N° 1-6736
Scope available
on www.cofrac.fr

CERTIFICATE #3478.01

# TEST REPORT

| | |
|---|---|
| EUT Description | **WLAN and BT, 2x2 PCIe M.2 1216 adapter card** |
| Brand Name | **Intel® Wi-Fi 6 AX203** |
| Model Name | **AX203D2W** |
| FCC ID / IC ID | **PD9AX203D2 / IC 1000M-AX203D2** |
| Date of Test Start/End | **2022-06-21 / 2022-07-01** |
| Features | **802.11ax, Dual Band, 2x2 Wi-Fi + Bluetooth® 5.1** (see section 5) |

| | |
|---|---|
| Applicant | **Intel Mobile Communications** |
| Address | **100 Center Point Circle, Suite 200**<br>**Columbia, South Carolina 29210**<br>**USA** |
| Contact Person | **Steven Hackett** |
| Telephone/Fax/ Email | **steven.c.hackett@intel.com** |

| | |
|---|---|
| Reference Standards | **FCC CFR Title 47 Part 15 C**<br>**FCC CFR Title 47 Part 15 E**<br>**RSS-247 issue 2, RSS-Gen issue 5 A1** (see section 1) |

| | |
|---|---|
| Test Report identification | **220601-09.TR01** |
| Revision Control | **Rev. 00**<br>**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 |
|---|---|
| Digitally signed by Khodor RIDA<br>Date: 2022.07.28 22:25:52 +02'00' | Digitally signed by Z.OUACHICHA<br>Date: 2022.07.29 09:23:41 +02'00' |
| Khodor RIDA<br>(Test Engineer Lead) | Zayd OUACHICHA<br>(Technical Manager) |

**Intel Corporation SAS – WRF Lab**
**425 rue de Goa – Le Cargo B6 - 06600 Antibes, France**
**Tel. +33493001400 / Fax +33493001401**

# Table of Contents

## 1. Standards, reference documents and applicable test methods

| | |
|---|---|
| FCC | 1. 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. 2019-10-01 Edition<br>2. FCC Title 47 CFR part 15 – Subpart E – Unlicensed National Information Infrastructure Devices. 2019-10-01 Edition<br>3. FCC Title 47 CFR part 15 – Subpart C – §15.209 Radiated emission limits; general requirements. 2019-10-01 Edition<br>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.<br>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).<br>6. FCC OET KDB 662911 D01 v02r01 - Emissions Testing of Transmitters with Multiple Outputs in the Same Band.<br>7. ANSI C63.10-2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices. |
| ISED | 1. RSS-Gen Issue 5 Amendment 1 - General Requirements for Compliance of Radio Apparatus.<br>2. RSS-247 Issue 2 - Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and License-Exempt Local Area Network (LE-LAN) Devices.<br>3. 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)<br>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.<br>5. FCC OET KDB 662911 D01 v02r01 - Emissions Testing of Transmitters with Multiple Outputs in the Same Band.<br>6. ANSI C63.10-2013 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.
- ✓ Tests performed under ISED standards identified in section 1 are covered by Cofrac 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 Corporation SAS Wireless RF Lab (Intel WRF Lab) is an ISO/IEC 17025:2017 testing laboratory accredited by the French Committee for Accreditation (Cofrac) with the certificate number 1-6736.
- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is a Registered Test Site listed by ISED, with ISED #1000Y.
- ✓ Intel WRF Lab declines any responsibility with respect to the identified information provided by the customer and that may affect the validity of results.
- ✓ 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 | 23.7ºC ± 1.1ºC |
| Humidity | 55.0% ± 3.2% |

## 4. Test samples

| Sample | Control # | Description | Model | Serial # | Date of receipt | Note |
|---|---|---|---|---|---|---|
| #01 | 200928-02.S02 | WiFi 6 Module | AX203D2W | WFM:90CCDF735F82 | 2020-10-22 | Used for 1-18 GHz Radiation Spurious Emission tests |
| | 200928-02.S11 | Adaptor | HrP M2 Adaptor JnP 1216 | 6961919-172 | 2020-10-27 | |
| | 180000-01.S02 | Socket | JfP Adapter M2 | - | 2017-08-09 | |
| | 220225-03.S07 | Microwave Absorber | Eccosorb BSR-1 | - | 2022-03-14 | |
| | 200611-03.S31 | Extender | ADEXELEC | - | 2020-08-19 | |
| | 200504-04.S07 | Laptop | Latitude 5401 | BVHLK13 | 2020-06-02 | |
| | 200921-01.S01 | Dipole | ARY121-0009-002-H0 | - | 2020-09-28 | |
| | 200921-01.S02 | Dipole | ARY121-0009-002-H0 | - | 2020-09-28 | |
| #02 | 200928-02.S01 | WiFi 6 Module | AX203D2W | WFM:90CCDF735FC3 | 2020-10-22 | Used for 30MHz-1 GHz and 18GHz-40GHz Radiation Spurious Emission tests |
| | 200928-03.S01 | Adaptor | HrP M2 Adaptor JnP 1216 | 6961919-280 | 2022-06-16 | |
| | 180001-01.S21 | Socket | Socket WsP/ThP /GfP/HrP | - | 2021-06-07 | |
| | 220225-03.S07 | Microwave Absorber | Eccosorb BSR-1 | - | 2022-03-14 | |
| | 210209-01.S06 | Extender | ADEXELEC | - | 2020-06-04 | |
| | 200611-03.S30 | Laptop | Latitude 5401 | 6DJLK13 | 2020-08-19 | |
| | 200921-01.S03 | Dipole | ARY121-0009-002-H0 | - | 2020-09-28 | |
| | 200921-01.S04 | Dipole | ARY121-0009-002-H0 | - | 2020-09-28 | |

