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RADIO TEST REPORT

Project ID
PRJ0033391

Report ID
REP010979

Type of assessment:
Permissive Change verification

Applicant:
SolidRun Ltd.

Description of product:
LMA BT and Wi-Fi module

Model(s)/HVIN(s):
SRG0400-WBT

Product marketing name (PMN):
LBEE5HY1MW

FCC identifier:
FCC ID: 2BA24LBEE5HY1MW

ISED certification number:
IC: 12107A-LBEE5HY1MW

Specifications:

- FCC 47 CFR Part 15 Subpart E, §15.407
- RSS-247, Issue 3, August 2023, Section 6

Date of issue: August 18, 2023

Hossein Zamani Zardehsavari, Senior Wireless/EMC Specialist
Tested by


Signature

Andrey Adelberg, Senior EMC/RF Specialist
Reviewed by


Signature

Lab locations

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Test site identifier	**Organization**	**Ottawa/Almonte**	**Montreal**	**Cambridge**
	FCC:	CA2040	CA2041	CA0101
	ISED:	2040A-4	2040G-5	24676
Website	www.nemko.com			

Limits of responsibility

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

Copyright notification

Table of Contents

Section 1 Report summary

1.1 Test specifications

FCC 47 CFR Part 15, Subpart E, Clause 15.407	Unlicensed National Information Infrastructure Devises operating in the 5.15–5.35 GHz, 5.47–5.725 GHz, 5.725–5.85 GHz, and 5.925–7.125 GHz bands.
RSS-247, Issue 3, August 2023, Section 6	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices. Technical requirements for licence-exempt local area network devices and digital transmission systems operating in the 5 GHz band

1.2 Test methods

789033 D02 General U-NII Test Procedures New Rules v02r01 (December 14, 2017)	Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E
ANSI C63.10 v2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

1.3 Exclusions

C2PC limited assessment due to an antenna change and host integration for LMA.

1.4 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was performed against all relevant requirements of the test standard except as noted in section 1.3 above. Results obtained indicate that the product under test complies In full with the requirements tested. The test results relate only to the items tested.

See "Summary of test results" for full details.

1.5 Test report revision history

Table 1.5-1: Test report revision history

Revision #	Date of issue	Details of changes made to test report
REP010634	August 10, 2023	Original report issued

Section 2 Engineering considerations

2.1 Modifications incorporated in the EUT for compliance

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

2.2 Technical judgment

None

2.3 Model variant declaration

N/A

2.4 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

Section 3 Test conditions

3.1 Atmospheric conditions

Temperature	15 °C – 35 °C
Relative humidity	20 % – 75 %
Air pressure	86 kPa (860 mbar) – 106 kPa (1060 mbar)

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

3.2 Power supply range

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

Section 4 Information provided by the applicant

4.1 Disclaimer

This section contains information provided by the applicant and has been utilized to support the test plan. Inaccurate information provided by the applicant can affect the validity of the results contained within this test report. Nemko accepts no responsibility for the information contained within this section and the impact it may have on the test plan and resulting measurements.

4.2 Applicant/Manufacture

Name	SolidRun Ltd.
Address	Acre, 2412401, Israel

4.3 EUT information

Product	LMA BT and Wi-Fi module
Model number	SRG0400-WBT
Model name	LBEE5HY1MW
HMN	SRG0400
Power supply requirements	DC: 12 V from external 100–240 V(AC) power adapter
Product description and theory of operation	The equipment will securely connect the Indoor Air quality sensors to the network cloud by sending data via ETP. It will use a default wirepas connectivity protocol.

4.4 Radio technical information

Device type	☐	Outdoor access point
	☒	Indoor access point
	☐	Fixed point-to-point access point
	☐	Client device
	☐	Device installed in vehicles
Frequency bands	5150–5250 MHz (U-NII-1) and 5250–5350 MHz (U-NII-2a)	
Type of modulation	802.11a/n/ac: OFDM (QPSK, BPSK, 16-QAM, 64-QAM)	
Emission classification	W7D	
Transmitter spurious, dBµV/m @ 3 m	59.1 (peak) and 50.4 (average) @ 31.6 GHz	
Antenna information	2.4/5GHz FPC antenna, gain: 4 dBi	

4.5 EUT setup details

4.5.1 Radio exercise details

Operating conditions	Once unit powered, the PCB is connected to a laptop through UART/ USB to control BT/Wi-Fi chip and Fujitsu Chip. Then Linux commands are sent through a Putty platform to set either the unit power on maximum or the baud rates and all other functionality of a radio module. For Quectel it the same procedure but using AT commands through Putty.
Transmitter state	Transmitter set into continuous mode.

Table 4.5-1: EUT sub assemblies

Description	Brand name	Model, Part number, Serial number, Revision level
AC adaptor	Power Supply	MN: ICP12-120-1000D, PN: ICP12-120-1000DSD4

Table 4.5-2: EUT interface ports

Description	Qty.
SMA	1
USB	1

Table 4.5-3: Support equipment

Description	Brand name	Model, Part number, Serial number, Revision level
Laptop	Lenovo	SN: PF39SXL6, MN: 20SU-S012N

Table 4.5-4: Inter-connection cables

Cable description	From	To	Length (m)
USB cable	EUT	Laptop	1
Power cord	EUT	AC main port	1

EUT setup configuration, continued

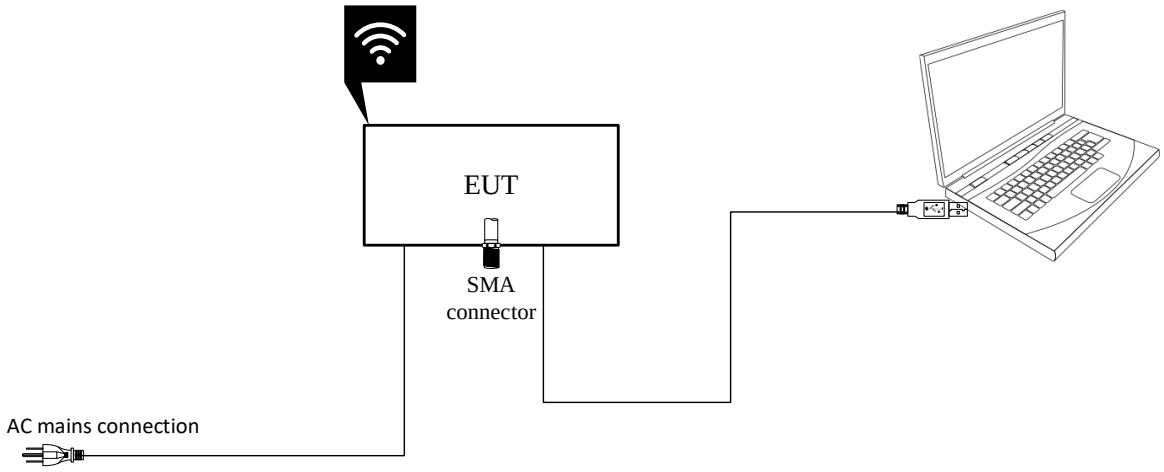


Figure 4.5-1: Radiated testing block diagram

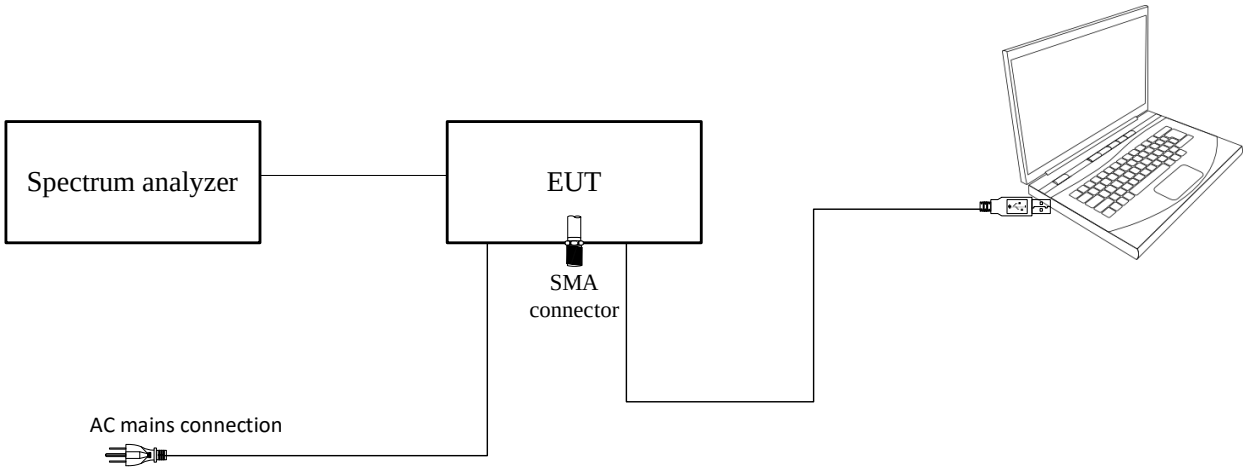


Figure 4.5-2: Antenna port testing block diagram

Section 5 Summary of test results

5.1 Testing location

Test location (s)	Montreal

5.2 Testing period

Test start date	April 24, 2023	Test end date	May 9, 2023

5.3 Sample information

Receipt date	April 23, 2023	Nemko sample ID number(s)	PRJ00333910001 and PRJ00333910002

5.4 FCC Part 15 Subpart A and C, general requirements test results

Table 5.4-1: FCC general requirements results

Part	Test description	Verdict
§15.207(a)	Conducted limits	Pass
§15.31I	Variation of power source	Pass
§15.31(m)	Number of tested frequencies	Pass
§15.203	Antenna requirement	Pass

5.5 FCC Part §15.407 test results

Table 5.5-1: FCC §15.407 requirements results

Part	Test description	Verdict
§15.403	Emission bandwidth	Pass
§15.407(a)(1)	Power and density limits within 5.15–5.25 GHz band	Pass
§15.407(b)(1)	Undesirable emission limits for 5.15–5.25 GHz band	Pass
§15.407(a)(2)	Power and density limits within 5.25–5.35 GHz and 5.47–5.725 GHz bands	Pass
§15.407(b)(2)	Undesirable emission limits for 5.25–5.35 GHz band	Pass
§15.407(b)(8)	AC power line conducted limits	Pass
§15.407(g)	Frequency stability	Not tested
§15.407(h)(1)[1]	Transmit power control (TPC)	Not applicable
§15.407(h)(2)[1]	Dynamic Frequency Selection (DFS)	Not tested[2]
§15.407(k)	Automated frequency coordination (AFC) system	Not applicable

Notes [1]DFS and TPC requirements are only applicable to 5.25–5.35 GHz and 5.47–5.725 GHz bands
[2]The tests have already been completed successfully. For additional information, kindly refer to the documents provided in the following link.
https://fcc.report/FCC-ID/VPYLBEE5HY1MW

5.6 ISED RSS-Gen, Issue 5, test results

Table 5.6-1: RSS-Gen requirements results

Clause	Test description	Verdict
7.3	Receiver radiated emission limits	Not applicable
7.4	Receiver conducted emission limits	Not applicable
6.9	Operating bands and selection of test frequencies	Pass
8.8	AC power-line conducted emissions limits	Pass

Notes: [1]According to sections 5.2 and 5.3 of RSS-Gen, Issue 5 the EUT does not have a stand-alone receiver neither scanner receiver, therefore exempt from receiver requirements.

