033 D02 General DTS, UNII,6GHz Test Procedures.

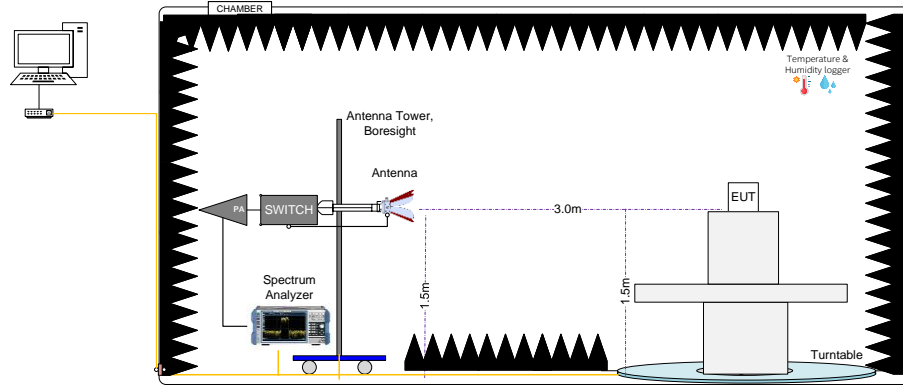
The DUT was installed in a test fixture and this test fixture is connected to a laptop computer and AC/DC power adapter. The laptop computer was used to configure the EUT to continuously transmit at a specified output power using all different modes and modulation schemes, using the Intel proprietary tool DRTU.

Radiated test setup

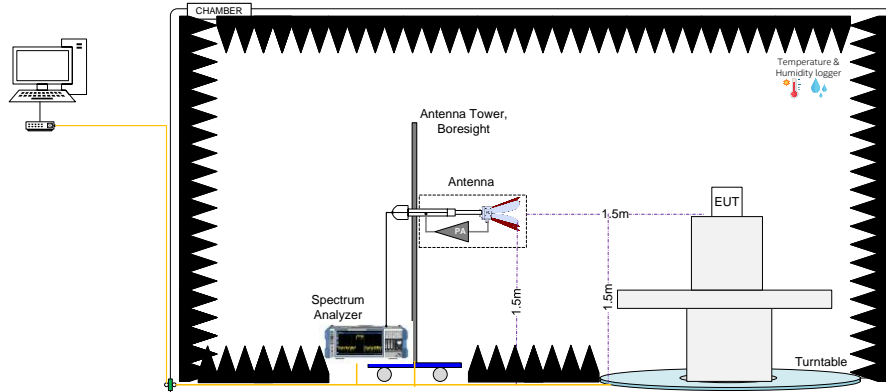
Radiated Setup 30MHz - 1GHz



Radiated Setup 1GHz – 11GHz



Radiated Setup 11GHz – 40GHz



Sample Calculation

The spurious received voltage $V(\text{dB}\mu\text{V})$ in the spectrum Analyzer is converted to Electric field strength using the transducer factor F corresponding to the Rx path Loss:

$$\mathbf{F (dB/m)} = \text{Rx Antenna Factor (dB/m)} + \text{Cable losses (dB)} - \text{Amplifiers Gain (dBi)}$$
$$\mathbf{E (dB\mu V/m)} = V(\text{dB}\mu\text{V}) + F (\text{dB/m})$$

For field strength measurements made at other than the distance at which the applicable limit is specified, the field strength of the emission at the distance specified by the limit is deduced as follows:

$$\mathbf{E_{SpecLimit} = E_{Meas} + 20 \cdot \log(D_{Meas}/D_{SpecLimit})}$$

where

E_{SpecLimit} is the field strength of the emission at the distance specified by the limit, in $\text{dB}\mu\text{V/m}$

E_{Meas} is the field strength of the emission at the measurement distance, in $\text{dB}\mu\text{V/m}$

D_{Meas} is the measurement distance, in *m*

D_{SpecLimit} is the distance specified by the limit, in *m*

A.2 Test Equipment List

Radiated Setup #1

| ID# | Device | Type/Model | Serial # | Manufacturer | Cal. Date | Cal. Due Date |
|---------|----------------------------|--------------|---------------|---------------------|------------|---------------|
| 006-000 | Anechoic Chamber | FACT3 | 5720 | ETS-Lindgren | 2024-01-17 | 2026-01-17 |
| 006-008 | Measurement SW, v11.30 | EMC32 | 100623 | Rohde & Schwarz | N/A | N/A |
| 259-000 | Temp & Humidity Logger | RA12E-TH-RAS | RA12-B9BD70 | Avtech | 2022-06-27 | 2024-06-27 |
| 006-001 | Turn Table | ETS | - | ETS-Lindgren | N/A | N/A |
| 006-011 | Boresight antenna mast | BAM 4.0-P | P/278/2890.01 | Maturo | N/A | N/A |
| 057-000 | Double Horn Ridged antenna | 3117 | 167062 | ETS-Lindgren | 2022-07-08 | 2024-07-08 |
| 058-000 | Double Horn Ridged antenna | 3116C | 157511 | ETS-Lindgren | 2022-10-21 | 2024-10-21 |
| 006-061 | Bi-Log Periodic antenna | CBL6143A | 61382 | Teseq | 2022-10-24 | 2024-10-24 |
| 147-000 | Spectrum analyzer | FSW43 | 101847 | Rohde & Schwarz | 2022-11-30 | 2024-11-30 |
| 301-000 | Amplifier 9kHz-1300MHz | 8447F | 3113A07440 | HP | 2024-03-19 | 2025-03-19 |
| 261-000 | Amplifier 1GHz-18GHz | 3117-PA | 00157993 | ETS-Lindgren | 2024-03-14 | 2025-03-14 |
| 502-006 | Amplifier 0.5GHz-40GHz | DEPA0540-43 | 2023A05 | Diamond Engineering | 2024-03-19 | 2025-03-19 |
| 009-007 | RF Filter | ZHSS-k11G+ | 8493 1831830 | Mini-Circuits | 2024-03-19 | 2025-03-19 |
| 006-068 | RF Switch | RC-2SP6T-40 | 02112090061 | Micro-Circuits | 2024-03-14 | 2025-03-14 |
| 006-066 | Cable 7m – 25MHz to 40GHz | R286304174 | 20.46.370 | Radiall | 2024-03-14 | 2025-03-14 |
| 006-063 | Cable 30cm – 1GHz to 40GHz | PE371-12 | - | Pasternack | 2024-03-14 | 2025-03-14 |
| 006-064 | Cable 30cm – 1GHz to 40GHz | PE371-12 | - | Pasternack | 2024-03-14 | 2025-03-14 |
| 006-065 | Cable 60cm – 25MHz to 1GHz | PE300-24 | - | Pasternack | 2024-03-12 | 2025-03-12 |