## 5. EUT Features

The herein information is provided by the customer

<table>
<tr><td>Brand Name</td><td>Intel® Wi-Fi 6 AX203</td></tr>
<tr><td>Model Name</td><td>AX203D2W</td></tr>
<tr><td>Software Version</td><td>DRTU_01594_99_3500_51W</td></tr>
<tr><td>Driver Version</td><td>99.0.58.2</td></tr>
<tr><td>Prototype / Production</td><td>Production</td></tr>
<tr><td>Supported Radios</td><td>802.11b/g/n/ax 2.4GHz (2400.0 – 2483.5 MHz)<br>802.11a/n/ac/ax 5.2GHz (5150.0 – 5350.0 MHz)<br>5.6GHz (5470.0 – 5725.0 MHz)<br>5.8GHz (5725.0 – 5850.0 MHz)<br>Bluetooth 5.1 2.4GHz (2400.0 – 2483.5 MHz)</td></tr>
<tr><td>Antenna Information</td><td>
<table>
<tr><th>Transmitter</th><th>Chain 1 (A) / Aux</th><th>Chain 2 (B) / Main</th></tr>
<tr><td>Manufacturer</td><td>Wieson</td><td>Wieson</td></tr>
<tr><td>Antenna type</td><td>Dipole</td><td>Dipole</td></tr>
<tr><td>Part number</td><td>ARY121-0009-002-H0</td><td>ARY121-0009-002-H0</td></tr>
<tr><td>Declared Antenna gain (dBi) - 2.4GHz</td><td>+3.10</td><td>+3.10</td></tr>
<tr><td>Declared Antenna gain (dBi) – 5.2 & 5.3GHz</td><td>+4.11</td><td>+4.11</td></tr>
<tr><td>Declared Antenna gain (dBi) – 5.5GHz</td><td>+5.17</td><td>+5.17</td></tr>
<tr><td>Declared Antenna gain (dBi) – 5.8 GHz</td><td>+5.17</td><td>+5.17</td></tr>
</table>
</td></tr>
</table>

## 6. Remarks and comments

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

## 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 | RSS part | Test name | Verdict |
|---|---|---|---|---|
| 802.11 b/g/n/ax 2.4GHz | 15.247 (d) 15.209 | RSS-247 Clause 5.5 RSS-Gen A1 Clause 8.9 | Spurious Emission (radiated) | P |
| BLE | 15.247 (d) 15.209 | RSS-247 Clause 5.5 RSS-GEN A1 Clause 8.9 | Spurious Emission (radiated) | P |
| BT | 15.247 (d) 15.209 | RSS-247 Clause 5.5 RSS-GEN A1 Clause 8.9 | Spurious Emission (radiated) | P |
| 802.11 a/n/ac/ax – U-NII-1 | 15.407 (b) (1) 15.209 | RSS-247 Clause 6.2.1.2 RSS-GEN A1, Clause 8.9 | Spurious Emission (radiated) | P |
| 802.11 a/n/ac/ax – U-NII-2A | 15.407 (b) (2) 15.209 | RSS-247 Clause 6.2.2.2 RSS-GEN A1, Clause 8.9 | Spurious Emission (radiated) | P |
| 802.11 a/n/ac/ax – U-NII-2C | 15.407 (b) (3) 15.209 | RSS-247 Clause 6.2.3.2 RSS-GEN A1 Clause 8.9 | Spurious Emission (radiated) | P |
| 802.11 a/n/ac/ax – U-NII- 3 | 15.407 (b) (4) 15.209 | RSS-247 Clause 6.2.4.2 RSS-GEN A1 Clause 8.9 | 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