5.7 ISED RSS-247, Issue 3, test results

Table 5.7-1: ISED RSS-247 requirements results

Section	Test description	Verdict
6.1[1]	Types of Modulation	Pass
6.2.1.1	Power limits for 5150–5250 MHz band	Pass
6.2.2.1	Power limits for 5250–5350 MHz band	Pass
6.2.1.2	Unwanted emission limits for 5150–5250 MHz band	Pass
6.2.2.2	Unwanted emission limits for 5250–5350 MHz band	Pass
6.3	Dynamic Frequency Selection (DFS) for devices operating in the bands 5250–5350 MHz, 5470–5600 MHz and 5650–5725 MHz	Not tested[2]

Notes: [1] The EUT employs digital modulations, such as: 802.11a, 802.11n HT20 and 802.11n HT40
[2]The tests have already been completed successfully. For additional information, kindly refer to the documents provided in the following link. https://fcc.report/FCC-ID/VPYLBEE5HY1MW

Section 6 Test equipment

6.1 Test equipment list

Table 6.1-1: Equipment list

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
3 m EMI test chamber (Emissions)	TDK	SAC-3	FA002532e	1 year	April 1, 2024
Flush mount turntable	Sunol	FM2022	FA002550	—	NCR
Antenna mast	Sunol	TLT2	FA002552	—	NCR
Power Meter	HIOKI	PW3337	FA002727	—	NCR
DC Power Supply	Sorensen	SGA80X125C-AAA	FA002738	—	NCR
Receiver/spectrum analyzer	Rohde & Schwarz	ESU 26	FA002043	1 year	November 28, 2024
Bilog antenna (20–2000 MHz)	Sunol	JB1	FA002517	1 year	March 30, 2024
Horn antenna (1–18 GHz)	EMCO	3115	FA001451	1 year	April 10, 2024
Horn antenna (18–40 GHz)	EMCO	3116	FA002487	1 year	April 13, 2024
Pre-amplifier (18–40 GHz)	Com-Power	PAM-840	FA002508	—	NCR
Signal and Spectrum Analyzer	Rhode&Schwarz	FSW50	FA003267	1 year	December 8, 2024

Notes: NCR - no calibration required

Table 6.1-2: Automation software details

Test description	Manufacturer of Software	Details
Unwanted emissions	Rohde & Schwarz	EMC32, Software for EMC Measurements, Version 10.60.20
Conducted emissions as of January 29, 2021	Rohde & Schwarz	EMC32, Software for EMC Measurements, Version 10.60.20

Section 7 Testing data

7.1 Variation of power source

7.1.1 References, definitions and limits

FCC §15.31 (e):

For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

7.1.2 Test summary

Verdict	Pass				
Test date	April 25, 2023	Test engineer	Hossein Zamani		
Temperature	24 °C	Relative humidity	23 %	Air pressure	1012 mbar

7.1.3 Observations, settings and special notes

The testing was performed as per ANSI C63.10 Section 5.13.

a) Where the device is intended to be powered from an external power adapter, the voltage variations shall be applied to the input of the adapter provided with the device at the time of sale. If the device is not marketed or sold with a specific adapter, then a typical power adapter shall be used.
b) For devices, where operating at a supply voltage deviating ±15% from the nominal rated value may cause damages or loss of intended function, test to minimum and maximum allowable voltage per manufacturer's specification and document in the report.
c) For devices with wide range of rated supply voltage, test at 15% below the lowest and 15% above the highest declared nominal rated supply voltage.
d) For devices obtaining power from an input/output (I/O) port (USB, firewire, etc.), a test jig is necessary to apply voltage variation to the device from a support power supply, while maintaining the functionalities of the device.

For battery-operated equipment, the equipment tests shall be performed using a variable power supply.

7.1.4 Test data

EUT Power requirements:	☐ AC	☒ DC	☐ Battery
If EUT is an AC or a DC powered, was the noticeable output power variation observed?	☐ YES	☒ NO	☐ N/A
If EUT is battery operated, was the testing performed using fresh batteries?	☐ YES	☐ NO	☒ N/A
If EUT is rechargeable battery operated, was the testing performed using fully charged batteries?	☐ YES	☐ NO	☒ N/A

7.2 Antenna requirement

7.2.1 References, definitions and limits

FCC §15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

RSS-Gen, Clause 6.8:

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report.

7.2.2 Test summary

Verdict	Pass				
Test date	April 25, 2023	Test engineer	Hossein Zamani		
Temperature	24 °C	Relative humidity	23 %	Air pressure	1012 mbar

7.2.3 Observations, settings and special notes

None

7.2.4 Test data

Must the EUT be professionally installed?	☒ YES	☐ NO	
Does the EUT have detachable antenna(s)?	☒ YES	☐ NO	
If detachable, is the antenna connector(s) non-standard?	☐ YES	☒ NO	☐ N/A

Table 7.2-1: Antenna information

Antenna type	Manufacturer	Model number	Maximum gain	Connector type
FPC antenna	Pulse LARSEN Antenna	W3918XXXX	4 dBi @ 5 GHz bands	U.FL

7.3 AC power line conducted emissions limits

7.3.1 References, definitions and limits

FCC §15.407(b):

(8) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in § 15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in § 15.207.

FCC §15.207:

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 µH/50 Ω line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

ANSI C63.10, Clause 6.2:

If the EUT normally receives power from another device that in turn connects to the public utility ac power lines, measurements shall be made on that device with the EUT in operation to demonstrate that the device continues to comply with the appropriate limits while providing the EUT with power. If the EUT is operated only from internal or dedicated batteries, with no provisions for connection to the public utility ac power lines (600 VAC or less) to operate the EUT (such as an adapter), then ac power-line conducted measurements are not required.

For direct current (dc) powered devices where the ac power adapter is not supplied with the device, an “off-the-shelf” unmodified ac power adapter shall be used. If the device is supposed to be installed in a host (e.g., the device is a module or PC card), then it is tested in a typical compliant host.

RSS-Gen, Clause 8.8:

A radio apparatus that is designed to be connected to the public utility (AC) power line shall ensure that the radio frequency voltage, which is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz, shall not exceed the limits in table below.

Unless the requirements applicable to a given device state otherwise, for any radio apparatus equipped to operate from the public utility AC power supply either directly or indirectly (such as with a battery charger), the radio frequency voltage of emissions conducted back onto the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown in table below. The more stringent limit applies at the frequency range boundaries.

Table 7.3-1: Conducted emissions limit

	Conducted emissions limit, dBµV	
Frequency of emission, MHz	**Quasi-peak**	**Average****
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50

Notes: * - The level decreases linearly with the logarithm of the frequency.
** - A linear average detector is required.

7.3.2 Test summary

Verdict	Pass				
Test date	May 5, 2023	Test engineer	Hossein Zamani		
Temperature	23 °C	Relative humidity	23 %	Air pressure	1008 mbar

7.3.3 Observations, settings and special notes

Port under test – Coupling device	AC main port – Artificial Mains Network (AMN)
EUT power input during test	12 V_{DC} (via external 100–240 V_{AC}, 50/60 Hz power adapter)
EUT setup configuration	Table top
Measurement details	A preview measurement was generated with the receiver in continuous scan mode. Emissions detected within 10 dB or above the limit were re-measured with the appropriate detector against the correlating limit and recorded as the final measurement.
Additional notes:	– The EUT was set up as tabletop configuration per ANSI C63.10-2013 measurement procedure. – The spectral scan has been corrected with transducer factors (i.e. cable loss, LISN factors, and attenuators) for determination of compliance. Correction factor (dB) = LISN factor IL (dB) + cable loss (dB) + attenuator (dB) – Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.

Conducted AC line emissions test was performed as per ANSI C63.10, Clause 6.2. Spectrum analyser settings:

Resolution bandwidth	9 kHz
Video bandwidth	30 kHz
Detector mode	Peak and Average (Preview), Quasi-peak and CAverage (Final)
Trace mode	Max Hold
Measurement time	100 ms (Preview), 160 ms (Final)

Table 7.3-2: Measurement uncertainty calculations based on equipment list

Measurement	U_{cispr} **dB**	U_{lab} **dB**
Conducted disturbance at AC mains and other port power using a V-AMN (9 kHz to 150 kHz)	3.8	2.8
Conducted disturbance at AC mains and other port power using a V-AMN (150 kHz to 30 MHz)	3.4	2.2

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

Compliance assessment:

If U_{lab} is less than or equal to U_{cispr} then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit

If U_{lab} is greater than U_{cispr} then:

- compliance is deemed to occur if no measured disturbance level, increased by (U_{lab} - U_{cispr}), exceeds the disturbance limit
- non-compliance is deemed to occur if any measured disturbance level, increased by (U_{lab} - U_{cispr}), exceeds the disturbance limit

7.3.1 Test data

Table 7.3-3: Conducted emissions results on phase line

Frequency, MHz	Quasi-Peak result, dBµV	Quasi-Peak limit, dBµV	Quasi-Peak margin, dB	Correction factor, dB
21.9745	54.4	60	5.6	9.9
22.48075	54.3	60	5.7	9.9
22.73275	54.9	60	5.1	9.9
22.98475	54.5	60	5.5	9.8
23.23675	55.9	60	4.2	9.8
23.491	56.1	60	3.9	9.9
23.743	56.5	60	3.5	9.9
23.995	55.8	60	4.3	9.9
24.24925	56	60	4	9.9
24.50125	56.2	60	3.8	9.9
24.75325	56.6	60	3.4	9.9
25.00525	56.3	60	3.7	9.9
25.2595	55.8	60	4.2	9.9
25.5115	54.8	60	5.3	9.9
25.7635	54.7	60	5.3	9.9
26.0155	55	60	5	9.9
26.26975	53.6	60	6.4	9.9
26.52175	53.8	60	6.2	9.9
26.77375	52.9	60	7.1	9.9
27.028	52.2	60	7.8	9.9

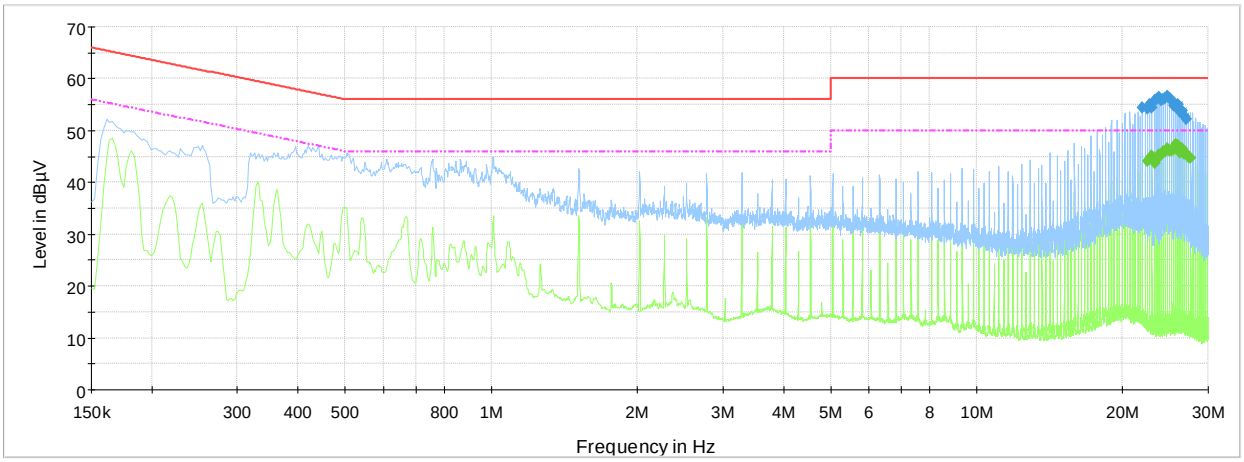
Frequency, MHz	CAverage result, dBµV	CAverage limit, dBµV	CAverage margin, dB	Correction factor, dB
22.48075	44.1	50	5.9	9.9
22.98475	45.2	50	4.8	9.8
23.239	43.7	50	6.3	9.8
23.491	44.4	50	5.6	9.9
23.743	45.3	50	4.8	9.9
23.995	45.3	50	4.8	9.9
24.24925	45.9	50	4.1	9.9
24.50125	45.9	50	4.1	9.9
24.75325	46.6	50	3.4	9.9
25.00525	46.1	50	3.9	9.9
25.2595	46.1	50	3.9	9.9
25.5115	46.4	50	3.6	9.9
25.7635	47.4	50	2.6	9.9
26.0155	47.2	50	2.8	9.9
26.26975	45.8	50	4.2	9.9
26.52175	46.4	50	3.6	9.9
26.77375	45.6	50	4.4	9.9
27.02575	45.6	50	4.4	9.9
27.28	44.9	50	5.1	9.9
27.532	44.7	50	5.3	9.9

