



TEST REPORT

EUT Description	WLAN and BT, 1x1 PCIe M.2 2230 adapter card
Brand Name	Intel® Wi-Fi AX101
Model Name	AX101NGW
FCC ID / IC ID	FCCID: PD9AX101NG/ IC 1000M-AX101NG
Date of Test Start/End	2022-06-24 / 2022-07-03
Features	802.11ax, Dual Band, 1x1 Wi-Fi + Bluetooth® 5.1, Diversity Antenna (see section 5)

Applicant	Intel Mobile Communications
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Contact Person	Steven Hackett
Telephone/Fax/ Email	steven.c.hackett@intel.com

Reference Standards	FCC CFR Title 47 Part 15 C FCC CFR Title 47 Part 15 E RSS-247 issue 2, RSS-Gen issue 5 A1 (see section 1)
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Test Report identification	220526-01.TR04
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

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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 – §15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz. 2019-10-01 Edition 2. FCC Title 47 CFR part 15 – Subpart E – Unlicensed National Information Infrastructure Devices. 2019-10-01 Edition 3. FCC Title 47 CFR part 15 – Subpart C – §15.209 Radiated emission limits; general requirements. 2019-10-01 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 662911 D01 v02r01 - Emissions Testing of Transmitters with Multiple Outputs in the Same Band. 7. ANSI C63.10-2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.
ISED	<ol style="list-style-type: none"> 1. RSS-Gen Issue 5 Amendment 1 - General Requirements for Compliance of Radio Apparatus. 2. RSS-247 Issue 2 - Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and License-Exempt Local Area Network (LE-LAN) Devices. 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) 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 662911 D01 v02r01 - Emissions Testing of Transmitters with Multiple Outputs in the Same Band. 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.
- ✓ 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	23.7°C ± 1.1°C
Humidity	52.0% ± 4%

4. Test samples

Sample	Control #	Description	Model	Serial #	Date of receipt	Note
#01	200928-03.S13	RF module	AX101NGW	BC17B85880D1	2021-02-04	Used for 1-18 GHz Radiation Spurious Emission tests
	200928-02.S11	Adaptor	HrP M2 Adaptor JnP 1216	6961919-172	2020-10-27	
	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	200928-03.S13	RF module	AX101NGW	BC17B85880D1	2021-02-04	Used for 30 MHz-1 GHz and 18 GHz - 40 GHz Radiation Spurious Emission tests
	200928-03.S01	Adaptor	HrP M2 Adaptor JnP 1216	6961919-280	2022-06-16	
	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

Brand Name	Intel® Wi-Fi AX101		
Model Name	AX101NGW		
Software Version	DRTU 01594_99_3500_51W		
Driver Version	99.0.58.2		
Prototype / Production	Production		
Supported Radios	802.11b/g/n/ax 802.11a/n/ac/ax Bluetooth 5.1	2.4GHz (2400.0 – 2483.5 MHz) 5.2GHz (5150.0 – 5350.0 MHz) 5.6GHz (5470.0 – 5725.0 MHz) 5.8GHz (5725.0 – 5850.0 MHz) 2.4GHz (2400.0 – 2483.5 MHz)	
Additional information			
Antenna Information	Transmitter	Main (chain A Diversity 1)	Aux (chain A Diversity 2)
	Manufacturer	Wieson	Wieson
	Antenna type	Dipole	Dipole
	Part number	ARY121-0009-002-H0	ARY121-0009-002-H0
	Declared Antenna gain (dBi) - 2.4GHz	+3.10	+3.10
	Declared Antenna gain (dBi) – 5.2 & 5.3GHz	+4.11	+4.11
	Declared Antenna gain (dBi) – 5.5GHz	+5.17	+5.17
	Declared Antenna gain (dBi) – 5.8 GHz	+5.17	+5.17