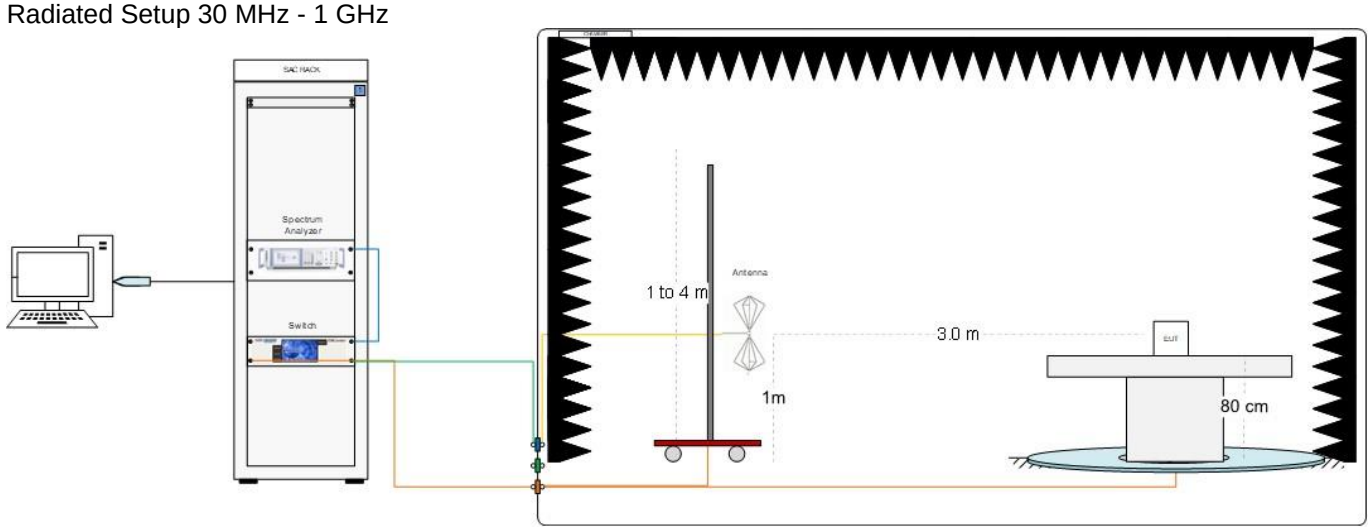
## A.1 Measurement System

Measurements were performed using the following setups, made in accordance to the general provisions of ANSI 63.10-2013 Test Procedures.

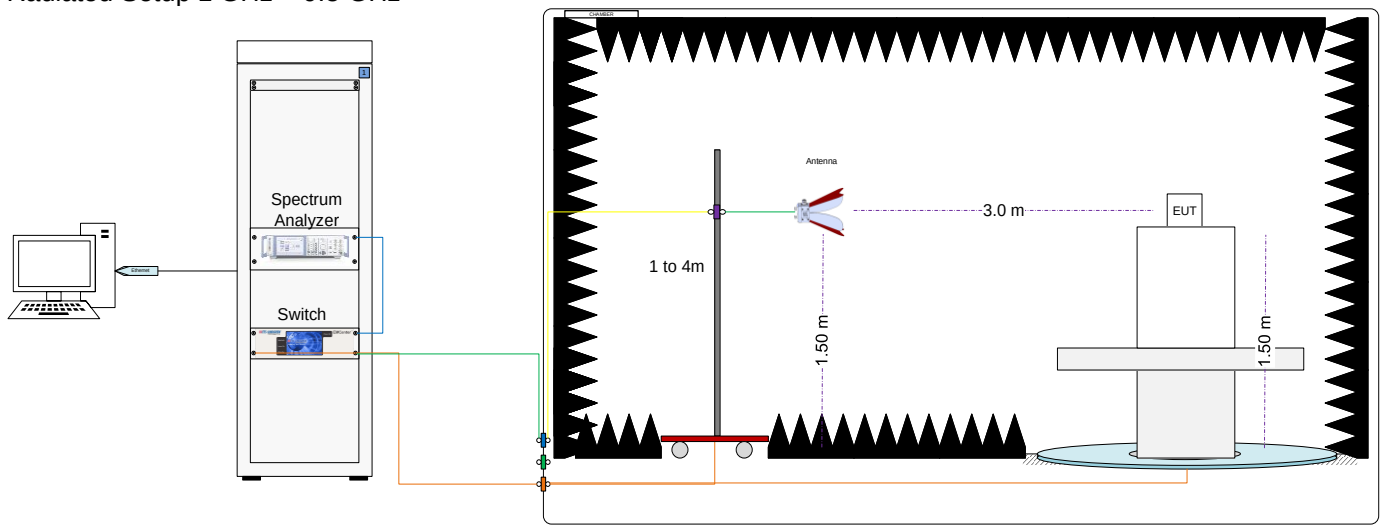
The DUT is installed in a test fixture and this test fixture is connected to a laptop computer and AC/DC power adapter. The laptop computer was used to configure the EUT to continuously transmit at a specified output power using all different modes and modulation schemes, using the Intel proprietary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