Table 7.3-4: Conducted emissions results on neutral line

Frequency, MHz	Quasi-Peak result, dBµV	Quasi-Peak limit, dBµV	Quasi-Peak margin, dB	Correction factor, dB
0.42225	45.1	57.4	12.3	9.9
0.43575	41.9	57.1	15.3	9.9
21.4705	49.2	60	10.8	9.9
21.7225	47.7	60	12.3	9.9
21.9745	50.3	60	9.7	10
22.48075	49.8	60	10.2	10
22.73275	49.5	60	10.5	10
22.98475	49	60	11	9.9
23.23675	48.8	60	11.2	9.9
23.491	49.4	60	10.7	9.9
23.743	49.6	60	10.4	9.9
23.995	49.3	60	10.7	9.9
24.247	49.4	60	10.6	9.9
24.50125	49.1	60	10.9	9.9
24.75325	49.6	60	10.4	9.9
25.00525	48.8	60	11.2	9.9
25.2595	49.9	60	10.1	9.9
25.5115	48.8	60	11.2	9.9
25.7635	49.3	60	10.7	9.9
26.0155	50.1	60	9.9	9.9

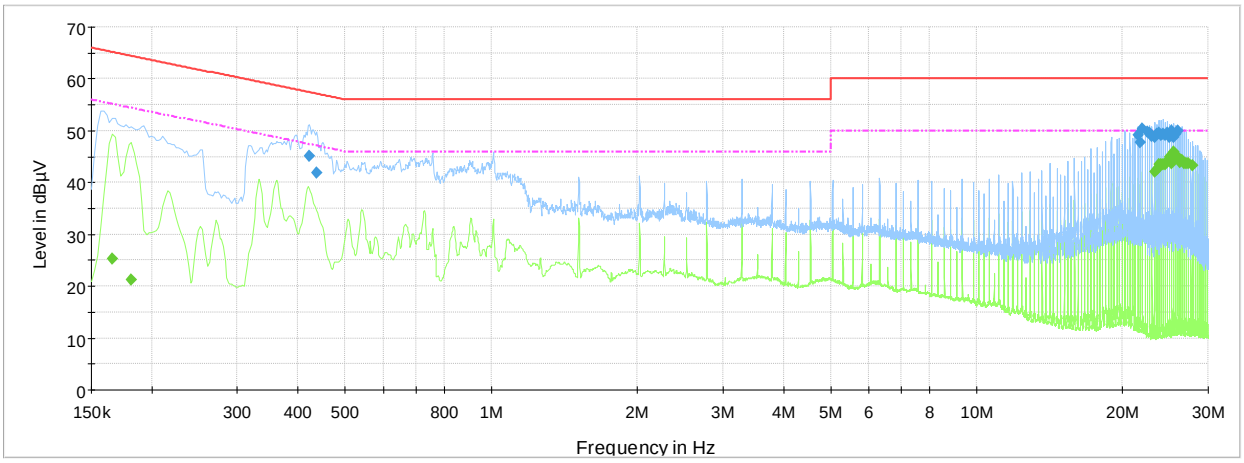
Frequency, MHz	CAverage result, dBµV	CAverage limit, dBµV	CAverage margin, dB	Correction factor, dB
0.165750	25.3	55.2	29.9	10.0
0.181500	21.2	54.4	33.2	10.0
23.236750	42.1	50.0	7.9	9.8
23.491000	42.6	50.0	7.4	9.8
23.743000	43.5	50.0	6.6	9.8
23.995000	43.4	50.0	6.6	9.8
24.247000	43.4	50.0	6.6	9.8
24.501250	43.6	50.0	6.4	9.8
24.753250	44.1	50.0	5.9	9.8
25.005250	45.0	50.0	5.0	9.8
25.257250	43.8	50.0	6.2	9.8
25.511500	45.9	50.0	4.2	9.8
25.763500	45.0	50.0	5.0	9.8
26.015500	45.0	50.0	5.0	9.8
26.267500	44.0	50.0	6.0	9.8
26.521750	44.4	50.0	5.6	9.8
26.773750	43.7	50.0	6.3	9.8
27.025750	43.7	50.0	6.3	9.8
27.280000	43.7	50.0	6.3	9.8
27.784000	43.4	50.0	6.6	9.8

Test data, continued



CE 150 kHz to 30 MHz phase Wi-Fi 5 GHz
Preview Result 2-AVG
Preview Result 1-PK+
CISPR 32 Limit - Class B, Mains (QP)
CISPR 32 Limit - Class B, Mains (Avg)
Final_Result QPK
Final_Result CAV

Plot 7.3-1: Conducted emissions on phase line



CE 150 kHz to 30 MHz neutral Wi-Fi 5 GHz
Preview Result 2-AVG
Preview Result 1-PK+
CISPR 32 Limit - Class B, Mains (QP)
CISPR 32 Limit - Class B, Mains (Avg)
Final_Result QPK
Final_Result CAV

Plot 7.3-2: Conducted emissions on neutral line

7.4 Transmitter output power and e.i.r.p. requirements

7.4.1 References, definitions and limits

FCC §15.407:

(a) Power limits:

(1) For the band 5.15–5.25 GHz.

(i) For an outdoor access point operating in the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For client devices in the 5.15–5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(2) For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(11) The maximum conducted output power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage.

(12) Power spectral density measurement. The maximum power spectral density is measured as either a conducted emission by direct connection of a calibrated test instrument to the equipment under test or a radiated measurement. Measurements are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth

RSS-247, Clause 6.2:

Power and unwanted emissions limits

The output power and e.i.r.p. of the equipment wanted emission shall be measured in terms of average value.

6.2.1 Frequency band 5150–5250 MHz

LE-LAN devices are restricted to indoor operation only in the band 5150–5250 MHz. However, original equipment manufacturer (OEM) devices, which are installed in vehicles by vehicles manufacturers, are permitted.

6.2.1.1 Power limits

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or 1.76 + 10 $\log_{10}$B, dBm, whichever is less. Devices shall implement transmitter power control (TPC) in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

For other devices, the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 $\log_{10}$B, dBm, whichever power is less. B is the 99% emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

6.2.2 Frequency band 5250–5350 MHz

For devices installed in vehicles, only OEM devices installed by vehicle manufacturers are permitted.

6.2.2.1 Power limits

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or 1.76 + 10 log10B, dBm, whichever is less. Devices shall implement TPC in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

Devices, other than devices installed in vehicles, shall comply with the following:

a. The maximum conducted output power shall not exceed 250 mW or 11 + 10 $\log_{10}$B, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band;

b. The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 $\log_{10}$B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

6.2.2.3 Additional requirements

In addition to the above requirements, devices shall comply with the following, where applicable:

a. Outdoor fixed devices with a maximum e.i.r.p. greater than 200 mW shall comply with the following e.i.r.p. at different elevations, where θ is the angle above the local horizontal plane (of the Earth) as shown below:

i. –13 dBW/MHz for 0°≤ θ< 8°
ii. −13 − 0.716 (θ − 8) dBW/MHz for 8°≤ θ< 40°
iii. −35.9 − 1.22 (θ − 40) dBW/MHz for 40°≤ θ< 45°
iv. –42 dBW/MHz for θ> 45°

b. Devices, other than outdoor fixed devices, having an e.i.r.p. greater than 200 mW shall comply with either i) or ii) below:

i. devices shall comply with the e.i.r.p. elevation mask in 6.2.2.3(a); or

ii. devices shall implement a method to permanently reduce their e.i.r.p. via a firmware feature in the event that the Department requires it. The test report must demonstrate how the device's power table can be updated to meet this firmware requirement. The manufacturer shall provide this firmware to update all systems automatically in compliance with the directions received from the Department.

7.4.2 Test summary

Verdict	Pass				
Test date	May 2, 2023	Test engineer	Hossein Zamani		
Temperature	23 °C	Relative humidity	27 %	Air pressure	1007 mbar

7.4.3 Observations, settings and special notes

FCC Power Limit

FCC limit for 802.11n HT20 was calculated as follows: 23.97 dBm

The maximum power spectral density shall not exceed 11 dBm in any 1 MHz band

RSS-247 Power Limit

RSS-247 EIRP limit for 802.11n HT20 was calculated as follows: $10 + 10 \times \text{Log}_{10}(16.87) = 22.27\text{dBm} < 23\text{dBm}$

The maximum power spectral density shall not exceed 11 dBm in any 1 MHz band.

Power spectral density was tested per ANSI C63.10, Clause 12.5 and 789033 D02, Clause II(F).

Conducted output power was tested per ANSI C63.10, Clause 12.3 and 789033 D02, Clause II(E) using method SA-1 or SA-1 Alternative (averaging with the EUT transmitting at full power throughout each sweep).

Spectrum analyser settings:

Resolution bandwidth	1 MHz
Video bandwidth	3 MHz
Frequency span	Enough to encompass the entire 26 dB EBW or 99% OBW of the signal
Detector mode	RMS
Trace mode	Max Hold
Power aggregation	Over 26 dB EBW or 99% OBW

7.4.4 Test data

Table 7.4-1: Output power measurements calculations results for FCC – UNII 1 and UNII-2a

Modulation	Frequency, MHz	Conducted output power, dBm	limit, dBm	Margin, dB	Antenna gain, dBi	EIRP, dBm	EIRP limit, dBm	EIRP margin, dB
802.11a	5180	11.16	23.98	12.82	4.00	15.16	29.98	14.82
	5220	11.98	23.98	12.00	4.00	15.98	29.98	14.00
	5240	12.00	23.98	11.98	4.00	16.00	29.98	13.98
802.11n HT20	5260	10.78	23.26	13.20	4.00	14.78	29.26	15.20
	5300	11.78	23.26	12.20	4.00	15.78	29.26	14.20
	5320	11.65	23.26	12.33	4.00	15.65	29.26	14.33
802.11a	5180	12.06	23.98	11.20	4.00	16.06	29.98	13.20
	5220	11.21	23.98	12.05	4.00	15.21	29.98	14.05
	5240	11.34	23.98	11.92	4.00	15.34	29.98	13.92
802.11n HT20	5260	11.66	23.26	11.60	4.00	15.66	29.26	13.60
	5300	11.02	23.26	12.24	4.00	15.02	29.26	14.24
	5320	11.01	23.26	12.25	4.00	15.01	29.26	14.25

Table 7.4-2: Output power measurements and EIRP calculations results for ISED – UNII 1 and UNII-2a

Modulation	Frequency, MHz	Conducted output power, dBm	limit, dBm	Margin, dB	Antenna gain, dBi	EIRP, dBm	EIRP limit, dBm	EIRP margin, dB
802.11a	5180	11.16	22.27	11.11	4.00	15.16	28.27	13.11
	5220	11.98	22.27	10.29	4.00	15.98	28.27	12.29
	5240	12.00	22.27	10.27	4.00	16.00	28.27	12.27
802.11n HT20	5260	10.78	22.27	11.49	4.00	14.78	28.27	13.49
	5300	11.78	22.27	10.49	4.00	15.78	28.27	12.49
	5320	11.65	22.27	10.62	4.00	15.65	28.27	12.62
802.11a	5180	12.06	22.27	10.21	4.00	16.06	28.27	12.21
	5220	11.21	22.27	11.06	4.00	15.21	28.27	13.06
	5240	11.34	22.27	10.93	4.00	15.34	28.27	12.93
802.11n HT20	5260	11.66	22.27	10.61	4.00	15.66	28.27	12.61
	5300	11.02	22.27	11.25	4.00	15.02	28.27	13.25
	5320	11.01	22.27	11.26	4.00	15.01	28.27	13.26

7.5 Spurious unwanted (undesirable) emissions

7.5.1 References, definitions and limits

FCC §15.407:

(b) Undesirable emission limits.
Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(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.