N/A: Not Applicable

Radiated Setup #2

| ID# | Device | Type/Model | Serial # | Manufacturer | Cal. Date | Cal. Due Date |
|---------|------------------------------|-----------------|-------------|-----------------|------------|---------------|
| 007-000 | Anechoic chamber | RFD-FA-100 | 5996 | ETS Lindgren | 2024-01-18 | 2026-01-18 |
| 127-000 | Spectrum Analyzer | FSV40 | 101358 | Rohde & Schwarz | 2023-01-27 | 2025-01-27 |
| 007-007 | Double Ridge Horn (1- 18GHz) | 3117 | 00152266 | ETS Lindgren | 2024-03-26 | 2026-03-26 |
| 007-006 | Switch & Positioner | EMCenter | 00151232 | ETS Lindgren | N/A | N/A |
| 059-000 | Double Ridge Horn (1- 18GHz) | 3117 | 201542 | ETS-Lindgren | 2023-09-26 | 2025-09-26 |
| 264-000 | Amplifier 1GHz-18GHz | 3117-PA | 00169546 | ETS-Lindgren | 2024-03-14 | 2025-03-14 |
| 007-011 | RF Cable 1-18GHz - 6.5m | 140-8500-11-51 | 001 | Atem | 2024-03-15 | 2025-03-15 |
| 007-005 | Measurement SW, v11.20.00 | EMC32 | 100401 | Rohde & Schwarz | N/A | N/A |
| 007-003 | Antenna Tower | 2171B-3.0M | 00150123 | ETS Lindgren | N/A | N/A |
| 007-002 | Turntable | - | - | ETS Lindgren | N/A | N/A |
| 007-022 | RF Cable 1-18GHz, 1.5m | 0501050991200GX | 19.23.493 | Radiall | 2024-03-12 | 2025-03-12 |
| 007-015 | RF Cable 1GHz-18GHz 1.5m | - | - | Spirent | 2024-03-12 | 2025-03-12 |
| 007-018 | RF Cable 1-9.5GHz 1.2m | 0500990991200KE | - | Radiall | 2024-03-12 | 2025-03-12 |
| 007-020 | RF Cable 1-18GHz, 1.2 m | 2301761761200PJ | 12.22.1104 | Radiall | 2024-03-15 | 2025-03-15 |
| 349-000 | Temp & Humidity Logger | RA12E-TH1-RAS | RA12-D4F8C3 | Avtech | 2023-11-30 | 2025-11-30 |

N/A: Not Applicable

Shared Radiated Equipment

| ID# | Device | Type/Model | Serial # | Manufacturer | Cal. Date | Cal. Due Date |
|---------|------------------------|------------|----------|-----------------|------------|---------------|
| 412-000 | DRTU Power finder V2.1 | - | - | Intel | NA | NA |
| 139-000 | Power Sensor | NRP-Z81 | 104383 | Rohde & Schwarz | 2023-04-21 | 2025-04-21 |
| 061-000 | Power Sensor | NRP-Z81 | 104386 | Rohde & Schwarz | 2024-04-09 | 2026-04-09 |
| 140-000 | Power Sensor | NRP-Z81 | 104382 | Rohde & Schwarz | 2024-04-04 | 2026-04-04 |

N/A: Not Applicable

A.3 Measurement Uncertainty Evaluation

The system uncertainty evaluation is shown in the table below with a coverage factor of $k = 2$ to indicate a 95% level of confidence:

| Measurement type | Uncertainty | Unit |
|------------------------------|-------------|------|
| Radiated tests <1GHz | ± 6.23 | dB |
| Radiated tests 1GHz – 40 GHz | ± 6.40 | dB |

Annex B. Test Results

B.1 Test Condition

For 802.11b, g and a mode the EUT can transmit at both CHAIN A and CHAIN B RF outputs individually, but not simultaneously.

For 802.11n20 & 802.11ax/be20 (20 MHz channel bandwidth), 802.11n40 & 802.11ax/be40 (40MHz channel bandwidth), 802.11ac80 & 802.11ax/be80 (80MHz channel bandwidth), 802.11ac160 & 802.11ax/be160 (160MHz channel bandwidth) and 802.11be320 (320MHz channel bandwidth) modes the EUT can transmit at both CHAIN A and CHAIN B RF outputs individually, and also simultaneously.

The following data rates were selected based on preliminary testing that identified those rates as the worst cases for the spurious level:

| Transmission | Mode | Bandwidth (MHz) | Worst Case Data Rate |
|--------------|-------------|-----------------|----------------------|
| SISO | 802.11b | 20 | 1Mbps |
| | 802.11g, a | 20 | 6Mbps |
| | 802.11n | 20 | HT0 |
| | | 40 | HT0 |
| | 802.11ac | 80 | VHT0 |
| | | 160 | VHT0 |
| | 802.11ax/be | 20 | MCS0 |
| | | 40 | MCS0 |
| | | 80 | MCS0 |
| | | 160 | MCS0 |
| 802.11be | 320 | MCS0 | |
| MIMO | 802.11n | 20/40 | HT8 |
| | 802.11ac | 80/160 | VHT0 |
| | 802.11ax/be | 20/40/80/160 | MCS0 |
| | 802.11be | 320 | MCS0 |

B.2 Radiated spurious emission

The herein test results were performed by:

| Test case measurement | Test Personnel |
|-----------------------------|----------------------|
| Radiated spurious emissions | K.KHATIB, R.SIMONINI |

B.2.1 DTS

Standard references

| FCC part | Limits | | | | | | | | | | | | | | | | | | | | |
|--|---|-----------------------|-------------------------|-------------------------|--------------------|-------|-----|----|---|--------|-----|------|---|---------|-----|----|---|-----------|-----|----|---|
| 15.247 (d) 15.209 | Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a): | | | | | | | | | | | | | | | | | | | | |
| | <table border="1"> <thead> <tr> <th>Freq Range (MHz)</th> <th>Field Strength (μV/m)</th> <th>Field Strength (dBμV/m)</th> <th>Meas. Distance (m)</th> </tr> </thead> <tbody> <tr> <td>30-88</td> <td>100</td> <td>40</td> <td>3</td> </tr> <tr> <td>88-216</td> <td>150</td> <td>43.5</td> <td>3</td> </tr> <tr> <td>216-960</td> <td>200</td> <td>46</td> <td>3</td> </tr> <tr> <td>Above 960</td> <td>500</td> <td>54</td> <td>3</td> </tr> </tbody> </table> | Freq Range (MHz) | Field Strength (μV/m) | Field Strength (dBμV/m) | Meas. Distance (m) | 30-88 | 100 | 40 | 3 | 88-216 | 150 | 43.5 | 3 | 216-960 | 200 | 46 | 3 | Above 960 | 500 | 54 | 3 |
| | Freq Range (MHz) | Field Strength (μV/m) | Field Strength (dBμV/m) | Meas. Distance (m) | | | | | | | | | | | | | | | | | |
| | 30-88 | 100 | 40 | 3 | | | | | | | | | | | | | | | | | |
| | 88-216 | 150 | 43.5 | 3 | | | | | | | | | | | | | | | | | |
| | 216-960 | 200 | 46 | 3 | | | | | | | | | | | | | | | | | |
| Above 960 | 500 | 54 | 3 | | | | | | | | | | | | | | | | | | |
| The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector. | | | | | | | | | | | | | | | | | | | | | |
| For average radiated emission measurements above 1000 MHz. there is also a limit specified when measuring with peak detector function corresponding to 20 dB above the indicated values in the table. | | | | | | | | | | | | | | | | | | | | | |

Test procedure

The radiated setups shown in section A.1 were used to measure the radiated spurious emissions. Depending of the frequency range and bands being tested, different antennas and filters were used. The final measurement is done by varying the antenna height from 1 to 4 meters, the EUT azimuth over 360° and for both Vertical and Horizontal polarizations.