Radiated test setup

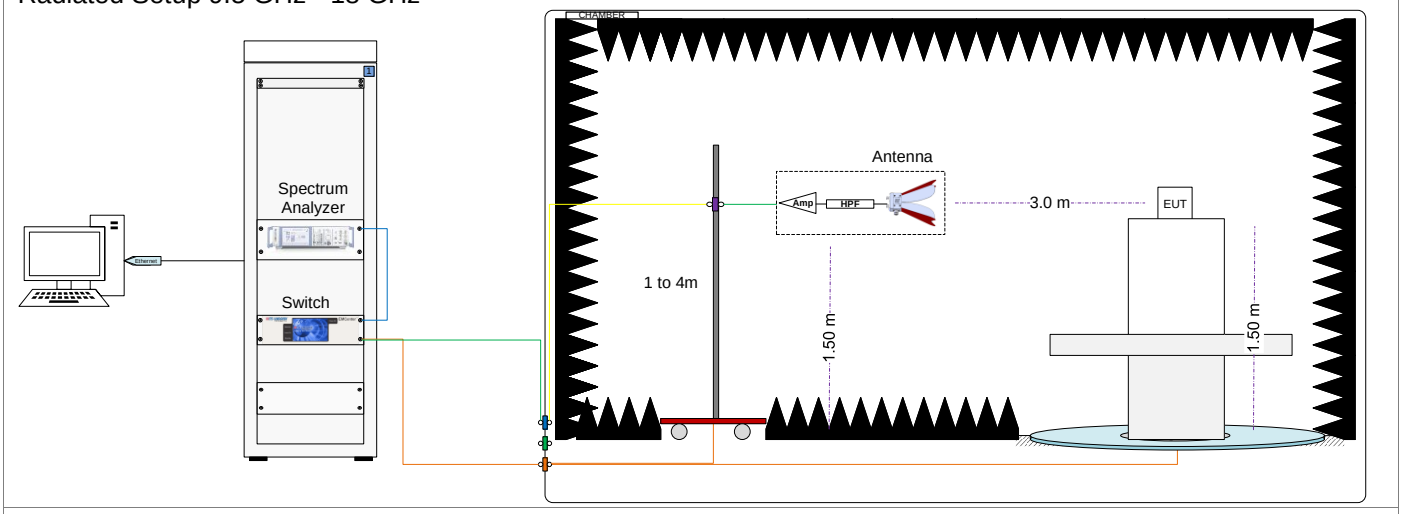
Radiated Setup 30 MHz - 1 GHz



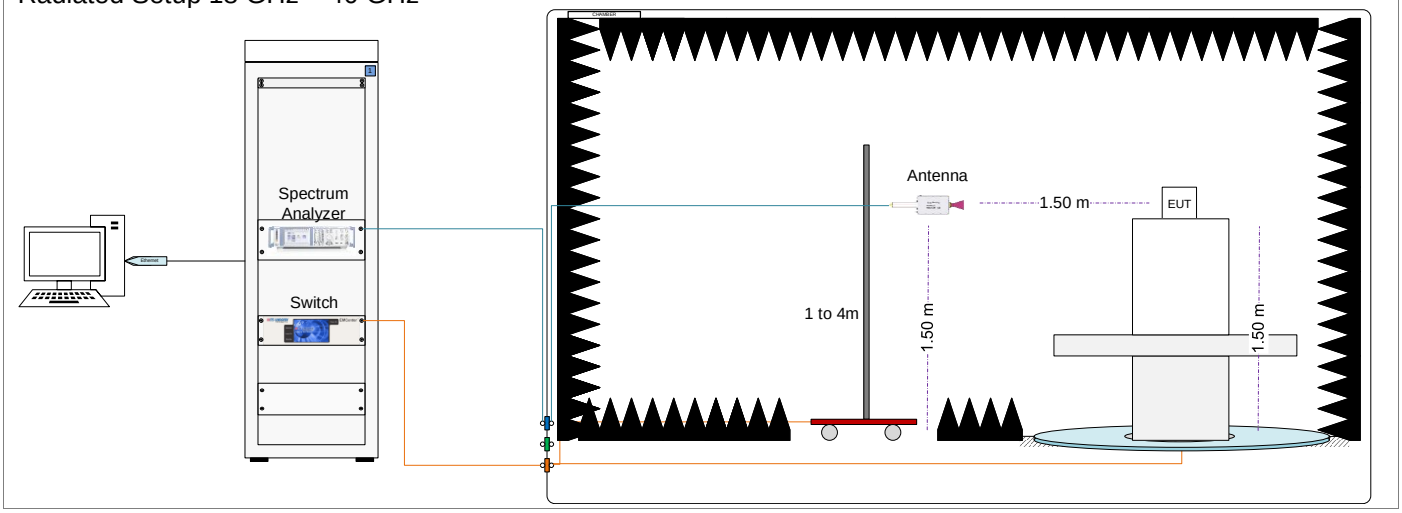

Radiated Setup 1 GHz – 9.5 GHz



Radiated Setup 9.5 GHz - 18 GHz




Radiated Setup 18 GHz – 40 GHz




Sample Calculation

The spurious received voltage V(dBµV) in the spectrum Analyzer is converted to Electric field strength using the transducer factor F corresponding to the Rx path Loss:

