RF Test Report

Applicant	:	Corsair Memory, Inc.
Product Name	:	Dongle
Trade Name	:	Corsair
Model Number	:	RDA0050
Applicable Standard	:	Canada RSS-247 Issue 3 Canada RSS-Gen Issue 5 (Amendment 2) ANSI C63.10:2013
Received Date	:	Nov. 24, 2023
Test Period	:	Feb. 02, 2024 ~ Jun. 05, 2024
Issued Date	:	Jun. 12, 2024

Issued by

Eurofins E&E Wireless Taiwan Co., Ltd.
No. 140-1, Changan Street, Bade District,
Taoyuan City 334025, Taiwan (R.O.C.)
Tel：+886-3-2710188 / Fax：+886-3-2710190

Testing Laboratory
1330

Taiwan Accreditation Foundation accreditation number: 1330
Frequency Range : 9 kHz to 40 GHz
Test Firm Registration Number: 7381A (Bade test site)
Test Firm Registration Number: 28922 (Wugu test site)

Note:

1. The test results are valid only for samples provided by customers and under the test conditions described in this report.
2. This report shall not be reproduced except in full, without the written approval of Eurofins E&E Wireless Taiwan Co., Ltd.
3. The relevant information is provided by customers in this test report. According to the correctness, appropriateness or completeness of the information provided by the customer, if there is any doubt or error in the information which affects the validity of the test results, the laboratory does not take the responsibility.

Revision History

Rev.	Issued Date	Description	Revised By
00	May 30, 2024	Initial Issue	Snow Wang
01	Jun. 12, 2024	Update chapter 3.4 (P.12) Update Appendix A. Test Data Update Appendix B. Test Plots	Snow Wang

Verification of Compliance

Applicant	:	Corsair Memory, Inc.
Product Name	:	Dongle
Trade Name	:	Corsair
Model Number	:	RDA0050
IC	:	10954A-RDA0050
Applicable Standard	:	Canada RSS-247 Issue 3 Canada RSS-Gen Issue 5 (Amendment 2) ANSI C63.10:2013
Test Result	:	Complied
Performing Lab.	:	Eurofins E&E Wireless Taiwan Co., Ltd. No. 140-1, Changan Street, Bade District, Taoyuan City 334025, Taiwan (R.O.C.) Tel：+886-3-2710188 / Fax：+886-3-2710190 Taiwan Accreditation Foundation accreditation number: 1330

Eurofins E&E Wireless Taiwan Co., Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by Eurofins E&E Wireless Taiwan Co., Ltd. based on interpretations and/or observations of test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Approved By : Kai Yu Yang

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1 General Information

1.1. Summary of Test Result

Standard RSS-GEN	Item	Result	Remark
6.7	99 % Occupied Bandwidth	Reference	-----
8.8	AC Power Line Conducted Emissions	PASS	-----
8.9	Transmitter Unwanted Emissions	PASS	-----
6.8	Antenna Requirement	PASS	-----
Standard RSS-247	Item	Result	Remark
5.1 (2), 5.4 (2), 5.4 (6) (ii)	Transmitter Output Power and E.I.R.P.	PASS	-----
5.1 (1)	20 dB Emission Bandwidth	PASS	-----
5.1 (2)	Hopping Channel Carrier Frequencies Separated	PASS	-----
5.1 (4)	Number of Hopping Channels	PASS	-----
5.1 (4)	Average Time of Occupancy (Dwell Time)	PASS	-----
5.5	Out of Band Conducted Spurious Emission	PASS	-----
5.5	Band Edge Measurement	PASS	-----

Decision Rule

■ Uncertainty is not included.

□ Uncertainty is included.

1.2. Testing Location

Lab Name: Eurofins E&E Wireless Taiwan Co., Ltd.

Site Address: ■ No. 140-1, Changan Street, Bade District, Taoyuan City 334025, Taiwan (R.O.C.)

Site Address: □ No. 2, Wuquan 5th Rd. Wugu Dist., New Taipei City, Taiwan (R.O.C.)