Test Results**Radiated spurious - 30 MHz – 1 GHz****Radiated Spurious – All modes**

| Frequency | Level | Detector | Limit | Margin | Polar |
|-----------|--------------|------------|--------------|--------|-------|
| MHz | dB μ V/m | --- | dB μ V/m | dB | --- |
| 30.6 | 37.8 | Quasi-Peak | 40.0 | 2.2 | V |
| 47.8 | 37.2 | Quasi-Peak | 40.0 | 2.8 | V |
| 50.0 | 38.9 | Quasi-Peak | 40.0 | 1.1 | V |

Note 1: The spurious signals detected do not depend on either the operating channel or the modulation mode.

1 GHz – 26 GHz, 802.11b, 1Mbps, Chain A**Radiated Spurious – CH1**

| Frequency | Level | Detector | Limit | Margin | Polar |
|-----------|--------------|----------|--------------|--------|-------|
| MHz | dB μ V/m | --- | dB μ V/m | dB | --- |
| 10975.0 | 56.5 | Peak | 74.0 | 17.5 | V |
| 10975.0 | 47.9 | Average | 54.0 | 6.1 | V |
| 12060.0 | 44.3 | Peak | 74.0 | 29.7 | V |
| 12060.0 | 38.3 | Average | 54.0 | 15.7 | V |
| 16881.8 | 49.6 | Peak | 74.0 | 24.4 | H |
| 16882.5 | 43.6 | Average | 54.0 | 10.4 | H |

B.2.2 BLE

Standards references.

| FCC part | Limits | | | | | | | | | | | | | | | | | | | | |
|------------------------------|--|-----------------------|-------------------------|-------------------------|--------------------|-------|-----|----|---|--------|-----|------|---|---------|-----|----|---|-----------|-----|----|---|
| <p>15.247 (d) 15.209</p> | <p>Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a):</p> <table border="1" data-bbox="518 465 1310 678"> <thead> <tr> <th data-bbox="521 470 716 533">Freq Range (MHz)</th> <th data-bbox="716 470 911 533">Field Strength (μV/m)</th> <th data-bbox="911 470 1106 533">Field Strength (dBμV/m)</th> <th data-bbox="1106 470 1307 533">Meas. Distance (m)</th> </tr> </thead> <tbody> <tr> <td data-bbox="521 533 716 566">30-88</td> <td data-bbox="716 533 911 566">100</td> <td data-bbox="911 533 1106 566">40</td> <td data-bbox="1106 533 1307 566">3</td> </tr> <tr> <td data-bbox="521 566 716 600">88-216</td> <td data-bbox="716 566 911 600">150</td> <td data-bbox="911 566 1106 600">43.5</td> <td data-bbox="1106 566 1307 600">3</td> </tr> <tr> <td data-bbox="521 600 716 633">216-960</td> <td data-bbox="716 600 911 633">200</td> <td data-bbox="911 600 1106 633">46</td> <td data-bbox="1106 600 1307 633">3</td> </tr> <tr> <td data-bbox="521 633 716 678">Above 960</td> <td data-bbox="716 633 911 678">500</td> <td data-bbox="911 633 1106 678">54</td> <td data-bbox="1106 633 1307 678">3</td> </tr> </tbody> </table> <p data-bbox="454 712 1377 925">The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands above 1000MHz. Radiated emission limits in these three bands are based on measurements employing an average detector. For average radiated emission measurements above 1000 MHz, there is also a limit specified when measuring with peak detector function, corresponding to 20 dB above the indicated values in the table.</p> | Freq Range (MHz) | Field Strength (μV/m) | Field Strength (dBμV/m) | Meas. Distance (m) | 30-88 | 100 | 40 | 3 | 88-216 | 150 | 43.5 | 3 | 216-960 | 200 | 46 | 3 | Above 960 | 500 | 54 | 3 |
| | Freq Range (MHz) | Field Strength (μV/m) | Field Strength (dBμV/m) | Meas. Distance (m) | | | | | | | | | | | | | | | | | |
| 30-88 | 100 | 40 | 3 | | | | | | | | | | | | | | | | | | |
| 88-216 | 150 | 43.5 | 3 | | | | | | | | | | | | | | | | | | |
| 216-960 | 200 | 46 | 3 | | | | | | | | | | | | | | | | | | |
| Above 960 | 500 | 54 | 3 | | | | | | | | | | | | | | | | | | |

Test procedure

The radiated setups shown in section A.1 were used to measure the radiated spurious emissions. were used to measure the radiated spurious emissions. Depending of the frequency range and bands being tested, different antennas and filters were used. The final measurement is done by varying the antenna height from 1 to 4 meters, the EUT azimuth over 360° and for both Vertical and Horizontal polarizations.

Test Results**Radiated spurious - 30 MHz – 1 GHz****Radiated Spurious – All modes**

| Frequency | Level | Detector | Limit | Margin | Polar |
|-----------|--------------|------------|--------------|--------|-------|
| MHz | dB μ V/m | --- | dB μ V/m | dB | --- |
| 44.9 | 32.1 | Quasi-Peak | 40.0 | 7.9 | V |
| 49.9 | 35.8 | Quasi-Peak | 40.0 | 4.2 | V |

Note 1: The spurious signals detected do not depend on either the operating channel or the modulation mode.

1 GHz – 26 GHz, BLE**Radiated Spurious – 2440 MHz**

| Frequency | Level | Detector | Limit | Margin | Polar |
|-----------|--------------|----------|--------------|--------|-------|
| MHz | dB μ V/m | --- | dB μ V/m | dB | --- |
| 10499.8 | 59.5 | Peak | 74.0 | 14.5 | V |
| 10500.7 | 48.0 | Average | 54.0 | 6.0 | V |
| 12700.2 | 45.7 | Peak | 74.0 | 28.3 | H |
| 12700.2 | 34.2 | Average | 54.0 | 19.8 | V |
| 25406.0 | 51.8 | Peak | 74.0 | 22.2 | V |
| 25407.0 | 39.2 | Average | 54.0 | 14.8 | H |