**F (dB/m)=** Rx Antenna Factor (dB/m) + Cable losses (dB) – Amplifiers Gain (dBi)
**E (dBµV/m) =** V(dBµV) + F (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:

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

where

*$E_{SpecLimit}$ is the field strength of the emission at the distance specified by the limit, in dBµV/m*
*$E_{Meas}$ is the field strength of the emission at the measurement distance, in dBµV/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 | FACT 3 | 5720 | ETS Lindgren | 2022-01-12 | 2024-01-12 |
| 006-001 | Turntable | - | - | ETS Lindgren | N/A | N/A |
| 006-008 | Measurement Software v11.30.00 | EMC32 | 100623 | Rohde & Schwarz | N/A | N/A |
| 147-000 | Spectrum analyzer | FSW43 | 101847 | Rohde & Schwarz | 2020-11-02 | 2022-11-02 |
| 006-002 | Switch & Positioning | EMC center | 00159757 | ETS Lindgren | N/A | N/A |
| 006-011 | Boresight antenna mast | BAM4.0-P | P/278/2890.01 | Maturo | N/A | N/A |
| 006-019 | Biconical antenna 30 MHz – 1 GHz | UBAA9115 + BBVU9135 + DGA9552N | 0286 + CH 9044 | Schwarzbeck | 2022-02-01 | 2024-02-01 |
| 056-000 | Horn Antenna 3117 + Amplifier + HPF6 | 3117 | 00157736 + 00157993 | ETS-Lindgren | 2022-04-25 | 2024-04-25 |
| 007-008 | Double Horn Ridged antenna | 3116C-PA | 00169308bis + 00196308 | ETS-Lindgren | 2021-08-05 | 2023-08-05 |
| 059-000 | Double ridged horn antenna | 3117-PA | 00201542 | ETS-Lindgren | 2021-08-05 | 2023-08-05 |
| 006-059 | RF Cable 7.0m | R286304174 | 20.46.369 | Radiall | 2022-03-04 | 2022-09-04 |
| 006-051 | RF Cable 1.0m | CBL-1.5M-SMSM+ | 202879 | Mini-Circuits | 2022-02-02 | 2022-08-02 |
| 006-030 | RF Cable 1.2m | UFA147A-0-0480-200200 | MFR 64639223720-003 | Micro-coax | 2022-02-02 | 2022-08-02 |
| 006-034 | Cable 1m - 1GHz to 18GHz | UFA147A | - | Utilflex | 2022-02-02 | 2022-08-02 |
| 026-018 | RF Cable 1.2m | 0500990991200KE | 18.23.179 | Radiall | 2022-05-09 | 2022-11-09 |
| 006-039 | RF Cable 2.5m | 0500990992500KE | 19.23.395 | Radiall | 2022-02-02 | 2022-08-02 |
| 365-000 | Temperature & Humidity logger | RA12E-TH1-RAS | 00-80-A3-E1-6E-55 | Avtech | 2021-03-08 | 2023-03-08 |

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 | 2021-09-14 | 2023-09-14 |
| 007-002 | Turntable | - | - | ETS Lindgren | N/A | N/A |
| 007-003 | Antenna Tower | 2171B-3.0M | 00150123 | ETS Lindgren | N/A | N/A |
| 007-006 | Switch & Positioner | EMCenter | 00151232 | ETS Lindgren | N/A | N/A |
| 007-005 | Measurement SW, V11.20.00 | EMC32 | 100401 | Rohde & Schwarz | N/A | N/A |
| 127-000 | Spectrum Analyzer | FSV40 | 101358 | Rohde & Schwarz | 2021-01-15 | 2023-01-15 |
| 007-007 | Double Ridge Horn (1-18GHz) | 3117 | 00152266 | ETS Lindgren | 2022-03-29 | 2024-03-29 |
| 056-000 | Horn Antenna 3117 + Amplifier + HPF6 | 3117 | 00157736 + 00157993 | ETS-Lindgren | 2022-04-25 | 2024-04-25 |
| 007-008 | Double Horn Ridged antenna | 3116C-PA | 00169308bis + 00196308 | ETS-Lindgren | 2021-08-05 | 2023-08-05 |
| 059-000 | Double ridged horn antenna | 3117-PA | 00201542 | ETS-Lindgren | 2021-08-05 | 2023-08-05 |
| 007-022 | RF Cable 1-18GHz, 1.5m | 0501050991200GX | 19.23.493 | Radiall | 2022-02-03 | 2022-08-03 |
| 007-020 | RF Cable 1-18GHz, 1.2 m | 2301761761200PJ | 12.22.1104 | Radiall | 2022-02-03 | 2022-08-03 |
| 007-011 | RF Cable 1-18GHz – 6.5m | 140-8500-11-51 | 001 | Spectrum | 2022-02-03 | 2022-08-03 |
| 007-015 | RF Cable 1GHz-18GHz 1.5m | - | - | Spirent | 2022-02-03 | 2022-08-03 |
| 007-014 | RF Cable 18-40 GHz 6m | R286304009 | 1747364 | Radiall | 2022-02-03 | 2022-08-03 |
| 007-023 | RF Cable 1m DC-40GHz | PE360-100CM | - | Pasternack | 2022-02-03 | 2022-08-03 |
| 007-018 | RF Cable 1-9.5GHz 1.2m | 0500990991200KE | - | Radiall | 2022-02-03 | 2022-08-03 |
| 325-000 | Temp & Humidity Logger | RA12E-TH1-RAS | RA12-B9B7C6 | Avtech | 2022-01-17 | 2024-01-17 |