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	K.Khatib	First Issue

Annex A. Test & System Description

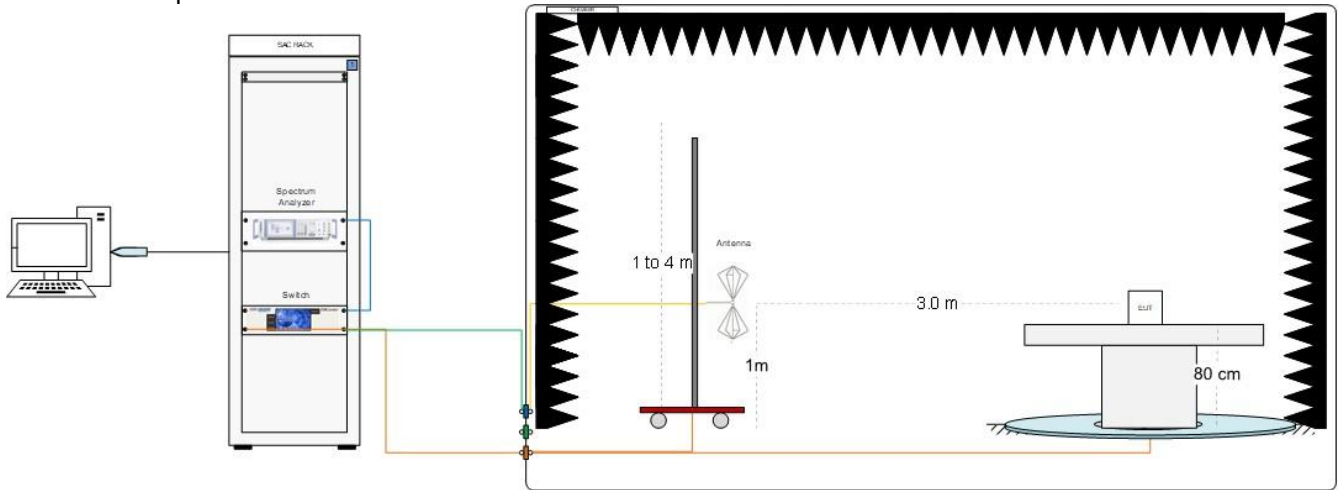
A.1 Measurement System

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

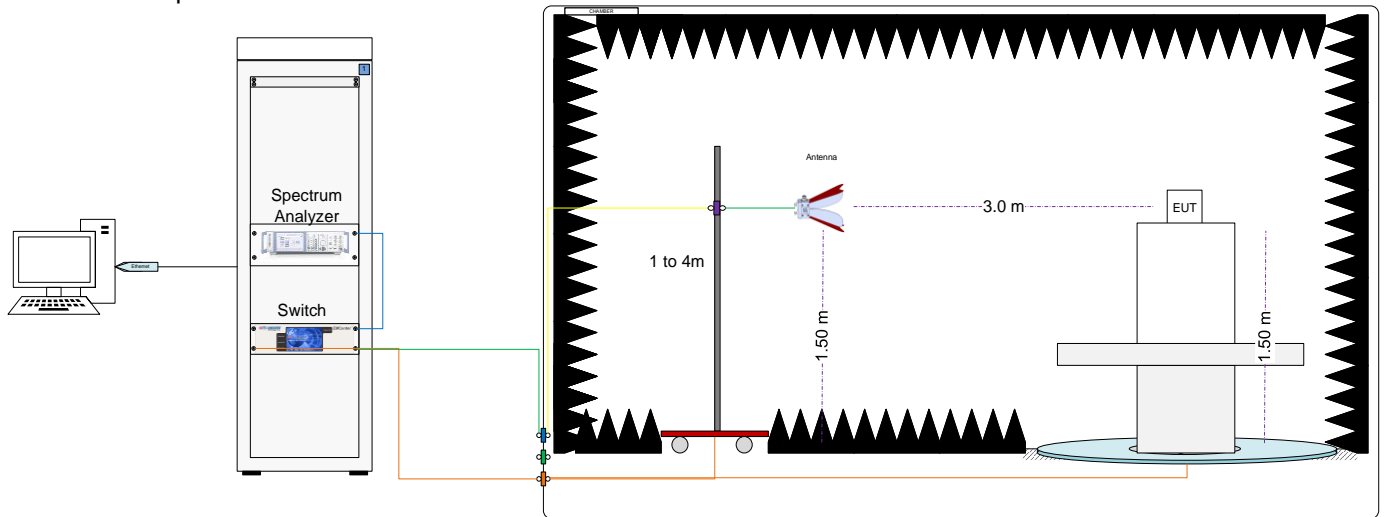
The DUT is installed in a test fixture and this test fixture is connected to a laptop computer and AC/DC power adapter. The laptop computer was used to configure the EUT to continuously transmit at a specified output power using all different modes and modulation schemes, using the Intel proprietary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