B.2.3 BT

Standard references

| FCC part | Limits | | | | | | | | | | | | | | | | | | | | |
|--------------------------|---|---|--|--|--------------------|-------|-----|----|---|--------|-----|------|---|---------|-----|----|---|-----------|-----|----|---|
| 15.247 (d) 15.209 (a) | <p data-bbox="454 376 1374 436">Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a):</p> <table border="1" data-bbox="515 465 1307 678"> <thead> <tr> <th data-bbox="520 472 715 533">Freq Range (MHz)</th> <th data-bbox="715 472 909 533">Field Strength ($\mu\text{V}/\text{m}$)</th> <th data-bbox="909 472 1104 533">Field Strength ($\text{dB}\mu\text{V}/\text{m}$)</th> <th data-bbox="1104 472 1302 533">Meas. Distance (m)</th> </tr> </thead> <tbody> <tr> <td data-bbox="520 533 715 566">30-88</td> <td data-bbox="715 533 909 566">100</td> <td data-bbox="909 533 1104 566">40</td> <td data-bbox="1104 533 1302 566">3</td> </tr> <tr> <td data-bbox="520 566 715 600">88-216</td> <td data-bbox="715 566 909 600">150</td> <td data-bbox="909 566 1104 600">43.5</td> <td data-bbox="1104 566 1302 600">3</td> </tr> <tr> <td data-bbox="520 600 715 633">216-960</td> <td data-bbox="715 600 909 633">200</td> <td data-bbox="909 600 1104 633">46</td> <td data-bbox="1104 600 1302 633">3</td> </tr> <tr> <td data-bbox="520 633 715 678">Above 960</td> <td data-bbox="715 633 909 678">500</td> <td data-bbox="909 633 1104 678">54</td> <td data-bbox="1104 633 1302 678">3</td> </tr> </tbody> </table> <p data-bbox="454 707 1374 831">The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.</p> <p data-bbox="454 831 1374 920">For average radiated emission measurements above 1000 MHz, there is also a limit specified when measuring with peak detector function, corresponding to 20 dB above the indicated values in the table.</p> | Freq Range (MHz) | Field Strength ($\mu\text{V}/\text{m}$) | Field Strength ($\text{dB}\mu\text{V}/\text{m}$) | Meas. Distance (m) | 30-88 | 100 | 40 | 3 | 88-216 | 150 | 43.5 | 3 | 216-960 | 200 | 46 | 3 | Above 960 | 500 | 54 | 3 |
| | Freq Range (MHz) | Field Strength ($\mu\text{V}/\text{m}$) | Field Strength ($\text{dB}\mu\text{V}/\text{m}$) | Meas. Distance (m) | | | | | | | | | | | | | | | | | |
| 30-88 | 100 | 40 | 3 | | | | | | | | | | | | | | | | | | |
| 88-216 | 150 | 43.5 | 3 | | | | | | | | | | | | | | | | | | |
| 216-960 | 200 | 46 | 3 | | | | | | | | | | | | | | | | | | |
| Above 960 | 500 | 54 | 3 | | | | | | | | | | | | | | | | | | |

Test procedure

The radiated setups shown in section A.1 were used to measure the radiated spurious emissions. Depending on the frequency range and bands being tested, different antennas and filters were used. The final measurement is done by varying the antenna height from 1 m to 4 m, the EUT azimuth over 360° and for both Vertical and Horizontal polarizations.

Test Results**Radiated spurious - 30 MHz – 1 GHz****Radiated Spurious – All modes**

| Frequency | Level | Detector | Limit | Margin | Polar |
|-----------|--------------|------------|--------------|--------|-------|
| MHz | dB μ V/m | --- | dB μ V/m | dB | --- |
| 30.6 | 38.1 | Quasi-Peak | 40.0 | 1.9 | V |
| 47.8 | 37.1 | Quasi-Peak | 40.0 | 2.9 | V |
| 50.0 | 38.0 | Quasi-Peak | 40.0 | 2.0 | V |

Note 1: The spurious signals detected do not depend on either the operating channel or the modulation mode.

1 GHz – 26 GHz, EDR – $\pi/4$ -DQPSK**Radiated Spurious – CH39 2DH5**

| Frequency | Level | Detector | Limit | Margin | Polar |
|-----------|--------------|----------|--------------|--------|-------|
| MHz | dB μ V/m | --- | dB μ V/m | dB | --- |
| 10499.8 | 60.9 | Peak | 74.0 | 13.1 | H |
| 10500.7 | 48.0 | Average | 54.0 | 6.0 | V |
| 12120.9 | 47.5 | Peak | 74.0 | 26.5 | H |
| 12121.2 | 34.9 | Average | 54.0 | 19.1 | H |
| 25435.5 | 51.1 | Peak | 74.0 | 22.9 | H |
| 25435.5 | 39.5 | Average | 54.0 | 14.5 | H |

B.2.4 U-NII-1

Standard references

| FCC part | Limits | | | | | | | | | | | | | | | | | | | | |
|------------------|---|-------------------------|-----------------------|-------------------------|--------------------|-------|-----|----|---|--------|-----|------|---|---------|-----|----|---|-----------|-----|----|---|
| 15.407 (b) (1) | For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz. | | | | | | | | | | | | | | | | | | | | |
| 15.209 | <p>Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a):</p> <table border="1" data-bbox="478 566 1268 795"> <thead> <tr> <th data-bbox="478 566 678 633">Freq Range (MHz)</th> <th data-bbox="678 566 874 633">Field Strength (µV/m)</th> <th data-bbox="874 566 1070 633">Field Strength (dBµV/m)</th> <th data-bbox="1070 566 1268 633">Meas. Distance (m)</th> </tr> </thead> <tbody> <tr> <td data-bbox="478 633 678 678">30-88</td> <td data-bbox="678 633 874 678">100</td> <td data-bbox="874 633 1070 678">40</td> <td data-bbox="1070 633 1268 678">3</td> </tr> <tr> <td data-bbox="478 678 678 723">88-216</td> <td data-bbox="678 678 874 723">150</td> <td data-bbox="874 678 1070 723">43.5</td> <td data-bbox="1070 678 1268 723">3</td> </tr> <tr> <td data-bbox="478 723 678 768">216-960</td> <td data-bbox="678 723 874 768">200</td> <td data-bbox="874 723 1070 768">46</td> <td data-bbox="1070 723 1268 768">3</td> </tr> <tr> <td data-bbox="478 768 678 795">Above 960</td> <td data-bbox="678 768 874 795">500</td> <td data-bbox="874 768 1070 795">54</td> <td data-bbox="1070 768 1268 795">3</td> </tr> </tbody> </table> <p>The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.</p> <p>For average radiated emission measurements above 1000 MHz, there is also a limit specified when measuring with peak detector function, corresponding to 20 dB above the indicated values in the table.</p> | Freq Range (MHz) | Field Strength (µV/m) | Field Strength (dBµV/m) | Meas. Distance (m) | 30-88 | 100 | 40 | 3 | 88-216 | 150 | 43.5 | 3 | 216-960 | 200 | 46 | 3 | Above 960 | 500 | 54 | 3 |
| Freq Range (MHz) | Field Strength (µV/m) | Field Strength (dBµV/m) | Meas. Distance (m) | | | | | | | | | | | | | | | | | | |
| 30-88 | 100 | 40 | 3 | | | | | | | | | | | | | | | | | | |
| 88-216 | 150 | 43.5 | 3 | | | | | | | | | | | | | | | | | | |
| 216-960 | 200 | 46 | 3 | | | | | | | | | | | | | | | | | | |
| Above 960 | 500 | 54 | 3 | | | | | | | | | | | | | | | | | | |

Test procedure

The radiated setup shown in section A.1 was used to measure the radiated spurious emissions. Depending of the frequency range and bands being tested, different antennas and filters were used. The final measurement is done by varying the antenna height, the EUT azimuth over 360° and for both Vertical and Horizontal polarizations.