N/A: Not Applicable

Shared Radiated Equipment

| ID# | Device | Type/Model | Serial # | Manufacturer | Cal. Date | Cal. Due Date |
|---|---|---|---|---|---|---|
| 412-000 | DRTU Power finder V2.0 | - | - | Intel | NA | NA |
| 139-000 | Power Sensor | NRP-Z81 | 104383 | Rohde & Schwarz | 2021-04-07 | 2023-04-07 |
| 140-000 | Power Sensor | NRP-Z81 | 104382 | Rohde & Schwarz | 2022-03-25 | 2024-03-25 |

## 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 | ±6.24 | dB |
| Radiated tests 1GHz – 40 GHz | ±6.04 | dB |

# Annex B. Test Results

## B.1 Test Conditions

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

For 802.11n20 & 802.11ax20 (20 MHz channel bandwidth), 802.11n40 & 802.11ax40 (40MHz channel bandwidth), 802.11ac80 & 802.11ax80 (80MHz channel bandwidth) 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 |
| | 802.11ax | 20 | HE0 |
| | | 40 | HE0 |
| | | 80 | HE0 |
| MIMO | 802.11n | 20/40 | HT8 |
| | 802.11ac | 80 | VHT0 |
| | 802.11ax | 20/40/80 | HE0 |

## 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.2.1 802.11 b/g/n/ax 2.4GHz

Standard references

<table>
<tr><th>FCC part</th><th>RSS part</th><th>Limits</th></tr>
<tr><td>15.247 (d)<br>15.209</td><td>RSS-247<br>Clause 5.5<br>RSS-Gen A1<br>Clause 8.9</td><td>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):<br><br>
<table>
<tr><th>Freq Range (MHz)</th><th>Field Stregth (µV/m)</th><th>Field Stregth (dBµV/m)</th><th>Meas. Distance (m)</th></tr>
<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>
</table>
<br>The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz. 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.<br>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.</td></tr>
</table>

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 to 4 meters, the EUT azimuth over 360º and for both Vertical and Horizontal polarizations.

Test Results

# Radiated spurious - 30 MHz – 1 GHz

## Radiated Spurious – All modes

| Frequency | QuasiPeak | Limit | Margin | Polar |
|---|---|---|---|---|
| MHz | dBµV/m | dBµV/m | dBµV/m | --- |
| 38.9 | 32.4 | 40.0 | 7.6 | 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 | MaxPeak | Average | Limit | Margin | Polar |
|---|---|---|---|---|---|
| MHz | dBµV/m | dBµV/m | dBµV/m | dB | --- |
| 4823.9 | 51.9 | --- | 74.0 | 22.1 | V |
| 4823.9 | --- | 46.4 | 54.0 | 7.6 | V |
| 17815.4 | 49.5 | --- | 74.0 | 24.5 | H |
| 17815.4 | --- | 40.9 | 54.0 | 13.1 | V |
| 25796.2 | 47.7 | --- | 74.0 | 26.3 | H |
| 25796.4 | --- | 40.4 | 54.0 | 13.6 | H |

### B.2.2 BLE

Standards references

<table>
<tr><th>FCC part</th><th>RSS part</th><th>Limits</th></tr>
<tr><td>15.247 (d)<br>15.209</td><td>RSS-247<br>Clause 5.5<br>RSS-Gen A1<br>Clause 8.9</td><td>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>
<tr><th>Freq Range (MHz)</th><th>Field Stregth (µV/m)</th><th>Field Stregth (dBµV/m)</th><th>Meas. Distance (m)</th></tr>
<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>
</table>
The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.<br>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.</td></tr>
</table>

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 to 4 meters, the EUT azimuth over 360º and for both Vertical and Horizontal polarizations.