Radiated test setup

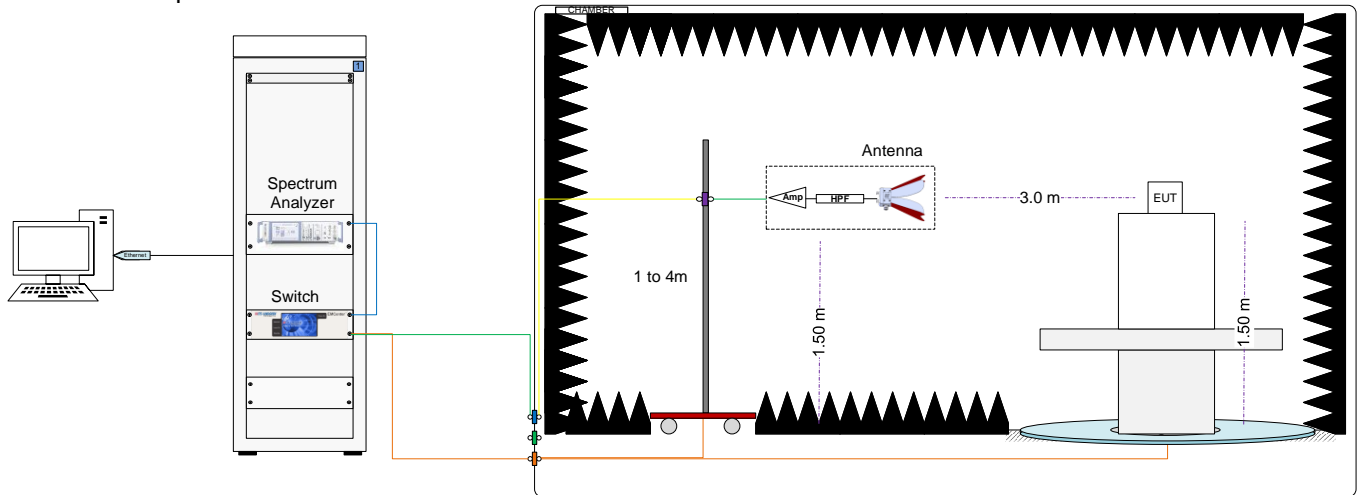
Radiated Setup 30 MHz - 1 GHz



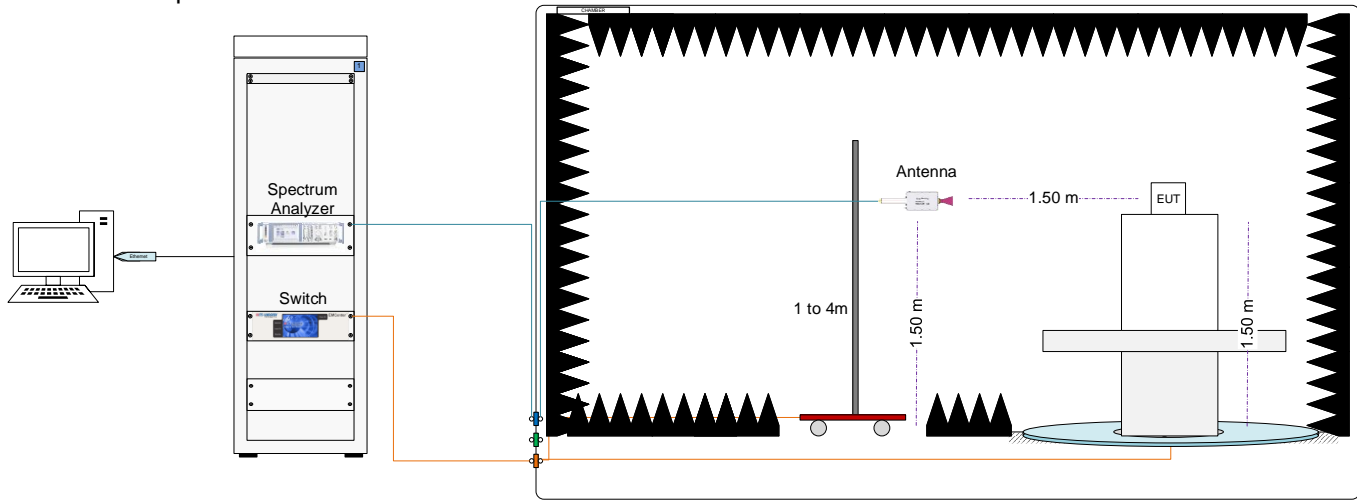
Radiated Setup 1 GHz – 9.5 GHz



Radiated Setup 9.5 GHz - 18 GHz



Radiated Setup 18 GHz – 40 GHz



Sample Calculation

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

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

$$E \text{ (dB}\mu\text{V/m)} = V \text{ (dB}\mu\text{V)} + F \text{ (dB/m)}$$

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:

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

where

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

E_{Meas} is the field strength of the emission at the measurement distance, in dB μ V/m

D_{Meas} is the measurement distance, in m

$D_{\text{SpecLimit}}$ 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 all modes, the EUT transmits at both CHAIN A DIV1 and CHAIN A DIV2 RF outputs individually, but not 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
Chain A – Diversity 1/ Diversity 2	802.11a	20	6Mbps
	802.11n	20	HT0
		40	HT0
	802.11ac	80	VHT0
	802.11ax	20	HE0
		40	HE0
		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

FCC part	RSS part	Limits			
15.247 (d) 15.209	RSS-247 Clause 5.5 RSS-Gen A1 Clause 8.9	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):			
		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 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. 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 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 360° 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	dB μ V/m	dB μ V/m	dB μ V/m	---
39.6	31.3	40.0	8.7	V

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

1 GHz – 26.5 GHz, 802.11ax20, HE0, Chain A- Diversity 2**Radiated Spurious – CH1**

Frequency	MaxPeak	Average	Limit	Margin	Polar
MHz	dB μ V/m	dB μ V/m	dB μ V/m	dB	---
4807.4	---	49.0	54.0	5.0	H
4807.4	57.0	---	74.0	17.0	H
17798.8	50.3	---	74.0	23.7	H
17801.1	---	39.0	54.0	15.0	H
25817.0	49.2	---	74.0	24.8	H
25817.0	---	40.5	54.0	13.5	H

B.2.2 BLE

Standards references

FCC part	RSS part	Limits																					
<p>15.247 (d) 15.209</p>	<p>RSS-247 Clause 5.5 RSS-Gen A1 Clause 8.9</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"> <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																				
<p>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. 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>																							

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 360° and for both Vertical and Horizontal polarizations.