1.3. Measurement Uncertainty

Test Item	Frequency	Uncertainty	
		BD	WG
Conducted Emission	150 kHz ~ 30 MHz	2.7 dB	2.6 dB
Conducted Output Power		1.1 dB	1.1 dB
RF Bandwidth		4.5 %	4.5 %
Power Spectral Density		1.1 dB	1.1 dB

Test Item	Frequency	Uncertainty			
		96601-BD	96603-BD	96602-WG	96603-WG
Radiated Emission	9 kHz ~ 30 MHz	1.9 dB	1.9 dB	1.6 dB	1.6 dB
	30 MHz ~ 1000 MHz	4.9 dB	4.9 dB	4.8 dB	4.8 dB
	1000 MHz ~ 18000 MHz	4.9 dB	5.0 dB	5.0 dB	5.2 dB
	18000 MHz ~ 26500 MHz	4.3 dB	4.4 dB	4.4 dB	4.5 dB
	26500 MHz ~ 40000 MHz	4.5 dB	4.5 dB	4.6 dB	4.5 dB

1.4. Test Site Environment

Items	Required (IEC 60068-1)	Interval(*)
Temperature (°C)	15-35	20-30
Humidity (%RH)	25-75	45-75

(*)The measurement ambient temperature is within this range.

2 EUT Description

The product specifications of the EUT presented in the report are declared by the manufacturer who shall take full responsibility for the authenticity(except Max. RF Output Power / E.I.R.P. / 99 % Occupied Bandwidth / Emission Designator).

Applicant	Corsair Memory, Inc. 115 North McCarthy Blvd, Milpitas, CA 95035, USA	
Product Name	Dongle	
Trade Name	Corsair	
Model Number	RDA0050	
Difference description of model number	1. There are two variants, One is for XBox and the other is for PC/PS. The only difference between both is on IC identifying for XBox, which has no impact on the RF feature,and other design and layout are the same. 2. Product has two enclosure design. The difference is the size of the LED light translucent area for Logo. No change in the design of the LED, and the circuit of the product.	
IC	10954A-RDA0050	
Hardware Version	R2	
Software Version / Firmware Version	Pre-RC 8	
Frequency Range	2402 ~ 2480 MHz for SRD 1M 2404 ~ 2478 MHz for SRD 2M	
Modulation Type	GFSK	
Antenna information	Type	Max. Gain (dBi)
	Chip Antenna	-0.9
Operate Temp. Range	0 ~ +40 ℃	
EUT Power Rating	5 Vdc from host equipment	

Frequency Band	Max. RF Output Power (W)	E.I.R.P. (W)	99 % Occupied Bandwidth (MHz)	Emission Designator
SRD 1M	0.01130	0.00918	1.046 MHz	1M05F1D
SRD 2M	0.01127	0.00916	2.072 MHz	2M07F1D

CH	Freq. (MHz)	CH	Freq. (MHz)	CH	Freq. (MHz)
0	2402	14	2430	28	2458
1	2404	15	2432	29	2460
2	2406	16	2434	30	2462
3	2408	17	2436	31	2464
4	2410	18	2438	32	2466
5	2412	19	2440	33	2468
6	2414	20	2442	34	2470
7	2416	21	2444	35	2472
8	2418	22	2446	36	2474
19	2420	23	2448	37	2476
10	2422	24	2450	38	2478
11	2424	25	2452	39	2480
12	2426	26	2454	---	---
13	2428	27	2456	---	---

3 Test Methodology

3.1. Mode of Operation

Decision of Test Eurofins has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Pre-Test Mode	Final-Test Mode
Transmit Mode	V
SRD 1M	V
SRD 2M	V

By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that “Y axis” position was the worst, then the final test was executed the worst condition and test data were recorded in this report.

Preliminary tests were performed in different modulation to find the worst case. The modulation has shown the worst-case in section 4.1. Investigation has been done on all the possible configurations for searching the worst cases.