Test Results

# Radiated spurious - 30 MHz – 1 GHz

## Radiated Spurious – All modes

| Frequency | QuasiPeak | Limit | Margin | Polar |
|---|---|---|---|---|
| 37.5 | 33.0 | 40.0 | 7.0 | 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 – CH0

| Frequency | MaxPeak | Average | Limit | Margin | Polar |
|---|---|---|---|---|---|
| MHz | dBµV/m | dBµV/m | dBµV/m | dB | --- |
| 9481.0 | --- | 45.9 | 54.0 | 8.1 | H |
| 9481.5 | 57.7 | --- | 74.0 | 16.3 | H |
| 17816.0 | 53.1 | --- | 74.0 | 20.9 | V |
| 17818.0 | --- | 40.0 | 54.0 | 14.0 | H |
| 21999.5 | 48.6 | --- | 74.0 | 25.4 | H |
| 22000.0 | --- | 37.9 | 54.0 | 16.1 | H |

### B.2.3 BT

Standard references

<table>
<tr><th>FCC part</th><th>RSS part</th><th>Limits</th></tr>
<tr><td>15.247 (d)<br>15.209 (a)</td><td>RSS-247<br>Clause 5.5<br><br>RSS GEN A1<br>Clause 8.9</td><td>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>
<tr><th>Freq Range (MHz)</th><th>Field Stregth (µV/m)</th><th>Field Stregth (dBµV/m)</th><th>Meas. Distance (m)</th></tr>
<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>
</table>
The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.<br>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.</td></tr>
</table>

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 360º and for both Vertical and Horizontal polarizations.

Test Results

# Radiated spurious - 30 MHz – 1 GHz

## Radiated Spurious – All modes

| Frequency | QuasiPeak | Limit | Margin | Polar |
|---|---|---|---|---|
| MHz | dBµV/m | dBµV/m | dBµV/m | --- |
| 38.9 | 34.6 | 40.0 | 5.4 | V |

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

# 1 GHz – 26 GHz, BR – GFSK

## Radiated Spurious – CH0 DH5

| Frequency | MaxPeak | Average | Limit | Margin | Polar |
|---|---|---|---|---|---|
| MHz | dBµV/m | dBµV/m | dBµV/m | dB | --- |
| 2342.0 | 50.0 | --- | 74.0 | 24.0 | H |
| 2342.0 | --- | 40.7 | 54.0 | 13.3 | V |
| 17813.5 | --- | 40.0 | 54.0 | 14.1 | H |
| 17814.5 | 52.5 | --- | 74.0 | 21.5 | V |
| 22000.0 | --- | 38.5 | 54.0 | 15.5 | V |
| 22000.0 | 49.1 | --- | 74.0 | 24.9 | V |

### B.2.4 802.11 a/g/n/ax U-NII-1

Standard references

<table>
<tr><th>FCC part</th><th>Limits</th></tr>
<tr><td>15.407 (b) (1)</td><td>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.</td></tr>
<tr><td>15.209</td><td>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>
<tr><th>Freq Range (MHz)</th><th>Field Strength (µV/m)</th><th>Field Strength (dBµV/m)</th><th>Meas. Distance (m)</th></tr>
<tr><td>0.009-0.490</td><td>2400/f(kHz)</td><td>-</td><td>300</td></tr>
<tr><td>0.490-1.705</td><td>24000/f(kHz)</td><td>-</td><td>300</td></tr>
<tr><td>1.705-30.0</td><td>30</td><td>-</td><td>30</td></tr>
<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>
</table>
The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.<br>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.</td></tr>
</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 360º and for both Vertical and Horizontal polarizations.

Test Results

# Radiated spurious - 30 MHz – 1 GHz

## Radiated Spurious – All modes

| Frequency | QuasiPeak | Limit | Margin | Polar |
|---|---|---|---|---|
| MHz | dBµV/m | dBµV/m | dBµV/m | --- |
| 38.9 | 33.5 | 40.0 | 6.5 | V |

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

# 1 GHz – 40 GHz, 802.11a, 6Mbps, Chain A

## Radiated Spurious – CH36

| Frequency | MaxPeak | Average | Limit | Margin | Polar |
|---|---|---|---|---|---|
| MHz | dBµV/m | dBµV/m | dBµV/m | dB | --- |
| 6999.1 | 57.9 | --- | 68.2 | 10.3 | V |
| 10362.3 | 49.6 | --- | 68.2 | 18.6 | V |
| 20719.7 | 46.1 | --- | 74.0 | 27.9 | H |
| 20719.7 | --- | 39.9 | 54.0 | 14.1 | H |

### B.2.5 802.11 a/g/n/ax U-NII-2A

Standard references

<table>
<tr><th>FCC part</th><th>Limits</th></tr>
<tr><td>15.407 (a) (2)</td><td>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.</td></tr>
<tr><td>15.209</td><td>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>
<tr><th>Freq Range (MHz)</th><th>Field Strength (µV/m)</th><th>Field Strength (dBµV/m)</th><th>Meas. Distance (m)</th></tr>
<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>
</table>
The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.<br>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.</td></tr>
</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, the EUT azimuth over 360º and for both Vertical and Horizontal polarizations.