Test Results**Radiated spurious - 30 MHz – 1 GHz****Radiated Spurious – All modes**

| Frequency | Level | Detector | Limit | Margin | Polar |
|-----------|--------------|------------|--------------|--------|-------|
| MHz | dB μ V/m | --- | dB μ V/m | dB | --- |
| 30.6 | 38.2 | Quasi-Peak | 40.0 | 1.8 | V |
| 34.7 | 36.1 | Quasi-Peak | 40.0 | 3.9 | V |
| 50.0 | 38.2 | Quasi-Peak | 40.0 | 1.8 | V |

Note 1: The spurious signals detected do not depend on either the operating channel or the modulation mode.

802.11ax/be**1 GHz – 40 GHz, 802.11a, 6Mbps, Chain A****Radiated Spurious – CH36**

| Frequency | Level | Detector | Limit | Margin | Polar |
|-----------|--------------|----------|--------------|--------|-------|
| MHz | dB μ V/m | --- | dB μ V/m | dB | --- |
| 10990.1 | 58.6 | Peak | 74.0 | 15.4 | H |
| 10990.1 | 47.9 | Average | 54.0 | 6.1 | V |
| 15536.6 | 39.7 | Average | 54.0 | 14.3 | H |
| 15541.4 | 48.7 | Peak | 74.0 | 25.3 | H |

B.2.5 U-NII-2AStandard references

| FCC part | Limits | | | | | | | | | | | | | | | | | | | | |
|-------------------|---|-------------------------|-----------------------|-------------------------|--------------------|-------|-----|----|---|--------|-----|------|---|---------|-----|----|---|-----------|-----|----|---|
| 15.407 (a) (2) | For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz. | | | | | | | | | | | | | | | | | | | | |
| 15.209 | <p>Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a):</p> <table border="1" data-bbox="480 568 1270 779"> <thead> <tr> <th data-bbox="480 568 676 629">Freq Range (MHz)</th> <th data-bbox="676 568 873 629">Field Strength (µV/m)</th> <th data-bbox="873 568 1069 629">Field Strength (dBµV/m)</th> <th data-bbox="1069 568 1270 629">Meas. Distance (m)</th> </tr> </thead> <tbody> <tr> <td data-bbox="480 629 676 667">30-88</td> <td data-bbox="676 629 873 667">100</td> <td data-bbox="873 629 1069 667">40</td> <td data-bbox="1069 629 1270 667">3</td> </tr> <tr> <td data-bbox="480 667 676 705">88-216</td> <td data-bbox="676 667 873 705">150</td> <td data-bbox="873 667 1069 705">43.5</td> <td data-bbox="1069 667 1270 705">3</td> </tr> <tr> <td data-bbox="480 705 676 743">216-960</td> <td data-bbox="676 705 873 743">200</td> <td data-bbox="873 705 1069 743">46</td> <td data-bbox="1069 705 1270 743">3</td> </tr> <tr> <td data-bbox="480 743 676 779">Above 960</td> <td data-bbox="676 743 873 779">500</td> <td data-bbox="873 743 1069 779">54</td> <td data-bbox="1069 743 1270 779">3</td> </tr> </tbody> </table> <p>The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.</p> <p>For average radiated emission measurements above 1000 MHz, there is also a limit specified when measuring with peak detector function, corresponding to 20 dB above the indicated values in the table.</p> | Freq Range (MHz) | Field Strength (µV/m) | Field Strength (dBµV/m) | Meas. Distance (m) | 30-88 | 100 | 40 | 3 | 88-216 | 150 | 43.5 | 3 | 216-960 | 200 | 46 | 3 | Above 960 | 500 | 54 | 3 |
| Freq Range (MHz) | Field Strength (µV/m) | Field Strength (dBµV/m) | Meas. Distance (m) | | | | | | | | | | | | | | | | | | |
| 30-88 | 100 | 40 | 3 | | | | | | | | | | | | | | | | | | |
| 88-216 | 150 | 43.5 | 3 | | | | | | | | | | | | | | | | | | |
| 216-960 | 200 | 46 | 3 | | | | | | | | | | | | | | | | | | |
| Above 960 | 500 | 54 | 3 | | | | | | | | | | | | | | | | | | |

Test procedure

The radiated setups shown in section A.1 were used to measure the radiated spurious emissions. Depending of the frequency range and bands being tested, different antennas and filters were used. The final measurement is done by varying the antenna height, the EUT azimuth over 360° and for both Vertical and Horizontal polarizations.

Test Results**Radiated spurious - 30 MHz – 1 GHz****Radiated Spurious – All modes**

| Frequency | Level | Detector | Limit | Margin | Polar |
|-----------|--------------|------------|--------------|--------|-------|
| MHz | dB μ V/m | --- | dB μ V/m | dB | --- |
| 30.6 | 37.3 | Quasi-Peak | 40.0 | 2.7 | V |
| 34.7 | 35.8 | Quasi-Peak | 40.0 | 4.2 | V |
| 50.0 | 38.5 | Quasi-Peak | 40.0 | 1.5 | V |
| 64.2 | 30.8 | Quasi-Peak | 40.0 | 9.2 | V |

Note 1: The spurious signals detected do not depend on either the operating channel or the modulation mode.

802.11ax/be**1 GHz – 40 GHz, 802.11a, 6Mbps, Chain B****Radiated Spurious – CH64**

| Frequency | Level | Detector | Limit | Margin | Polar |
|-----------|--------------|----------|--------------|--------|-------|
| MHz | dB μ V/m | --- | dB μ V/m | dB | --- |
| 1111.0 | 49.5 | Peak | 74.0 | 24.5 | H |
| 1115.9 | 38.6 | Average | 54.0 | 15.4 | H |
| 7989.7 | 58.3 | Peak | 68.2 | 9.9 | H |
| 39992.8 | 56.1 | Peak | 74.0 | 17.9 | V |
| 39992.8 | 47.8 | Average | 54.0 | 6.2 | V |