(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.

(7) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

(8) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in § 15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in § 15.207.

(9) The provisions of § 15.205 apply to intentional radiators operating under this section.

(10) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency band edges as the design of the equipment permits.

RSS-247, Clause 6.2:

Power and unwanted emissions limits
The power and e.i.r.p. of the equipment unwanted emission shall be measured in peak value. However, the equipment is required to comply with the provisions in RSS-Gen with respect to emissions falling within restricted frequency bands which are listed in the same standard.
If the transmission is in bursts, the provisions of RSS-Gen for pulsed operation shall apply.
The outermost carrier frequencies or channels shall be used when measuring unwanted emissions. Such carrier or channel centre frequencies are to be indicated in the test report.

6.2.1 Frequency band 5150–5250 MHz
LE-LAN devices are restricted to indoor operation only in the band 5150–5250 MHz. However, original equipment manufacturer (OEM) devices, which are installed in vehicles by vehicles manufacturers, are permitted.

6.2.1.2 Unwanted emission limits
For transmitters with operating frequencies in the band 5150–5250 MHz, all emissions outside the band 5150–5350 MHz shall not exceed −27 dBm/MHz e.i.r.p. Any unwanted emissions that fall into the band 5250–5350 MHz shall be attenuated below the channel power by at least 26 dB, when measured using a resolution bandwidth between 1 and 5% of the occupied bandwidth (i.e. 99% bandwidth), above 5250 MHz. The 26 dB bandwidth may fall into the 5250–5350 MHz band; however, if the occupied bandwidth also falls within the 5250–5350 MHz band, the transmission is considered as intentional and the devices shall comply with all requirements in the band 5250–5350 MHz including implementing dynamic frequency selection (DFS) and TPC, on the portion of the emission that resides in the 5250–5350 MHz band.

6.2.2 Frequency band 5250–5350 MHz
For devices installed in vehicles, only OEM devices installed by vehicle manufacturers are permitted.

6.2.2.2 Unwanted emission limits
Devices shall comply with the following:

a. All emissions outside the band 5250–5350 MHz shall not exceed -27 dBm/MHz e.i.r.p.; or

b. All emissions outside the band 5150–5350 MHz shall not exceed -27 dBm/MHz e.i.r.p. and its power shall comply with the spectral power density for operation within the band 5150–5250 MHz. The device, except devices installed in vehicles, shall be labelled or include in the user manual the following text “for indoor use only.”

References, definitions and limits, continued

Table 7.5-1: FCC §15.209 and RSS-Gen – Radiated emission limits

	Field strength of emissions		
Frequency, MHz	**µV/m**	**dBµV/m**	**Measurement distance, m**
0.009–0.490	2400/F	$67.6 - 20 \times \log_{10}(F)$	300
0.490–1.705	24000/F	$87.6 - 20 \times \log_{10}(F)$	30
1.705–30.0	30	29.5	30
30–88	100	40.0	3
88–216	150	43.5	3
216–960	200	46.0	3
above 960	500	54.0	3

Notes: In the emission table above, the tighter limit applies at the band edges.
For frequencies above 1 GHz the limit on peak RF emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test.

Table 7.5-2: ISED restricted frequency bands

MHz	**MHz**	**MHz**	**GHz**
0.090–0.110	12.57675–12.57725	399.9–410	7.25–7.75
0.495–0.505	13.36–13.41	608–614	8.025–8.5
2.1735–2.1905	16.42–16.423	960–1427	9.0–9.2
3.020–3.026	16.69475–16.69525	1435–1626.5	9.3–9.5
4.125–4.128	16.80425–16.80475	1645.5–1646.5	10.6–12.7
4.17725–4.17775	25.5–25.67	1660–1710	13.25–13.4
4.20725–4.20775	37.5–38.25	1718.8–1722.2	14.47–14.5
5.677–5.683	73–74.6	2200–2300	15.35–16.2
6.215–6.218	74.8–75.2	2310–2390	17.7–21.4
6.26775–6.26825	108–138	2483.5–2500	22.01–23.12
6.31175–6.31225	149.9–150.05	2655–2900	23.6–24.0
8.291–8.294	156.52475–156.52525	3260–3267	31.2–31.8
8.362–8.366	156.7–156.9	3332–3339	36.43–36.5
8.37625–8.38675	162.0125–167.17	3345.8–3358	Above 38.6
8.41425–8.41475	167.72–173.2	3500–4400	
12.29–12.293	240–285	4500–5150	
12.51975–12.52025	322–335.4	5350–5460	

Note: Certain frequency bands listed in Table 7.5-2 and above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.

Table 7.5-3: FCC restricted frequency bands

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2690–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	Above 38.6
13.36–13.41			

7.5.2 Test summary

Verdict	Pass				
Test date	May 6, 2023	Test engineer	Hossein Zamani		
Temperature	23 °C	Relative humidity	28 %	Air pressure	1011 mbar

7.5.3 Observations, settings and special notes

- As part of the current assessment, the test range of 9 kHz to 40 GHz has been fully considered and compared to the actual frequencies utilized within the EUT. Since the EUT contains a transmitter in the GHz range, the EUT has been deemed compliant without formal testing in the 9 kHz to 30 MHz test range, therefore formal test results (tabular data and/or plots) are not provided within this test report.
- Radiated measurements were performed at a distance of 3 m.
- The spurious emission was tested per ANSI C63.10, Clause 12.7 and 789033 D02, Clause II(G).

Spectrum Analyzer for peak radiated measurements within restricted bands below 1 GHz:

Resolution bandwidth:	100 kHz
Video bandwidth:	300 kHz
Detector mode:	Peak
Trace mode:	Max Hold

Spectrum analyzer for peak radiated measurements within restricted bands above 1 GHz:

Resolution bandwidth:	1 MHz
Video bandwidth:	3 MHz
Detector mode:	Peak
Trace mode:	Max Hold

Table 7.5-4: Measurement uncertainty calculations based on equipment list

Measurement	U_{cispr} dB	U_{lab} dB
Radiated disturbance (30 MHz to 1 GHz)	6.3	5.8
Radiated disturbance (1 GHz to 6 GHz)	5.2	4.7
Radiated disturbance (6 GHz to 18 GHz)	5.5	4.7

Notes: Nemko Canada Inc. has calculated measurement uncertainty and is documented in EMC/MUC/001 "Uncertainty in EMC measurements." Measurement uncertainty was calculated using the methods described in CISPR 16-4-2 Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-2: Uncertainties, statistics and limit modelling – Measurement instrumentation uncertainty. The expression of Uncertainty in EMC Testing. Measurement uncertainty calculations assume a coverage factor of K=2 with 95% certainty.

Compliance assessment:

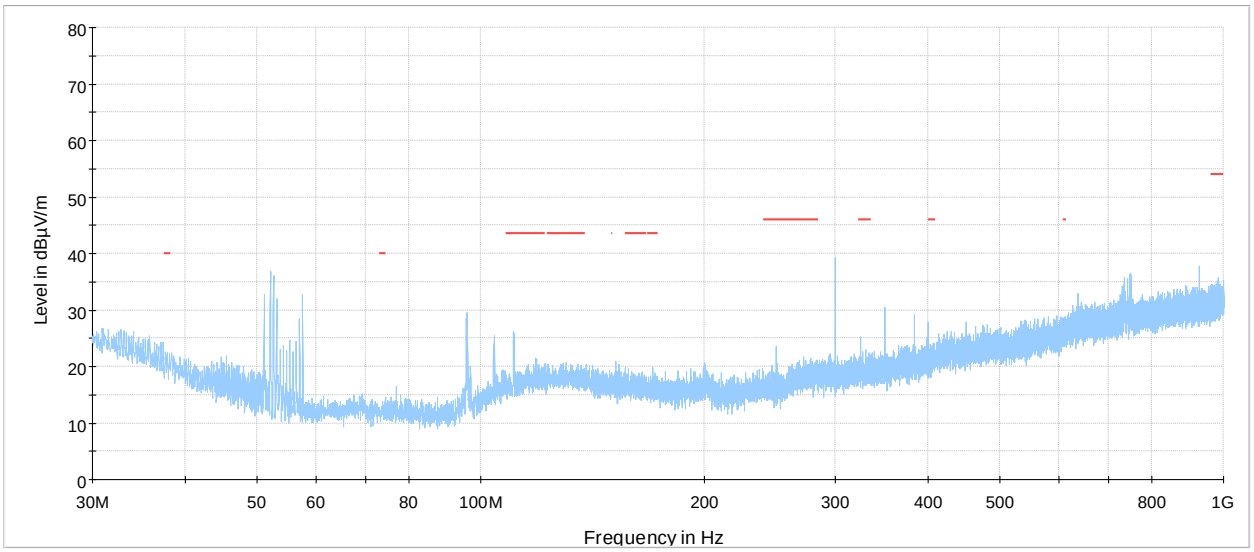
If U_{lab} is less than or equal to U_{cispr} then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit

If U_{lab} is greater than U_{cispr} then:

- compliance is deemed to occur if no measured disturbance level, increased by (U_{lab} - U_{cispr}), exceeds the disturbance limit
- non-compliance is deemed to occur if any measured disturbance level, increased by (U_{lab} - U_{cispr}), exceeds the disturbance limit

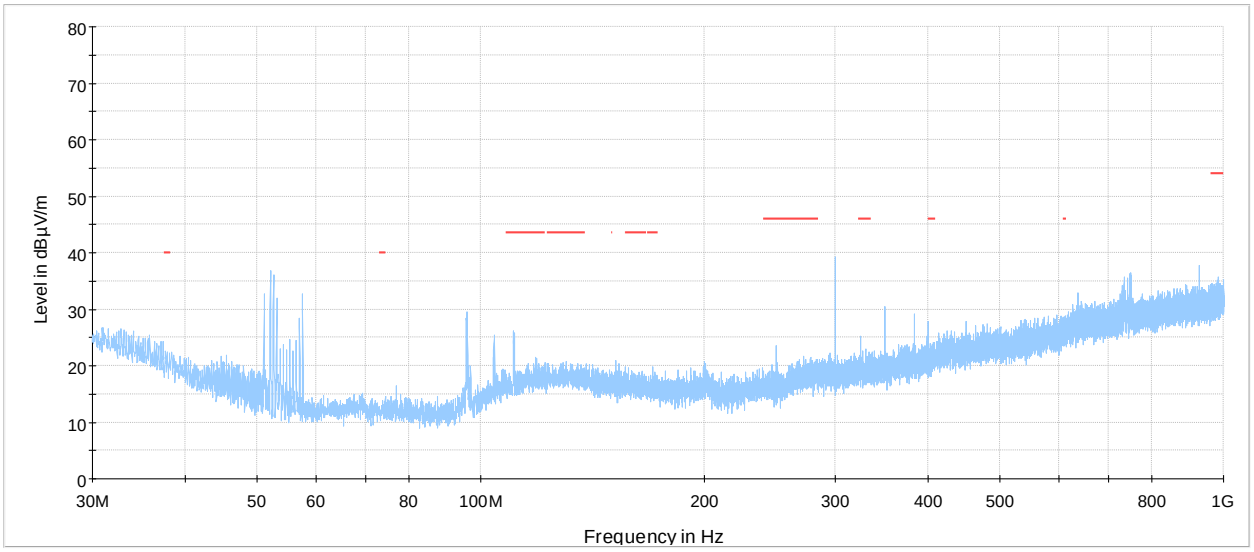
7.5.1 Test data



SPR 30 MHz to 1000 MHz Wi-Fi 5 GHz U-NII-1 low channel

Preview Result 1-PK+
FCC 15.209 and RSS-210 limit line RstrB

Figure 7.5-1: radiated spurious emissions from 30 MHz to 1000 MHz at low channel (UNII-1)