Test Results

# Radiated spurious - 30 MHz – 1 GHz

## Radiated Spurious – All modes

| Frequency | QuasiPeak | Limit | Margin | Polar |
|---|---|---|---|---|
| MHz | dBµV/m | dBµV/m | dBµV/m | --- |
| 38.9 | 33.7 | 40.0 | 6.3 | V |

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

# 1 GHz – 40 GHz, 802.11a, 6Mbps, Chain B

## Radiated Spurious – CH64

| Frequency | MaxPeak | Average | Limit | Margin | Polar |
|---|---|---|---|---|---|
| MHz | dBµV/m | dBµV/m | dBµV/m | dB | --- |
| 6997.2 | 57.9 | --- | 68.2 | 10.3 | H |
| 17810.6 | 50.4 | --- | 74.0 | 23.6 | H |
| 17810.6 | --- | 40.0 | 54.0 | 14.0 | V |
| 39648.0 | 52.5 | --- | 74.0 | 21.4 | H |
| 39648.0 | --- | 45.7 | 54.0 | 8.3 | V |

### B.2.6 802.11 a/g/n/ax U-NII-2C

Standard references

<table>
<tr><th>FCC part</th><th>RSS clause</th><th>Limits</th></tr>
<tr><td>15.407 (b) (3)</td><td>RSS-247 Clause 6.2.3 (2)</td><td>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.</td></tr>
<tr><td>15.209</td><td>RSS-GEN A1, Clause 8.9</td><td>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>
<tr><th>Freq Range (MHz)</th><th>Field Strength (µV/m)</th><th>Field Strength (dBµV/m)</th><th>Meas. Distance (m)</th></tr>
<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>
</table>
The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.<br>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.</td></tr>
</table>

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 360º and for both Vertical and Horizontal polarizations.

Test Results

# Radiated spurious - 30 MHz – 1 GHz

## Radiated Spurious – All modes

| Frequency | QuasiPeak | Limit | Margin | Polar |
|---|---|---|---|---|
| MHz | dBµV/m | dBµV/m | dBµV/m | --- |
| 39.5 | 32.7 | 40.0 | 7.3 | V |

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

# 1 GHz – 40 GHz, 802.11a, 6Mbps, Chain B

## Radiated Spurious – CH100

| Frequency | MaxPeak | Average | Limit | Margin | Polar |
|---|---|---|---|---|---|
| MHz | dBµV/m | dBµV/m | dBµV/m | dB | --- |
| 6998.2 | 57.4 | --- | 68.2 | 10.8 | H |
| 11001.2 | 52.0 | --- | 74.0 | 22.0 | V |
| 11001.2 | --- | 41.2 | 54.0 | 12.8 | V |
| 39666.6 | 53.1 | --- | 74.0 | 20.9 | V |
| 39666.6 | --- | 45.3 | 54.0 | 8.7 | H |

### B.2.7 802.11 a/g/n/ax U-NII-3

Standard references

<table>
<tr><th>FCC part</th><th>RSS clause</th><th>Limits</th></tr>
<tr><td>15.407 (b) (4)</td><td>RSS-247 Clause 6.2.4.2</td><td>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.</td></tr>
<tr><td>15.209</td><td>RSS-GEN A1, Clause 8.9</td><td>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>
<tr><th>Freq Range (MHz)</th><th>Field Strength (µV/m)</th><th>Field Strength (dBµV/m)</th><th>Meas. Distance (m)</th></tr>
<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>
</table>
The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.<br>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.</td></tr>
</table>

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 360º and for both Vertical and Horizontal polarizations.

Test Results

# Radiated spurious - 30 MHz – 1 GHz

## Radiated Spurious – All modes

| Frequency | QuasiPeak | Limit | Margin | Polar |
|---|---|---|---|---|
| MHz | dBµV/m | dBµV/m | dBµV/m | --- |
| 39.0 | 34.3 | 40.0 | 5.7 | V |

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

# 1 GHz – 40 GHz, 802.11a, 6Mbps, Chain A

## Radiated Spurious – CH149

| Frequency | MaxPeak | Average | Limit | Margin | Polar |
|---|---|---|---|---|---|
| MHz | dBµV/m | dBµV/m | dBµV/m | dB | --- |
| 6998.2 | 57.7 | --- | 68.2 | 10.5 | V |
| 11488.5 | 56.1 | --- | 74.0 | 17.9 | V |
| 11488.5 | --- | 45.3 | 54.0 | 8.7 | V |
| 22978.8 | --- | 43.5 | 54.0 | 10.5 | V |
| 22980.3 | 53.0 | --- | 74.0 | 21.0 | V |