B.2.6 U-NII-2C

Standard references

| FCC part | Limits | | | | | | | | | | | | | | | | | | | | |
|------------------|--|-------------------------|-----------------------|-------------------------|--------------------|-------|-----|----|---|--------|-----|------|---|---------|-----|----|---|-----------|-----|----|---|
| 15.407 (b) (3) | For transmitters operating in the 5.47–5.725 GHz band: all emissions outside of the 5.47–5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz. | | | | | | | | | | | | | | | | | | | | |
| 15.209 | <p>Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a):</p> <table border="1" data-bbox="507 533 1295 707"> <thead> <tr> <th data-bbox="507 533 703 593">Freq Range (MHz)</th> <th data-bbox="703 533 900 593">Field Strength (μV/m)</th> <th data-bbox="900 533 1096 593">Field Strength (dBμV/m)</th> <th data-bbox="1096 533 1295 593">Meas. Distance (m)</th> </tr> </thead> <tbody> <tr> <td data-bbox="507 593 703 622">30-88</td> <td data-bbox="703 593 900 622">100</td> <td data-bbox="900 593 1096 622">40</td> <td data-bbox="1096 593 1295 622">3</td> </tr> <tr> <td data-bbox="507 622 703 651">88-216</td> <td data-bbox="703 622 900 651">150</td> <td data-bbox="900 622 1096 651">43.5</td> <td data-bbox="1096 622 1295 651">3</td> </tr> <tr> <td data-bbox="507 651 703 680">216-960</td> <td data-bbox="703 651 900 680">200</td> <td data-bbox="900 651 1096 680">46</td> <td data-bbox="1096 651 1295 680">3</td> </tr> <tr> <td data-bbox="507 680 703 707">Above 960</td> <td data-bbox="703 680 900 707">500</td> <td data-bbox="900 680 1096 707">54</td> <td data-bbox="1096 680 1295 707">3</td> </tr> </tbody> </table> <p>The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector. For average radiated emission measurements above 1000 MHz, there is also a limit specified when measuring with peak detector function, corresponding to 20 dB above the indicated values in the table.</p> | Freq Range (MHz) | Field Strength (μV/m) | Field Strength (dBμV/m) | Meas. Distance (m) | 30-88 | 100 | 40 | 3 | 88-216 | 150 | 43.5 | 3 | 216-960 | 200 | 46 | 3 | Above 960 | 500 | 54 | 3 |
| Freq Range (MHz) | Field Strength (μV/m) | Field Strength (dBμV/m) | Meas. Distance (m) | | | | | | | | | | | | | | | | | | |
| 30-88 | 100 | 40 | 3 | | | | | | | | | | | | | | | | | | |
| 88-216 | 150 | 43.5 | 3 | | | | | | | | | | | | | | | | | | |
| 216-960 | 200 | 46 | 3 | | | | | | | | | | | | | | | | | | |
| Above 960 | 500 | 54 | 3 | | | | | | | | | | | | | | | | | | |

Test procedure

The radiated setups shown in section A.1 were used to measure the radiated spurious emissions. Depending of the frequency range and bands being tested, different antennas and filters were used. The final measurement is done by varying the antenna height from 1 m to 4 m, the EUT azimuth over 360° and for both Vertical and Horizontal polarizations.

Test Results**Radiated spurious - 30 MHz – 1 GHz****Radiated Spurious – All modes**

| Frequency | Level | Detector | Limit | Margin | Polar |
|-----------|--------------|------------|--------------|--------|-------|
| MHz | dB μ V/m | --- | dB μ V/m | dB | --- |
| 30.6 | 38.4 | Quasi-Peak | 40.0 | 1.6 | V |
| 43.9 | 33.9 | Quasi-Peak | 40.0 | 6.1 | V |
| 50.0 | 38.1 | Quasi-Peak | 40.0 | 1.9 | V |

Note 1: The spurious signals detected do not depend on either the operating channel or the modulation mode.

802.11ax/be**1 GHz – 40 GHz, 802.11ax/be40, MCS0, Chain A+B****Radiated Spurious – CH114**

| Frequency | Level | Detector | Limit | Margin | Polar |
|-----------|--------------|----------|--------------|--------|-------|
| MHz | dB μ V/m | --- | dB μ V/m | dB | --- |
| 1455.0 | 43.3 | Average | 54.0 | 10.7 | H |
| 1455.0 | 54.0 | Peak | 74.0 | 20.0 | H |
| 5420.0 | 59.1 | Peak | 74.0 | 14.9 | H |
| 5420.5 | 52.1 | Average | 54.0 | 1.9 | H |
| 8490.5 | 49.1 | Average | 54.0 | 4.9 | H |
| 8490.8 | 58.1 | Peak | 74.0 | 15.9 | H |
| 11319.5 | 39.5 | Average | 54.0 | 14.5 | H |
| 11320.0 | 47.2 | Peak | 74.0 | 26.8 | H |
| 16980.8 | 51.0 | Peak | 68.2 | 17.2 | V |
| 22641.6 | 52.3 | Peak | 74.0 | 21.7 | V |
| 22642.0 | 49.8 | Average | 54.0 | 4.2 | V |
| 28301.9 | 53.2 | Peak | 68.2 | 15.0 | V |

B.2.7 U-NII-3

Standard references

| FCC part | Limits | | | | | | | | | | | | | | | | | | | | |
|------------------|--|-------------------------------|-----------------------------|-------------------------------|--------------------|-------|-----|----|---|--------|-----|------|---|---------|-----|----|---|-----------|-----|----|---|
| 15.407 (b) (4) | For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge. | | | | | | | | | | | | | | | | | | | | |
| 15.209 | Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a): <table border="1" data-bbox="352 689 1139 902" style="margin: 10px auto;"> <thead> <tr> <th data-bbox="352 689 549 754">Freq Range (MHz)</th> <th data-bbox="553 689 743 754">Field Strength (μV/m)</th> <th data-bbox="748 689 938 754">Field Strength (dBμV/m)</th> <th data-bbox="943 689 1139 754">Meas. Distance (m)</th> </tr> </thead> <tbody> <tr> <td data-bbox="352 757 549 790">30-88</td> <td data-bbox="553 757 743 790">100</td> <td data-bbox="748 757 938 790">40</td> <td data-bbox="943 757 1139 790">3</td> </tr> <tr> <td data-bbox="352 792 549 826">88-216</td> <td data-bbox="553 792 743 826">150</td> <td data-bbox="748 792 938 826">43.5</td> <td data-bbox="943 792 1139 826">3</td> </tr> <tr> <td data-bbox="352 828 549 862">216-960</td> <td data-bbox="553 828 743 862">200</td> <td data-bbox="748 828 938 862">46</td> <td data-bbox="943 828 1139 862">3</td> </tr> <tr> <td data-bbox="352 864 549 898">Above 960</td> <td data-bbox="553 864 743 898">500</td> <td data-bbox="748 864 938 898">54</td> <td data-bbox="943 864 1139 898">3</td> </tr> </tbody> </table> <p data-bbox="209 936 1283 1055">The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.</p> <p data-bbox="209 1057 1283 1149">For average radiated emission measurements above 1000 MHz, there is also a limit specified when measuring with peak detector function, corresponding to 20 dB above the indicated values in the table.</p> | Freq Range (MHz) | Field Strength (μ V/m) | Field Strength (dB μ V/m) | Meas. Distance (m) | 30-88 | 100 | 40 | 3 | 88-216 | 150 | 43.5 | 3 | 216-960 | 200 | 46 | 3 | Above 960 | 500 | 54 | 3 |
| Freq Range (MHz) | Field Strength (μ V/m) | Field Strength (dB μ V/m) | Meas. Distance (m) | | | | | | | | | | | | | | | | | | |
| 30-88 | 100 | 40 | 3 | | | | | | | | | | | | | | | | | | |
| 88-216 | 150 | 43.5 | 3 | | | | | | | | | | | | | | | | | | |
| 216-960 | 200 | 46 | 3 | | | | | | | | | | | | | | | | | | |
| Above 960 | 500 | 54 | 3 | | | | | | | | | | | | | | | | | | |

Test procedure

The radiated setups shown in section A.1 were used to measure the radiated spurious emissions.