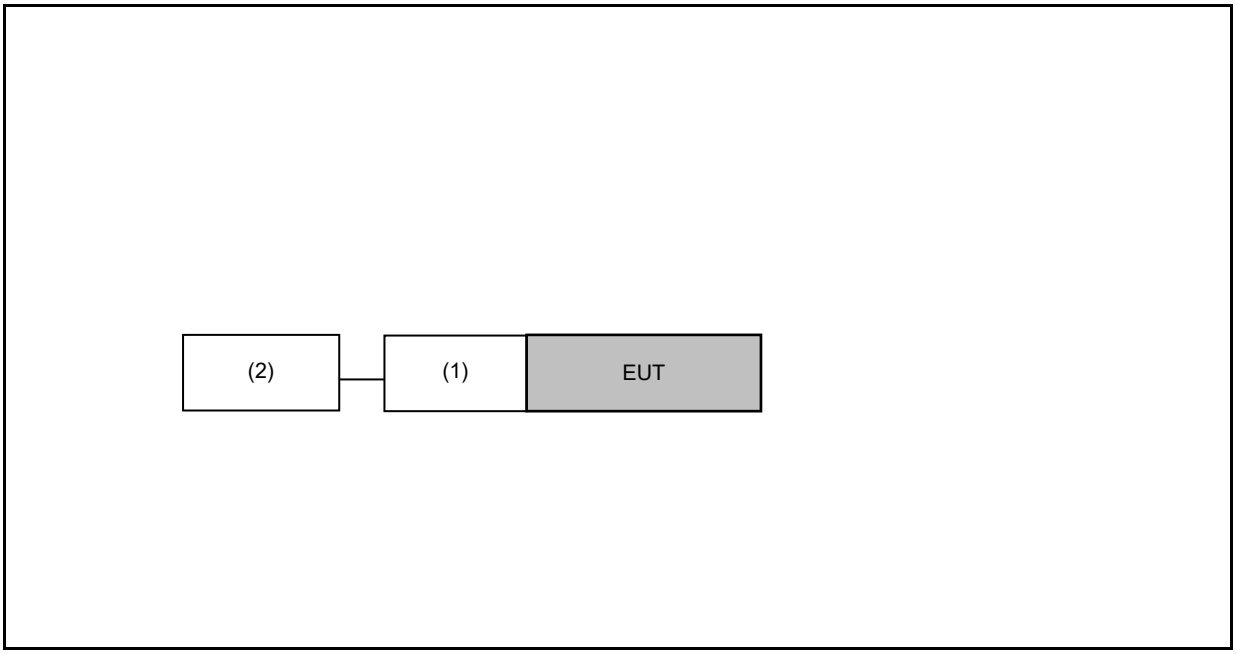
Note: The EUT was programmed to be in continuously transmitting mode.