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

Frequency	Quasi-Peak	Limit	Margin	Polar
39.5	32.3	40.0	7.7	V

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

1 GHz – 26 GHz, BLE, Chain A - Diversity 1**Radiated Spurious –CH19 2444 MHz**

Frequency	MaxPeak	Average	Limit	Margin	Polar
MHz	dB μ V/m	dB μ V/m	dB μ V/m	dB	---
3384.0	52.5	---	74.0	21.5	V
3384.5	---	40.2	54.0	13.8	V
17743.0	51.0	---	74.0	23.0	V
17744.0	---	39.1	54.0	14.9	V
25835.5	49.6	---	74.0	24.4	V
25835.5	---	38.3	54.0	15.7	H

B.2.3 BT

Standard references

FCC part	RSS part	Limits																					
<p>15.247 (d) 15.209 (a)</p>	<p>RSS-247 Clause 5.5 RSS GEN A1 Clause 8.9</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"> <thead> <tr> <th data-bbox="627 465 794 526">Freq Range (MHz)</th> <th data-bbox="826 465 978 526">Field Strength (µV/m)</th> <th data-bbox="1010 465 1177 526">Field Strength (dBµV/m)</th> <th data-bbox="1209 465 1361 526">Meas. Distance (m)</th> </tr> </thead> <tbody> <tr> <td data-bbox="627 533 794 566">30-88</td> <td data-bbox="826 533 978 566">100</td> <td data-bbox="1010 533 1177 566">40</td> <td data-bbox="1209 533 1361 566">3</td> </tr> <tr> <td data-bbox="627 573 794 607">88-216</td> <td data-bbox="826 573 978 607">150</td> <td data-bbox="1010 573 1177 607">43.5</td> <td data-bbox="1209 573 1361 607">3</td> </tr> <tr> <td data-bbox="627 613 794 647">216-960</td> <td data-bbox="826 613 978 647">200</td> <td data-bbox="1010 613 1177 647">46</td> <td data-bbox="1209 613 1361 647">3</td> </tr> <tr> <td data-bbox="627 654 794 678">Above 960</td> <td data-bbox="826 654 978 678">500</td> <td data-bbox="1010 654 1177 678">54</td> <td data-bbox="1209 654 1361 678">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																				
		<p>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. 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>																					

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	QuasiPeak	Limit	Margin	Polar
MHz	dB μ V/m	dB μ V/m	dB μ V/m	---
39.4	31.9	40.0	8.1	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, Chain A - Diversity 1**Radiated Spurious – CH39 2-DH5, 2441 MHz**

Frequency	MaxPeak	Average	Limit	Margin	Polar
MHz	dB μ V/m	dB μ V/m	dB μ V/m	dB	---
3138.5	---	41.1	54.0	12.9	V
3139.5	51.9	---	74.0	22.1	V
17748.5	51.6	---	74.0	22.4	H
17749.0	---	39.1	54.0	14.9	V
25830.5	49.6	---	74.0	24.4	V
25830.5	----	38.3	54.0	15.7	V

B.2.4 802.11 a/g/n/ax 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" style="margin-left: auto; margin-right: auto;"> <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>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> </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 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.</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)	0.009-0.490	2400/f(kHz)	-	300	0.490-1.705	24000/f(kHz)	-	300	1.705-30.0	30	-	30	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)																														
0.009-0.490	2400/f(kHz)	-	300																														
0.490-1.705	24000/f(kHz)	-	300																														
1.705-30.0	30	-	30																														
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	QuasiPeak	Limit	Margin	Polar
MHz	dB μ V/m	dB μ V/m	dB μ V/m	---
30.6	32.3	40.0	7.7	V

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

1 GHz – 40 GHz, 802.11ax20, HE0, Chain A - Diversity 1**Radiated Spurious – CH48**

Frequency	MaxPeak	Average	Limit	Margin	Polar
MHz	dB μ V/m	dB μ V/m	dB μ V/m	dB	---
6999.1	58.3	---	68.2	9.9	H
10463.8	49.1	---	68.2	19.1	V
15694.6	---	41.7	54.0	12.3	V
15695.1	51.9	---	74.0	22.1	V
20926.0	---	43.0	54.0	11.0	V
20927.0	52.2	---	74.0	21.8	V