Depending on the frequency range and bands being tested, different antennas and filters were used.

The final measurement is done by varying the antenna height, the EUT azimuth over 360° and for both Vertical and Horizontal polarizations.

Test Results**Radiated spurious - 30 MHz – 1 GHz****Radiated Spurious – All modes**

| Frequency | Level | Detector | Limit | Margin | Polar |
|-----------|--------------|------------|--------------|--------|-------|
| MHz | dB μ V/m | --- | dB μ V/m | dB | --- |
| 30.6 | 37.6 | Quasi-Peak | 40.0 | 2.4 | V |
| 50.0 | 38.0 | Quasi-Peak | 40.0 | 2.0 | V |
| 217.9 | 26.6 | Quasi-Peak | 46.0 | 19.4 | H |

Note 1: The spurious signals detected do not depend on either the operating channel or the modulation mode.

802.11ax/be**1 GHz – 40 GHz, 802.11a, 6Mbps, Chain A****Radiated Spurious – CH149**

| Frequency | Level | Detector | Limit | Margin | Polar |
|-----------|--------------|----------|--------------|--------|-------|
| MHz | dB μ V/m | --- | dB μ V/m | dB | --- |
| 1539.5 | 39.5 | Average | 54.0 | 14.5 | H |
| 1540.0 | 48.6 | Peak | 74.0 | 25.4 | H |
| 39972.0 | 47.9 | Average | 54.0 | 6.1 | V |
| 39972.9 | 56.5 | Peak | 74.0 | 17.5 | V |

B.2.8 U-NII-4

Standard references

| FCC part | Limits | | | | | | | | | | | | | | | | | | | | |
|--|---|-----------------------|-------------------------|-------------------------|--------------------|-------|-----|----|---|--------|-----|------|---|---------|-----|----|---|-----------|-----|----|---|
| 15.407 (b) (5) (iii) | For transmitters operating solely in the 5.850-5.895 GHz band or operating on a channel that spans across 5.725-5.895 GHz: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge. | | | | | | | | | | | | | | | | | | | | |
| 15.407 (b) (5) (ii) | For a client device, all emissions at or above 5.895 GHz shall not exceed an e.i.r.p. of -5 dBm/MHz and shall decrease linearly to an e.i.r.p. of -27 dBm/MHz at or above 5.925 GHz | | | | | | | | | | | | | | | | | | | | |
| 15.209 | Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a): | | | | | | | | | | | | | | | | | | | | |
| | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #d9e1f2;">Freq Range (MHz)</th> <th style="background-color: #d9e1f2;">Field Strength (µV/m)</th> <th style="background-color: #d9e1f2;">Field Strength (dBµV/m)</th> <th style="background-color: #d9e1f2;">Meas. Distance (m)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">30-88</td> <td style="text-align: center;">100</td> <td style="text-align: center;">40</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">88-216</td> <td style="text-align: center;">150</td> <td style="text-align: center;">43.5</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">216-960</td> <td style="text-align: center;">200</td> <td style="text-align: center;">46</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">Above 960</td> <td style="text-align: center;">500</td> <td style="text-align: center;">54</td> <td style="text-align: center;">3</td> </tr> </tbody> </table> | Freq Range (MHz) | Field Strength (µV/m) | Field Strength (dBµV/m) | Meas. Distance (m) | 30-88 | 100 | 40 | 3 | 88-216 | 150 | 43.5 | 3 | 216-960 | 200 | 46 | 3 | Above 960 | 500 | 54 | 3 |
| | Freq Range (MHz) | Field Strength (µV/m) | Field Strength (dBµV/m) | Meas. Distance (m) | | | | | | | | | | | | | | | | | |
| | 30-88 | 100 | 40 | 3 | | | | | | | | | | | | | | | | | |
| | 88-216 | 150 | 43.5 | 3 | | | | | | | | | | | | | | | | | |
| 216-960 | 200 | 46 | 3 | | | | | | | | | | | | | | | | | | |
| Above 960 | 500 | 54 | 3 | | | | | | | | | | | | | | | | | | |
| The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector. | | | | | | | | | | | | | | | | | | | | | |
| For average radiated emission measurements above 1000 MHz, there is also a limit specified when measuring with peak detector function, corresponding to 20 dB above the indicated values in the table. | | | | | | | | | | | | | | | | | | | | | |

Test procedure

The radiated setup shown in section A.1 was used to measure the radiated spurious emissions.

Depending of the frequency range and bands being tested, different antennas and filters were used.

The final measurement is done by varying the antenna height, the EUT azimuth over 360° and for both Vertical and Horizontal polarizations.

Test Results**Radiated spurious - 30 MHz – 1 GHz****Radiated Spurious – All modes**

| Frequency | Level | Detector | Limit | Margin | Polar |
|-----------|--------------|------------|--------------|--------|-------|
| MHz | dB μ V/m | --- | dB μ V/m | dB | --- |
| 30.6 | 38.1 | Quasi-Peak | 40.0 | 1.9 | V |
| 50.0 | 38.4 | Quasi-Peak | 40.0 | 1.6 | V |
| 66.7 | 35.7 | Quasi-Peak | 40.0 | 4.3 | V |

Note 1: The spurious signals detected do not depend on either the operating channel or the modulation mode.