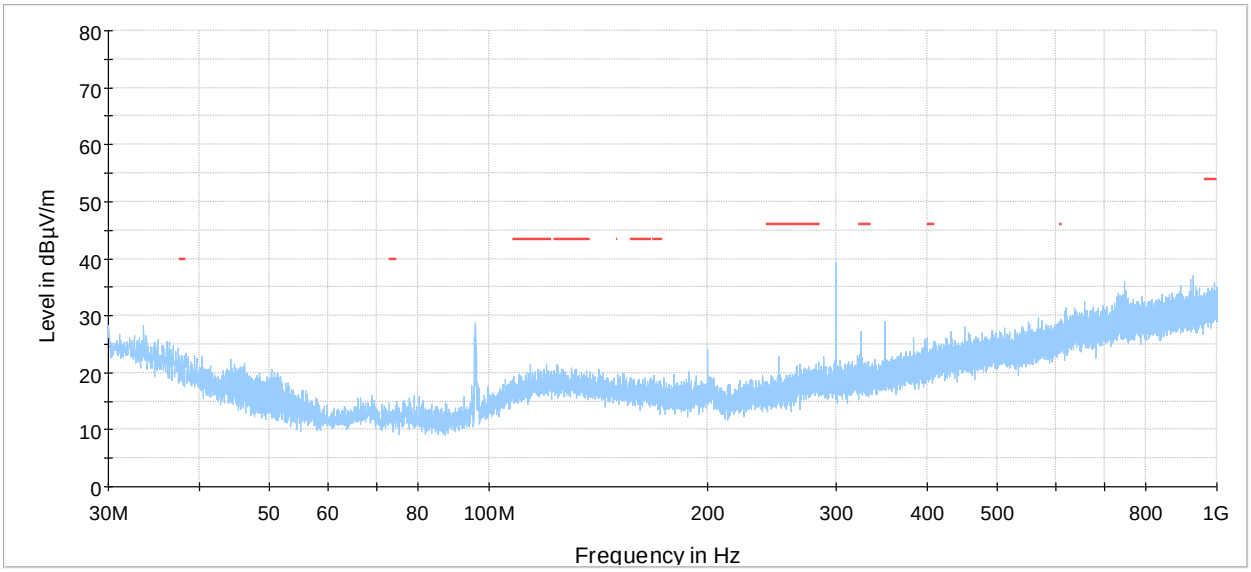


SPR 30 MHz to 1000 MHz Wi-Fi 5 GHz U-NII-1 low channel

Preview Result 1-PK+
FCC 15.209 and RSS-210 limit line RstrB

Figure 7.5-2: radiated spurious emissions from 30 MHz to 1000 MHz at low channel (UNII-1)

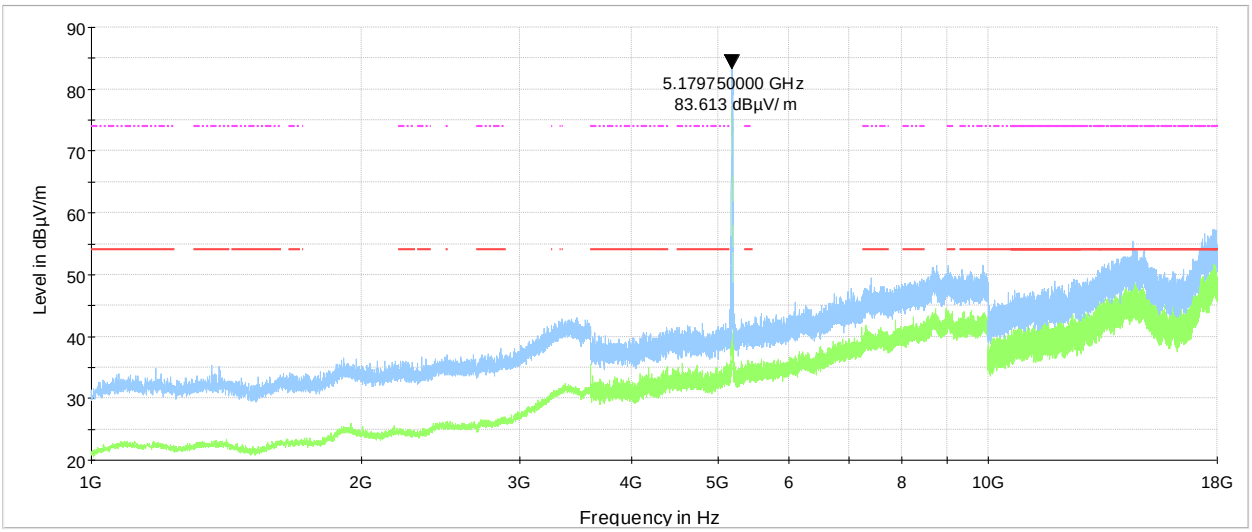
Test data, continued



SPR 30 MHz to 1000 MHz Wi-Fi 5 GHz U-NII-1 high channel

Preview Result 1-PK+
FCC 15.209 and RSS-210 limit line RstrB

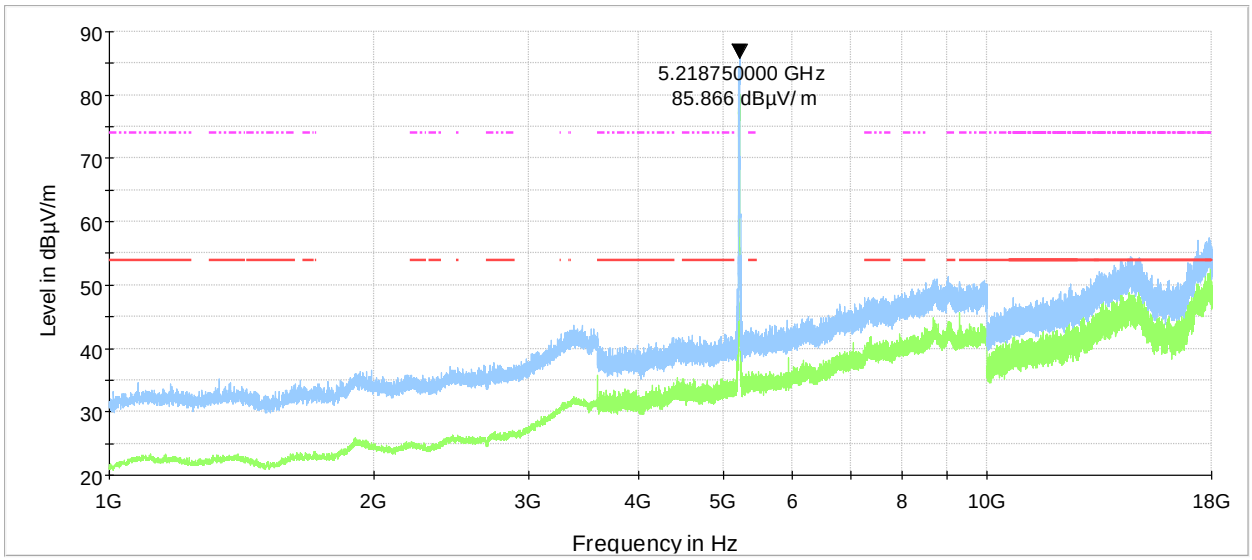
Figure 7.5-3: radiated spurious emissions from 30 MHz to 1000 MHz at high channel (UNII-1)



SPR 1 GHz to 18 GHz Wi-Fi 5 GHz U-NII-1 low channel

Preview Result 2-AVG
Preview Result 1-PK+
FCC 15.209 and RSS-210 limit line RstrB
FCC 15.209 and RSS-210 limit line RstrB pk

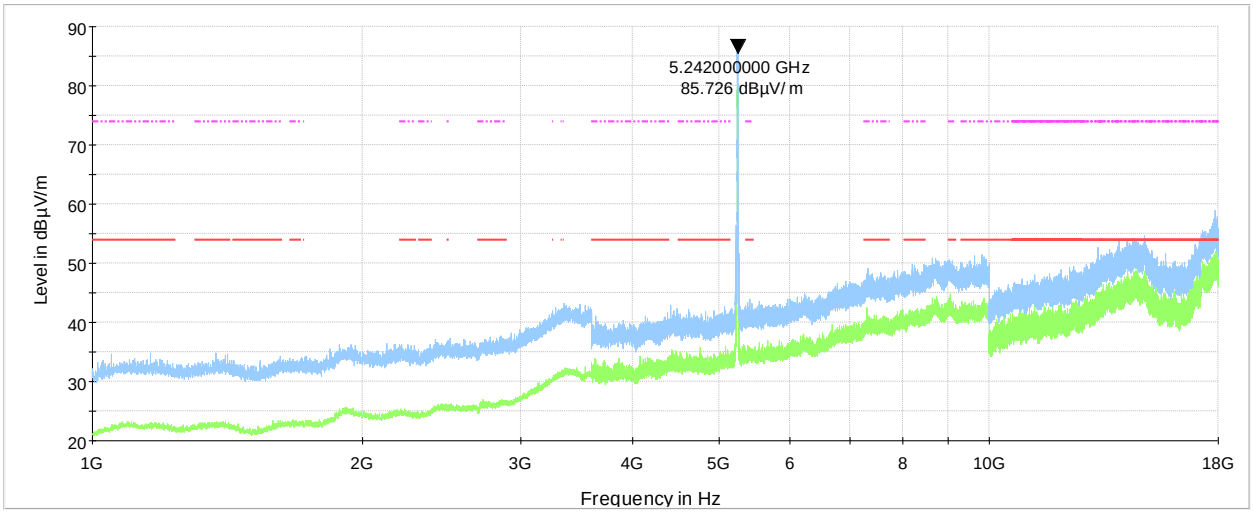
Figure 7.5-4: radiated spurious emissions from 1 GHz to 18 GHz at low channel (UNII-1)



SPR 1 GHz to 18 GHz Wi-Fi 5 GHz U-NII-1 mid channel

Preview Result 2-AVG
Preview Result 1-PK+
FCC 15.209 and RSS-210 limit line RstrB
FCC 15.209 and RSS-210 limit line RstrB pk

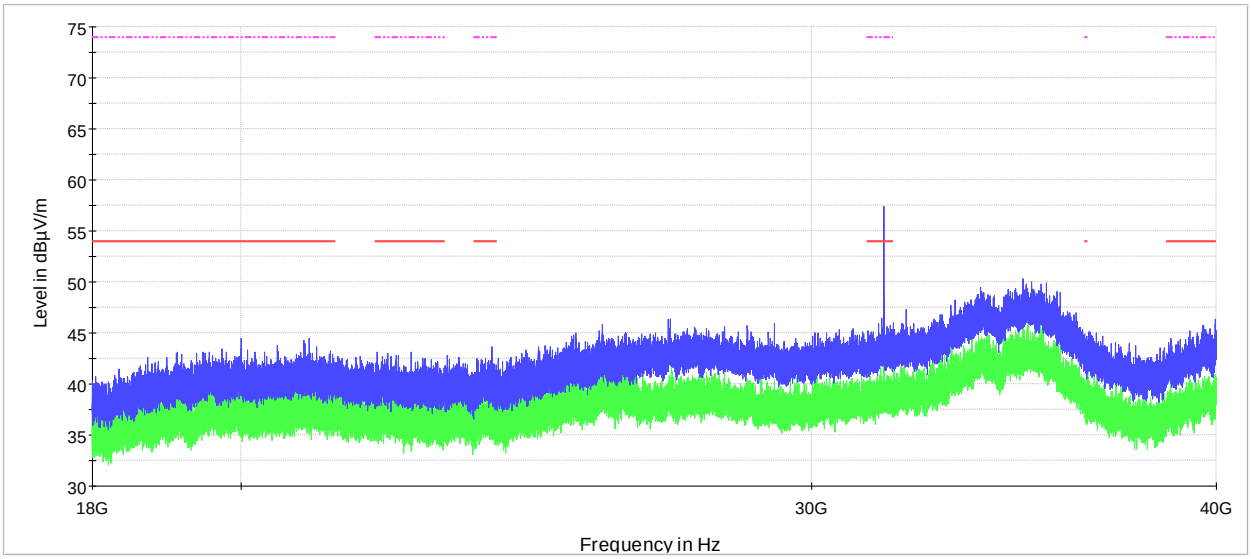
Figure 7.5-5: radiated spurious emissions from 1 GHz to 18 GHz at mid channel (UNII-1)