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

Standard 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="541 568 1331 779"> <thead> <tr> <th data-bbox="541 568 740 636">Freq Range (MHz)</th> <th data-bbox="740 568 940 636">Field Strength (µV/m)</th> <th data-bbox="940 568 1139 636">Field Strength (dBµV/m)</th> <th data-bbox="1139 568 1331 636">Meas. Distance (m)</th> </tr> </thead> <tbody> <tr> <td data-bbox="541 636 740 672">30-88</td> <td data-bbox="740 636 940 672">100</td> <td data-bbox="940 636 1139 672">40</td> <td data-bbox="1139 636 1331 672">3</td> </tr> <tr> <td data-bbox="541 672 740 707">88-216</td> <td data-bbox="740 672 940 707">150</td> <td data-bbox="940 672 1139 707">43.5</td> <td data-bbox="1139 672 1331 707">3</td> </tr> <tr> <td data-bbox="541 707 740 743">216-960</td> <td data-bbox="740 707 940 743">200</td> <td data-bbox="940 707 1139 743">46</td> <td data-bbox="1139 707 1331 743">3</td> </tr> <tr> <td data-bbox="541 743 740 779">Above 960</td> <td data-bbox="740 743 940 779">500</td> <td data-bbox="940 743 1139 779">54</td> <td data-bbox="1139 743 1331 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 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.</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	QuasiPeak	Limit	Margin	Polar
MHz	dBµV/m	dBµV/m	dBµV/m	---
39.5	30.5	40.0	9.5	V

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

1 GHz – 40 GHz, 802.11ax20, HE0, Chain A - Diversity 2

Radiated Spurious – CH64

Frequency	MaxPeak	Average	Limit	Margin	Polar
MHz	dBµV/m	dBµV/m	dBµV/m	dB	---
1106.2	---	42.2	54.0	11.8	V
1106.7	49.7	---	74.0	24.3	V
10622.0	52.2	---	74.0	21.8	V
10622.9	---	42.5	54.0	11.5	V
15934.0	48.4	---	74.0	25.6	V
15935.4	---	39.6	54.0	14.4	V
21245.2	---	41.3	54.0	12.7	V
21247.0	51.3	---	74.0	22.7	V

B.2.6 802.11 a/g/n/ax U-NII-2CStandard references

FCC part	RSS clause	Limits																				
15.407 (b) (3)	RSS-247 Clause 6.2.3 (2)	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	RSS-GEN A1, Clause 8.9	<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"> <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 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.</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 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	QuasiPeak	Limit	Margin	Polar
MHz	dBμV/m	dBμV/m	dBμV/m	---
39.5	31.2	40.0	8.8	V

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

1 GHz – 40 GHz, 802.11ax80, HE0, Chain A - Diversity 1**Radiated Spurious – CH122**

Frequency	MaxPeak	Average	Limit	Margin	Polar
MHz	dBμV/m	dBμV/m	dBμV/m	dB	---
6995.3	57.5	---	68.2	10.7	V
11144.3	55.3	---	74.0	18.7	V
11144.3	---	46.9	54.0	7.1	V
16716.5	52.2	---	68.2	16.0	V
22287.1	50.3	---	74.0	23.7	V
22287.6	---	42.1	54.0	11.9	V

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

FCC part	RSS clause	Limits																				
15.407 (b) (4)	RSS-247 Clause 6.2.4.2	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	RSS-GEN A1, Clause 8.9	<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"> <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 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.</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 (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 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	QuasiPeak	Limit	Margin	Polar
MHz	dBµV/m	dBµV/m	dBµV/m	---
39.5	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 – 40 GHz, 802.11ax20, HE0, Chain A - Diversity 1**Radiated Spurious – CH157**

Frequency	MaxPeak	Average	Limit	Margin	Polar
MHz	dBµV/m	dBµV/m	dBµV/m	dB	---
6989.7	58.8	---	68.2	9.4	V
11552.7	---	52.7	54.0	1.3	V
11554.2	58.9	---	74.0	15.1	V
17330.4	47.3	---	68.2	20.9	V
23105.5	50.6	---	74.0	23.4	V
23106.0	---	41.8	54.0	12.2	V
34658.9	55.3	---	68.2	12.9	V