802.11ax/be**1 GHz – 40 GHz, 802.11a, 6Mbps, Chain B****Radiated Spurious – CH177**

| Frequency | Level | Detector | Limit | Margin | Polar |
|-----------|--------------|----------|--------------|--------|-------|
| MHz | dB μ V/m | --- | dB μ V/m | dB | --- |
| 1678.2 | 52.0 | Peak | 74.0 | 22.0 | H |
| 1679.8 | 41.7 | Average | 54.0 | 12.3 | H |
| 39926.5 | 56.2 | Peak | 74.0 | 17.8 | V |
| 39926.5 | 47.9 | Average | 54.0 | 6.1 | V |

B.2.9 U-NII-5 to U-NII-8

Standard references

| FCC part | Limits | | | | | | | | | | | | | | | | | | | | |
|------------------|--|-------------------------|-----------------------|-------------------------|--------------------|-------|-----|----|---|--------|-----|------|---|---------|-----|----|---|-----------|-----|----|---|
| 15.407 (b) (5) | For transmitters operating within the 5.925-7.125 GHz band: Any emissions outside of the 5.925-7.125 GHz band must not exceed an e.i.r.p. of -27 dBm/MHz. | | | | | | | | | | | | | | | | | | | | |
| 15.35 (b) | When average radiated emission measurements are specified in this part, including average emission measurements below 1000 MHz, there also is a limit on the peak level of the radio frequency emissions. Unless otherwise specified, e.g., see §§15.250, 15.252, 15.253(d), 15.255, 15.256, and 15.509 through 15.519, the limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test. | | | | | | | | | | | | | | | | | | | | |
| 15.407 (b) (8) | Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in FCC Part 15.209 and RSS-Gen. | | | | | | | | | | | | | | | | | | | | |
| 15.209 | <p>Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a):</p> <table border="1" data-bbox="475 837 1265 1048"> <thead> <tr> <th>Freq Range (MHz)</th> <th>Field Strength (μV/m)</th> <th>Field Strength (dBμV/m)</th> <th>Meas. Distance (m)</th> </tr> </thead> <tbody> <tr> <td>30-88</td> <td>100</td> <td>40</td> <td>3</td> </tr> <tr> <td>88-216</td> <td>150</td> <td>43.5</td> <td>3</td> </tr> <tr> <td>216-960</td> <td>200</td> <td>46</td> <td>3</td> </tr> <tr> <td>Above 960</td> <td>500</td> <td>54</td> <td>3</td> </tr> </tbody> </table> <p>The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands above 1000 MHz. Radiated emission limits in this band is based on measurements employing an average detector.</p> <p>For average radiated emission measurements above 1000 MHz, there is also a limit specified when measuring with peak detector function, corresponding to 20 dB above the indicated values in the table.</p> | Freq Range (MHz) | Field Strength (μV/m) | Field Strength (dBμV/m) | Meas. Distance (m) | 30-88 | 100 | 40 | 3 | 88-216 | 150 | 43.5 | 3 | 216-960 | 200 | 46 | 3 | Above 960 | 500 | 54 | 3 |
| Freq Range (MHz) | Field Strength (μV/m) | Field Strength (dBμV/m) | Meas. Distance (m) | | | | | | | | | | | | | | | | | | |
| 30-88 | 100 | 40 | 3 | | | | | | | | | | | | | | | | | | |
| 88-216 | 150 | 43.5 | 3 | | | | | | | | | | | | | | | | | | |
| 216-960 | 200 | 46 | 3 | | | | | | | | | | | | | | | | | | |
| Above 960 | 500 | 54 | 3 | | | | | | | | | | | | | | | | | | |

Test procedure

The radiated setups shown in section A.1 were used to measure the radiated spurious emissions.

Depending of the frequency range and bands being tested, different antennas and filters were used.

- For frequencies less than or equal to 1000 MHz, measurements were made with the CISPR quasi-peak detector with a resolution bandwidth of 120kHz and a video bandwidth 3 times of the resolution bandwidth.
- For restricted bands, measurements above 1000 MHz were performed using average and peak detectors with a minimum resolution bandwidth of 1 MHz and a video bandwidth 3 times of the resolution bandwidth
- For unrestricted bands, measurements above 1000 MHz were performed using RMS* and peak detectors with a minimum resolution bandwidth of 1 MHz and a video bandwidth 3 times of the resolution bandwidth

*RMS detector is required only for FCC. For ISED tests, only average and peak detectors are measured for both restricted and unrestricted bands above 1GHz.

The final measurement is performed by varying the antenna height from 1 m to 4 m, the EUT rotating in azimuth over 360° for both vertical and horizontal polarizations.

Test Results**30 MHz – 1 GHz, Radiated spurious emissions****Radiated Spurious – All modes**

| Frequency | Level | Detector | Limit | Margin | Polar |
|-----------|--------------|------------|--------------|--------|-------|
| MHz | dB μ V/m | --- | dB μ V/m | dB | --- |
| 30.6 | 38.1 | Quasi-Peak | 40.0 | 1.9 | V |
| 50.0 | 38.3 | Quasi-Peak | 40.0 | 1.7 | V |
| 66.5 | 38.1 | Quasi-Peak | 40.0 | 1.9 | V |

Note 1: The spurious signals detected do not depend on either the operating channel or the modulation mode.

UNII 5**1 GHz – 40 GHz, 802.11ax/be20, MCS0, Chain A+B****Radiated Spurious – CH1**

| Frequency | Level | Detector | Limit | Margin | Polar |
|-----------|--------------|----------|--------------|--------|-------|
| MHz | dB μ V/m | --- | dB μ V/m | dB | --- |
| 10993.6 | 59.2 | Peak | 74.0 | 14.8 | H |
| 10994.2 | 48.0 | Average | 54.0 | 6.0 | V |
| 17861.9 | 43.4 | Average | 54.0 | 10.6 | H |
| 17862.8 | 57.2 | Peak | 74.0 | 16.8 | H |

UNII 6**1 GHz – 40 GHz, 802.11ax/be20, MCS0, Chain B****Radiated Spurious – CH113**

| Frequency | Level | Detector | Limit | Margin | Polar |
|-----------|--------------|----------|--------------|--------|-------|
| MHz | dB μ V/m | --- | dB μ V/m | dB | --- |
| 2312.5 | 40.4 | Average | 54.0 | 13.6 | H |
| 2312.5 | 51.3 | Peak | 74.0 | 22.7 | H |
| 39995.7 | 55.2 | Peak | 74.0 | 18.8 | V |
| 39995.7 | 48.0 | Average | 54.0 | 6.0 | V |

UNII 7**1 GHz – 40 GHz, 802.11ax/be20, MCS0, Chain A+B****Radiated Spurious – CH181**

| Frequency | Level | Detector | Limit | Margin | Polar |
|-----------|--------------|----------|--------------|--------|-------|
| MHz | dB μ V/m | --- | dB μ V/m | dB | --- |
| 10998.5 | 57.6 | Peak | 74.0 | 16.4 | V |
| 10998.5 | 47.9 | Average | 54.0 | 6.1 | V |
| 39996.1 | 56.1 | Peak | 74.0 | 17.9 | H |
| 39996.1 | 47.8 | Average | 54.0 | 6.2 | V |

UNII 8**1 GHz – 40 GHz, 802.11ax/be80, MCS0, Chain A+B****Radiated Spurious – CH233**

| Frequency | Level | Detector | Limit | Margin | Polar |
|-----------|--------------|----------|--------------|--------|-------|
| MHz | dB μ V/m | --- | dB μ V/m | dB | --- |
| 5160.0 | 57.0 | Peak | 88.2 | 31.2 | H |
| 5160.0 | 51.0 | RMS | 68.2 | 17.2 | H |
| 39986.5 | 48.0 | Average | 54.0 | 6.0 | V |
| 39986.9 | 56.6 | Peak | 74.0 | 17.4 | H |