SPR 1 GHz to 18 GHz Wi-Fi 5 GHz U-NII-1 high channel

Preview Result 2-AVG
Preview Result 1-PK+
FCC 15.209 and RSS-210 limit line RstrB
FCC 15.209 and RSS-210 limit line RstrB pk

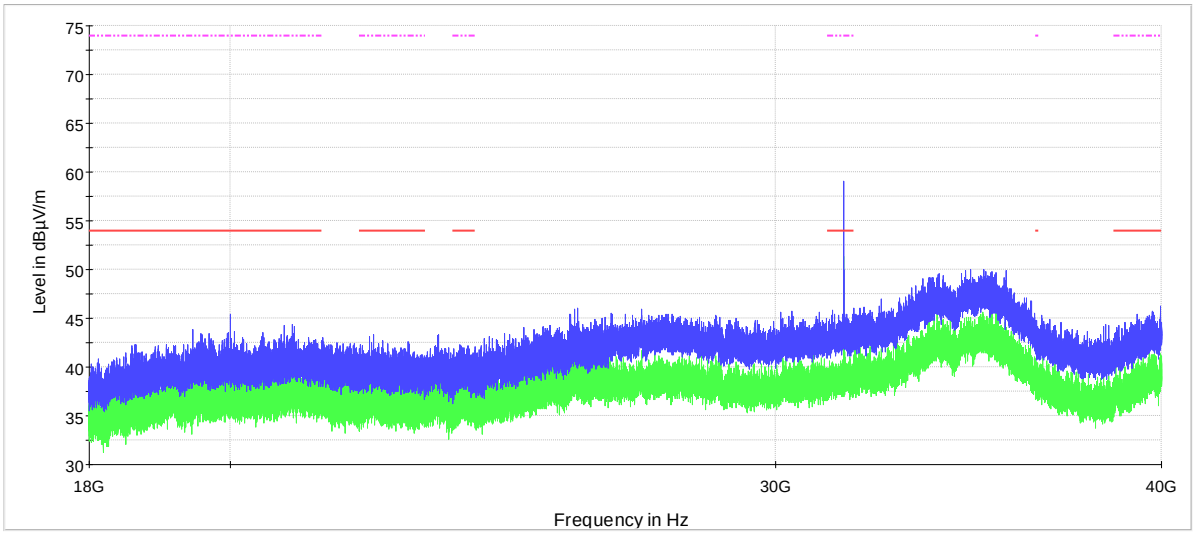
Figure 7.5-6: radiated spurious emissions from 1 GHz to 18 GHz at high channel (UNII-1)



SPR 18 GHz to 40 GHz Wi-Fi 5 GHz U-NII-1 low channel

AVG_MAXH
PK+_MAXH
FCC 15.209 and RSS-210 limit line RstrB
FCC 15.209 and RSS-210 limit line RstrB pk

Figure 7.5-7: radiated spurious emissions from 18 GHz to 40 GHz at low channel (UNII-1)



SPR 18 GHz to 40 GHz Wi-Fi 5 GHz U-NII-1 mid channel

AVG_MAXH
PK+_MAXH
FCC 15.209 and RSS-210 limit line RstrB
FCC 15.209 and RSS-210 limit line RstrB pk

Figure 7.5-8: radiated spurious emissions from 18 GHz to 40 GHz at mid channel (UNII-1)

Test data, continued

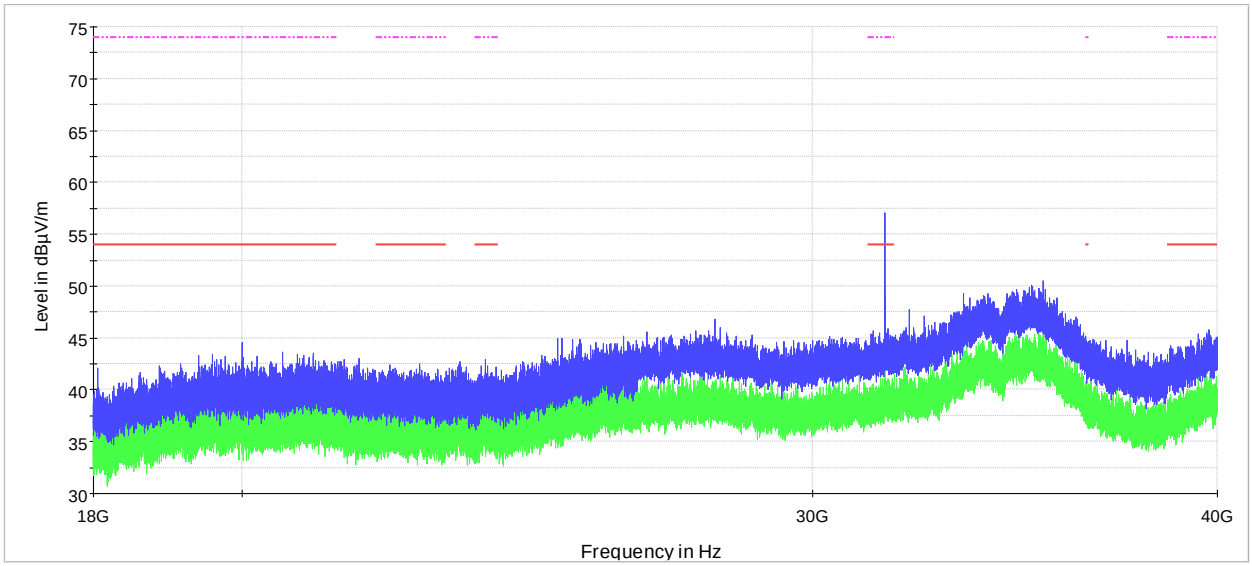


Figure 7.5-9: radiated spurious emissions from 18 GHz to 40 GHz at high channel (UNII-1)

Table 7.5-5: *Radiated field strength measurement results low channel (UNII-1)*

Frequency, MHz	Peak field strength, dBµV/m	Peak limit, dBµV/m	Margin, dB	Average field strength, dBµV/m	Average limit, dBµV/m	Margin, dB
31576.0000001	53.0	74	21	44.3	54	9.7
31576.0000001	57.4	74	16.6	49.0	54	5

Notes: **Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.**

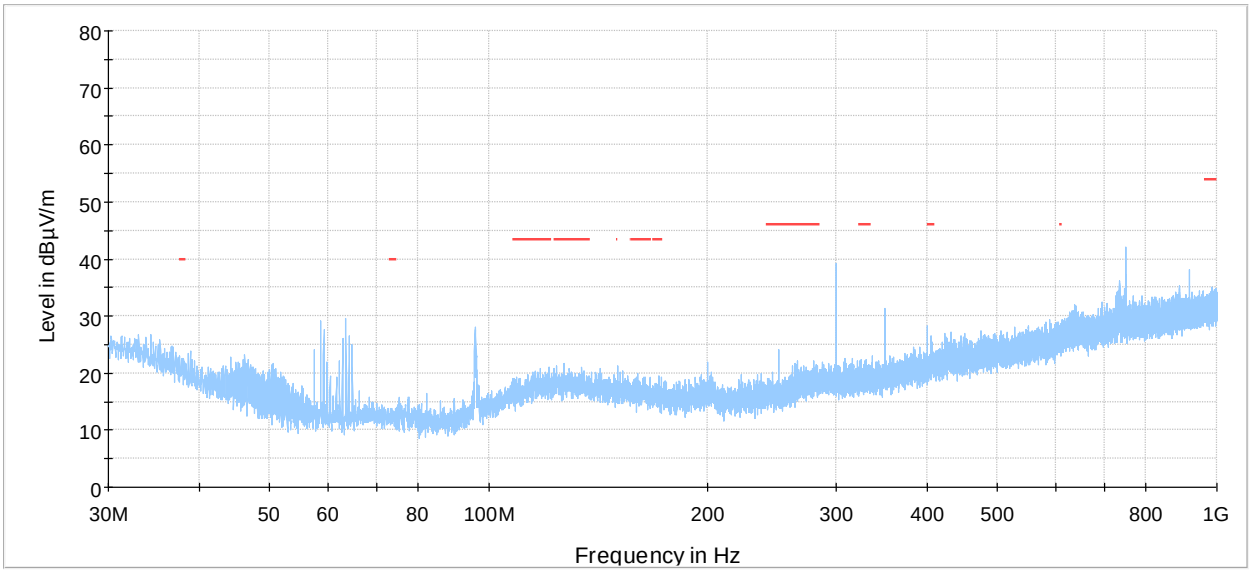
Table 7.5-6: *Radiated field strength measurement results mid channel (UNII-1)*

Frequency, MHz	Peak field strength, dBµV/m	Peak limit, dBµV/m	Margin, dB	Average field strength, dBµV/m	Average limit, dBµV/m	Margin, dB
31576.0000001	56.4	74	17.6	51.4	54	2.6
31576.0000001	59.1	74	14.9	50.4	54	3.6

Table 7.5-7: *Radiated field strength measurement results high channel (UNII-1)*

Frequency, MHz	Peak field strength, dBµV/m	Peak limit, dBµV/m	Margin, dB	Average field strength, dBµV/m	Average limit, dBµV/m	Margin, dB
31576.0000001	52.8	74	21.2	50.4	54	3.6
31576.0000001	57.1	74	16.9	49.5	54	4.5

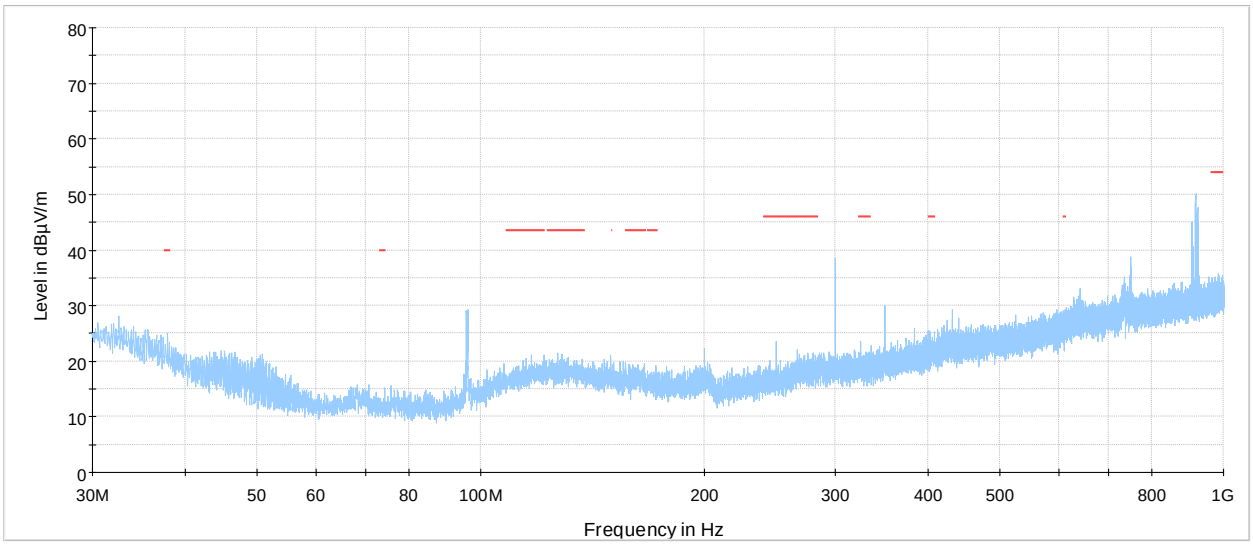
Test data, continued



SPR 30 MHz to 1000 MHz Wi-Fi 5 GHz U-NII-2A low channel

Preview Result 1-PK+
FCC 15.209 and RSS-210 limit line RstrB

Figure 7.5-10: *Radiated spurious emissions from 30 MHz to 1000 MHz at low channel (UNII-2a)*

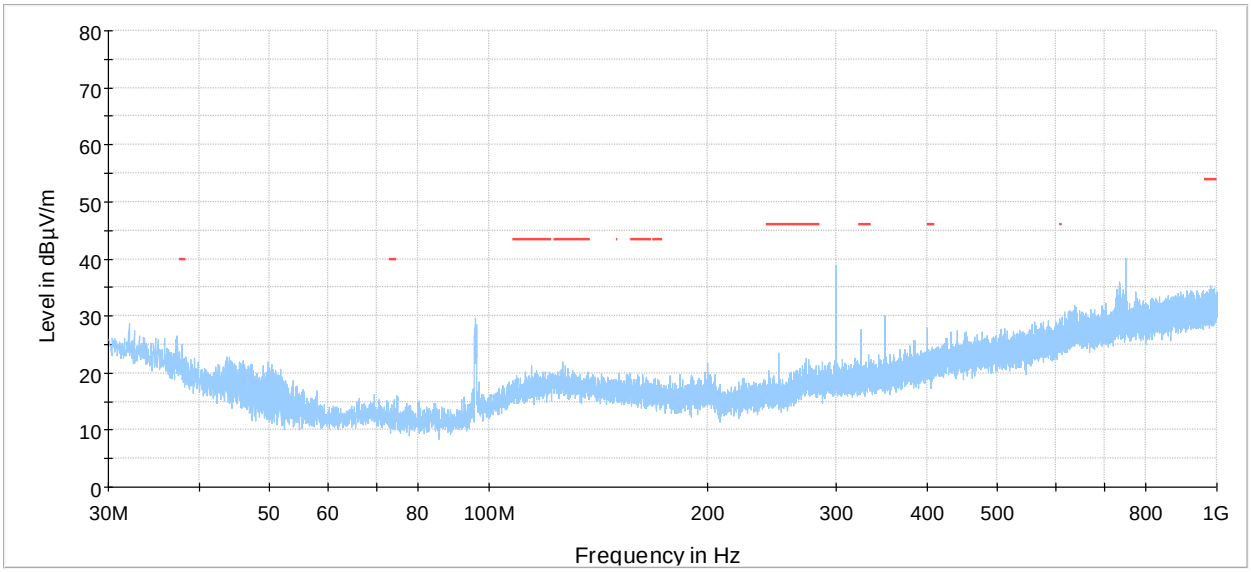


SPR 30 MHz to 1000 MHz Wi-Fi 5 GHz U-NII-2A mid channel

Preview Result 1-PK+
FCC 15.209 and RSS-210 limit line RstrB

Figure 7.5-11: *Radiated spurious emissions from 30 MHz to 1000 MHz at mid channel (UNII-2a)*

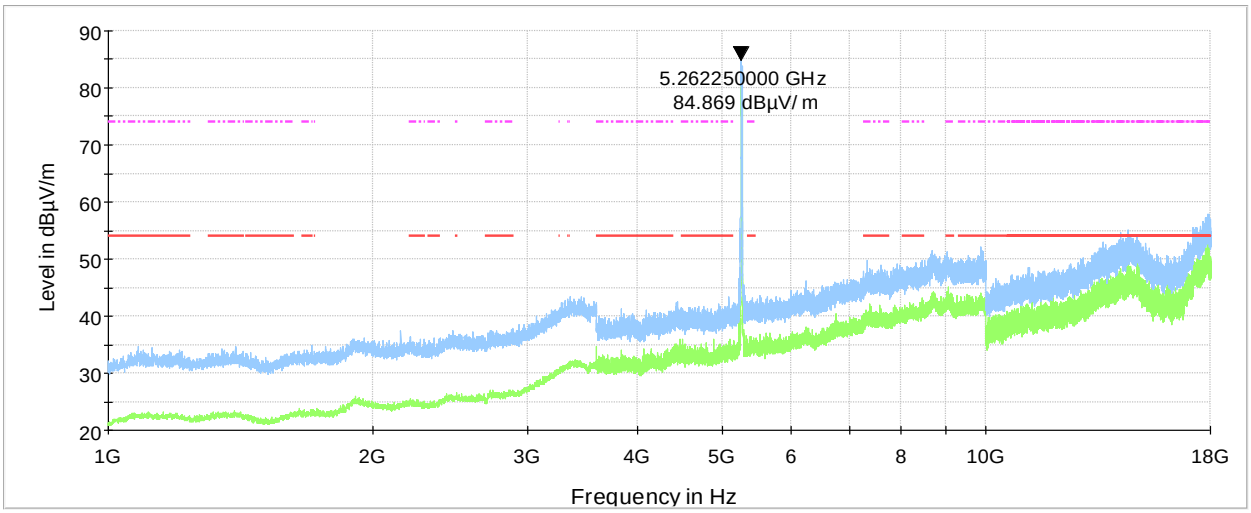
Test data, continued



SPR 30 MHz to 1000 MHz Wi-Fi 5 GHz U-NII-2A high channel

Preview Result 1-PK+
FCC 15.209 and RSS-210 limit line RstrB

Figure 7.5-12: *radiated spurious emissions from 30 MHz to 1000 MHz at high channel (UNII-2a)*



SPR 1 GHz to 18 GHz Wi-Fi 5 GHz U-NII-2A low channel

Preview Result 2-AVG
Preview Result 1-PK+
FCC 15.209 and RSS-210 limit line RstrB
FCC 15.209 and RSS-210 limit line RstrB pk

Figure 7.5-13: *radiated spurious emissions from 1 GHz to 18 GHz at low channel (UNII-2a)*

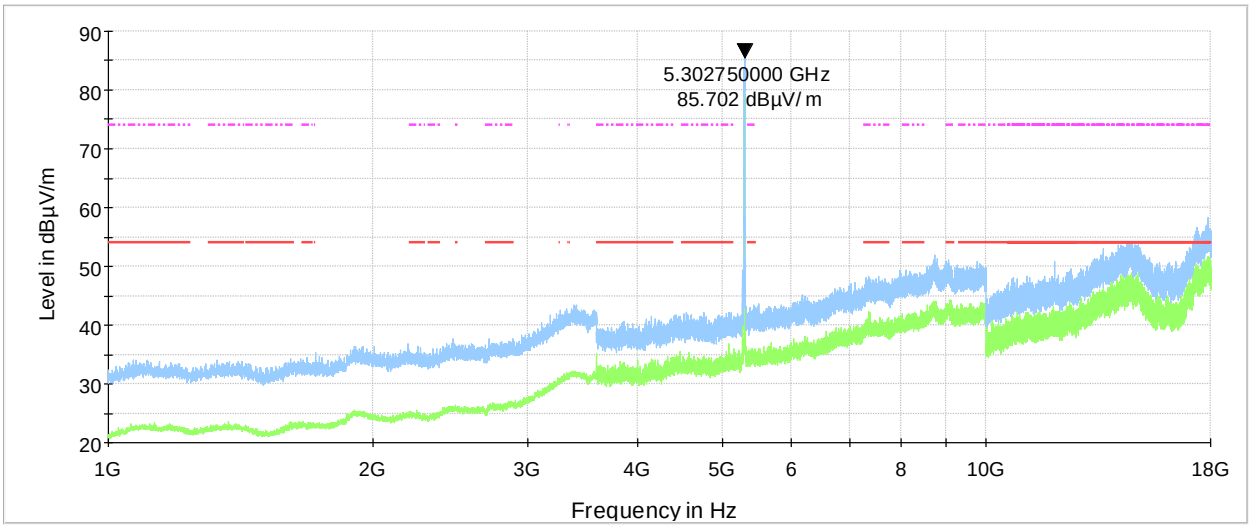


Figure 7.5-14: *radiated spurious emissions from 1 GHz to 18 GHz at mid channel (UNII-2a)*

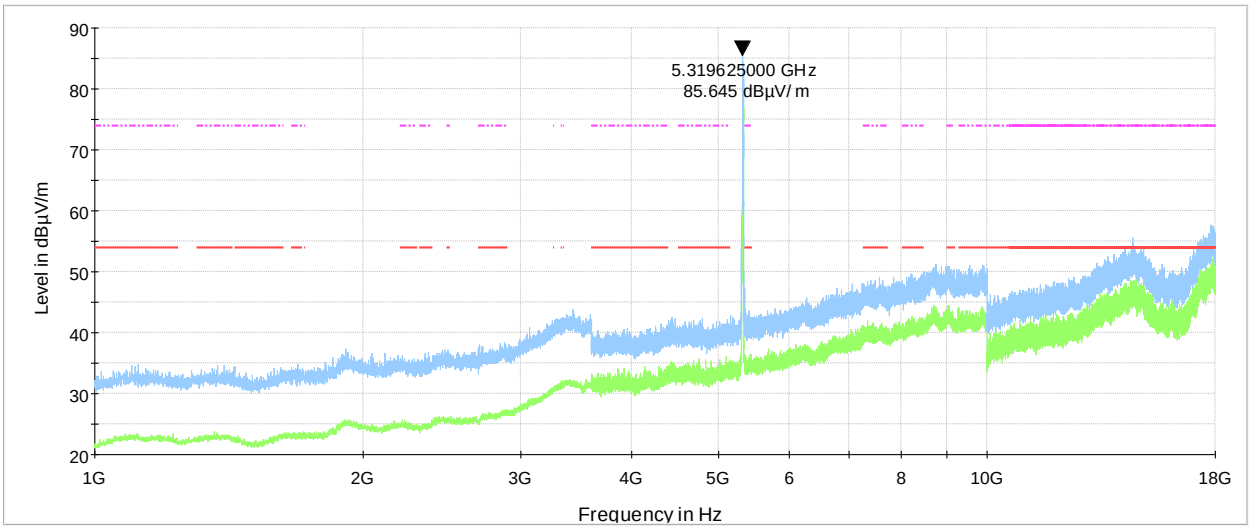


Figure 7.5-15: *radiated spurious emissions from 1 GHz to 18 GHz at high channel (UNII-2a)*

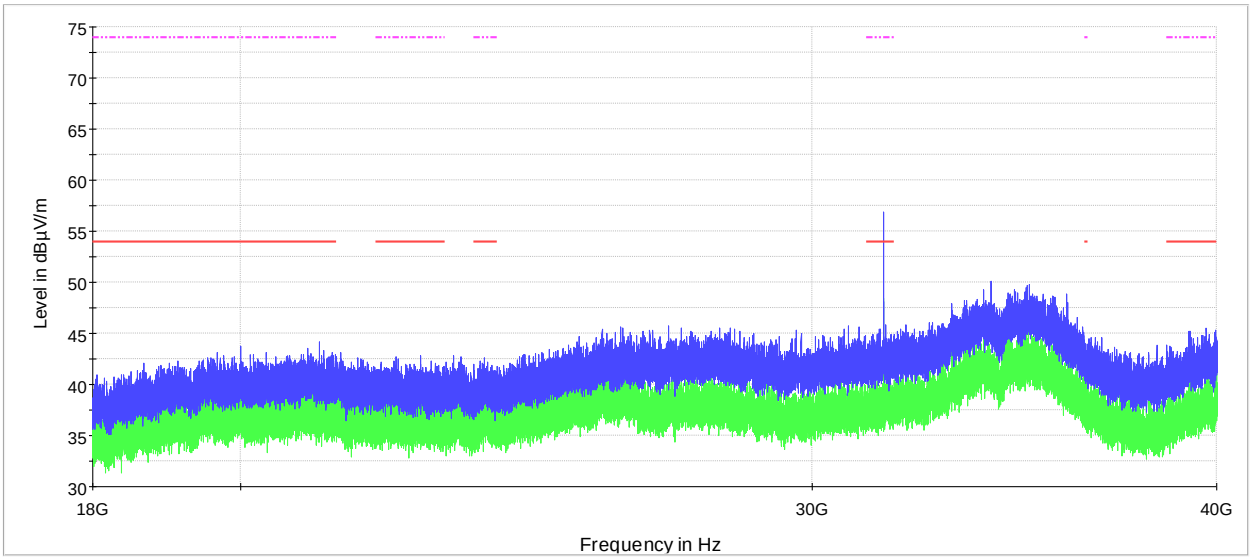


Figure 7.5-16: *radiated spurious emissions from 18 GHz to 40 GHz at low channel (UNII-2a)*

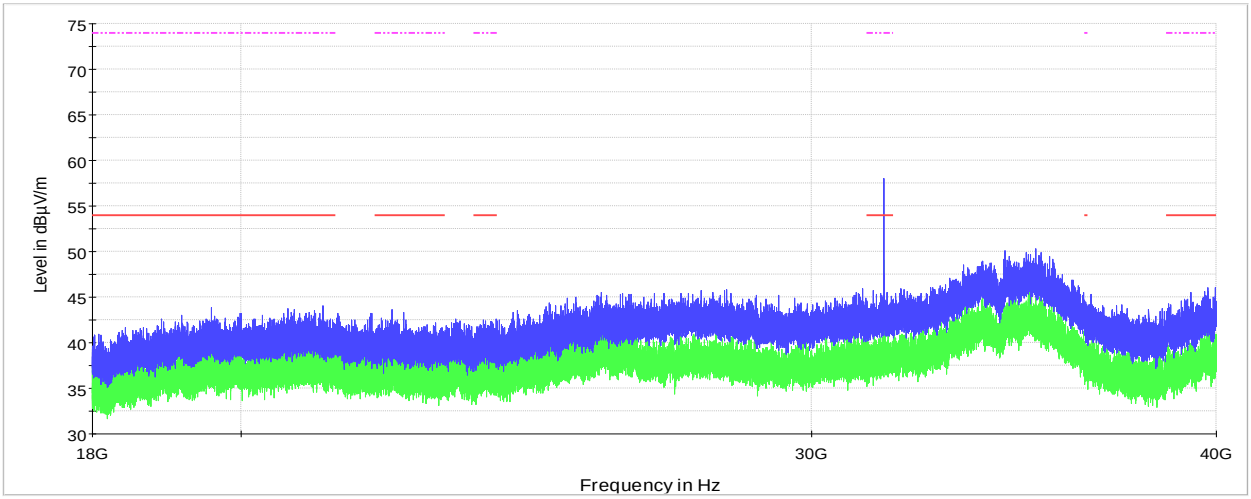


Figure 7.5-17: *radiated spurious emissions from 18 GHz to 40 GHz at mid channel (UNII-2a)*

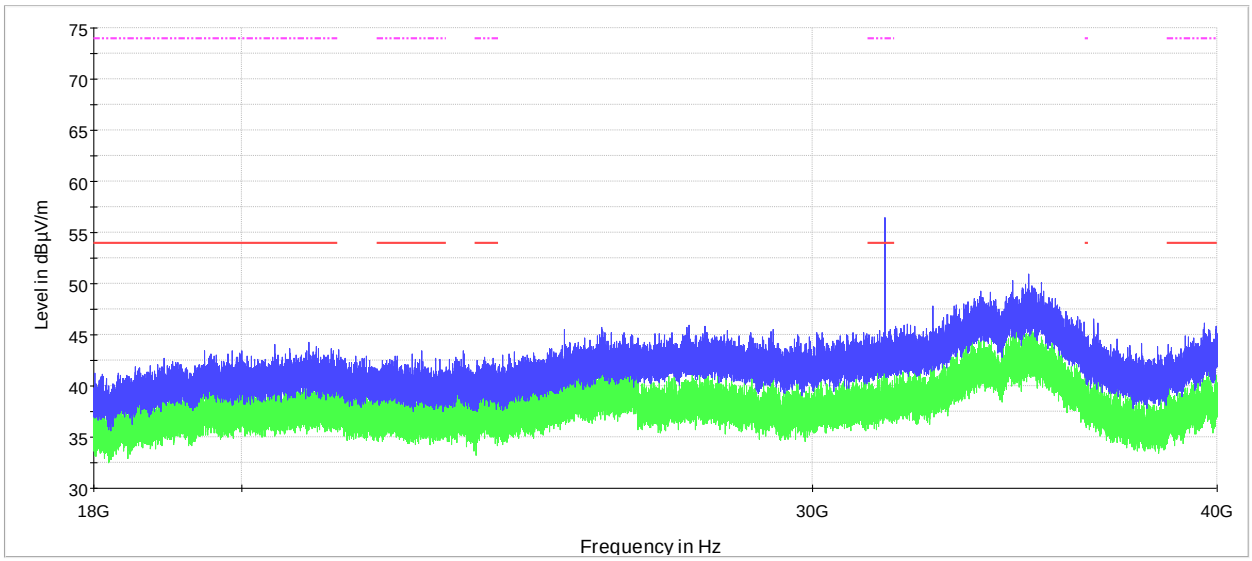
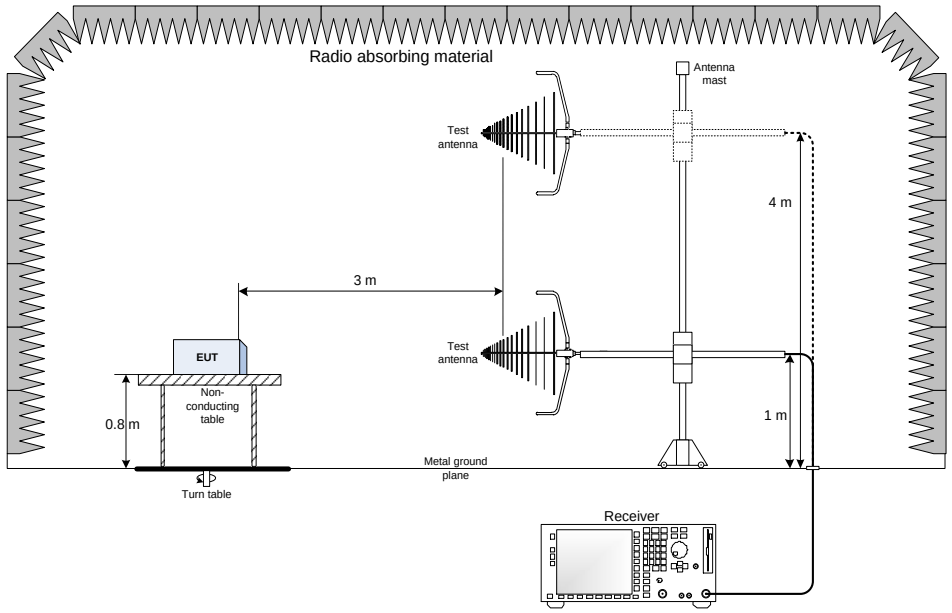


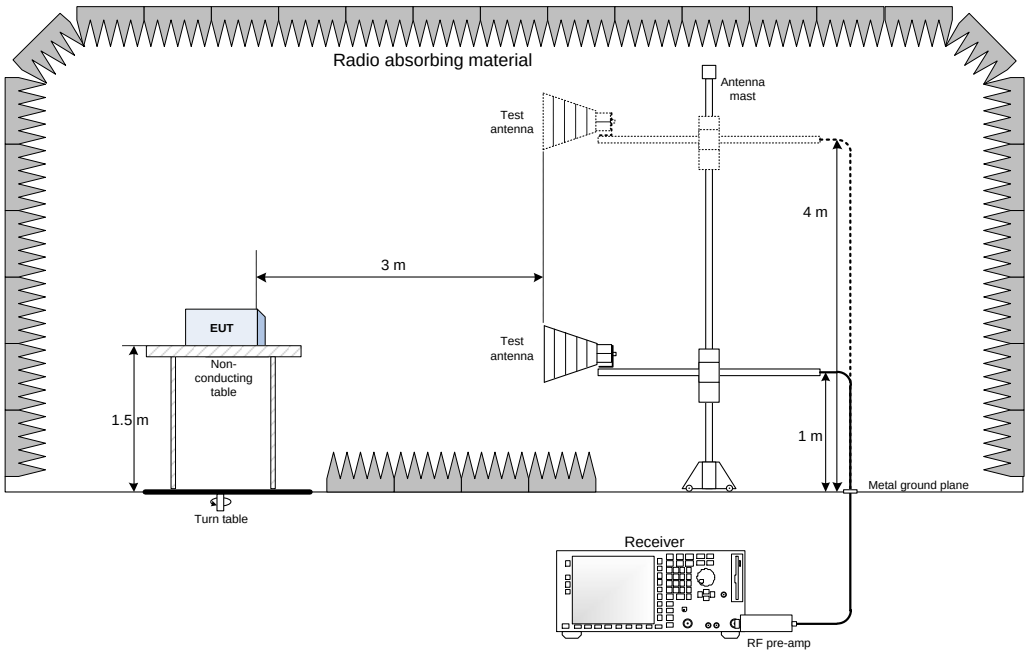
Figure 7.5-18: *radiated spurious emissions from 18 GHz to 40 GHz at high channel (UNII-2a)*

Section 8 Setup diagrams

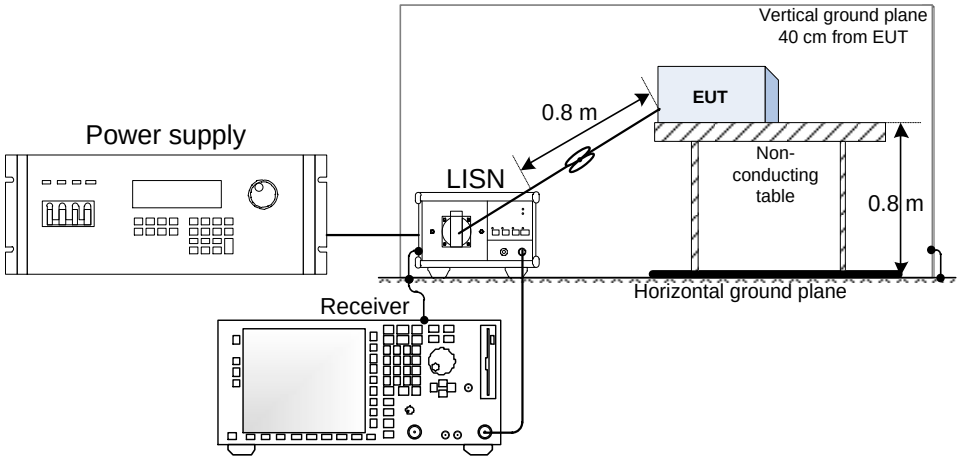
8.1 Radiated emissions set-up for frequencies below 1 GHz



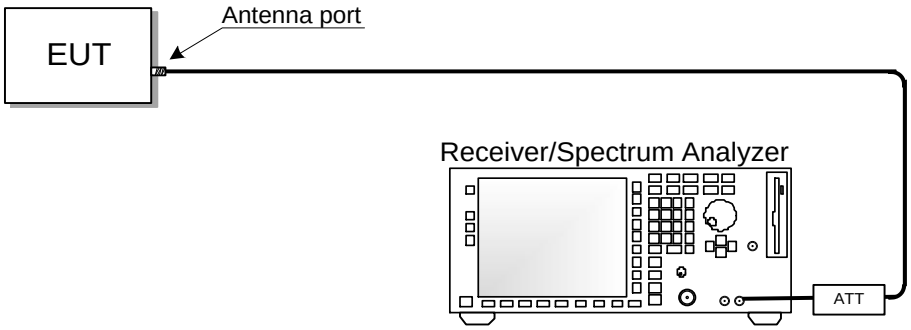
8.2 Radiated emissions set-up for frequencies above 1 GHz



8.3 AC mains conducted emissions set-up



8.4 Antenna port set-up



End of the test report