3.2. EUT Test Step

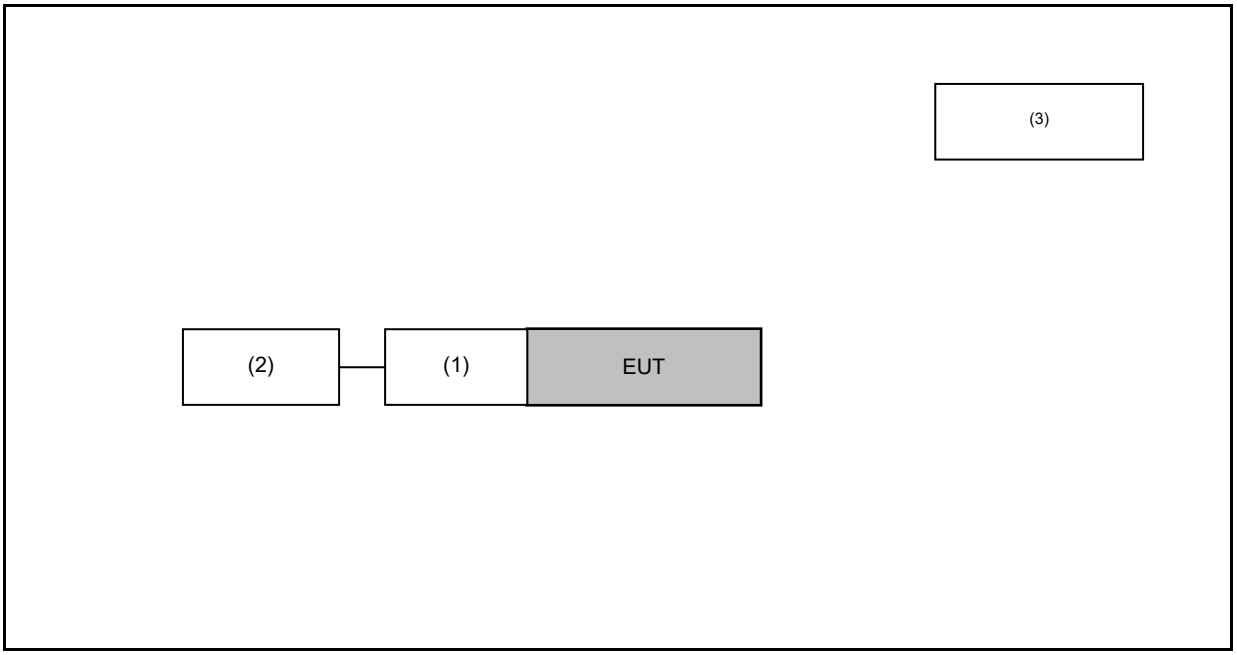
1	Setup the EUT shown on “Configuration of Test System Details”.
2	Turn on the power of all equipment.
3	Turn on TX function.
4	EUT run test program.

3.3. Configuration of Test System Details

Radiated Emissions



Conduction Emission



Product		Manufacturer	Model Number	Serial Number	Power Cord
(1)	Notebook	acer	N19C1	---	---
(2)	AC Adapter	chiicony	A18-045N2A	---	---
(3)	Wireless Headset	Corsair	RDA0049	---	---

3.4. Test Instruments

For Conducted Emission
Test Period: Feb. 06, 2024
Testing Engineer: Jayson Hsieh

Test Site		Conduction01-BD				
Use	Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
☒	Test Receiver	R&S	ESCI	100367	May 22, 2023	1 year
☐	Test Receiver	R&S	ESCI	100722	Oct. 26, 2023	1 year
☐	Test Receiver	R&S	ESCI	101000	Nov. 23, 2023	1 year
☒	LISN	R&S	ENV216	101040	Mar. 21, 2023	1 year
☐	LISN	R&S	ENV216	101140	Jan. 15, 2024	1 year
☒	RF Cable	Woken	00100D1380194M	TE-02-03	Jun. 01, 2023	1 year
☒	Software	EZ EMC	1.1.4.3	N/A	N.C.R.	---

☒ means with testing used ;
☐ means without testing used
Note: N.C.R. = No Calibration Request.

For Conducted
Test Period: Feb. 02, 2024 ~ Jun. 05, 2024
Testing Engineer: Andy Lu, Brian Lin

Test Site		RF01-BD				
Use	Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
☒	Power Sensor	Anritsu	MA2411B	1126022	Aug. 31, 2023	1 year
☒	Power Meter	Anritsu	ML2495A	1135009	Aug. 31, 2023	1 year
☐	Power Sensor	Agilent	N1921A	MY45241957	Nov. 29, 2023	1 year
☐	Power Meter	Agilent	N1911A	MY45101619	Nov. 29, 2023	1 year
☒	Spectrum Analyzer (10 Hz~26.5 GHz)	Keysight	N9010B	MY59071418	Mar. 20, 2023 Mar. 15, 2024	1 year
☐	Spectrum Analyzer (9 kHz~26.5 GHz)	Agilent	N9010A	MY48030518	Jul. 20, 2023	1 year
☐	Spectrum Analyzer (20 Hz~26.5 GHz)	Agilent	N9020A	US47520902	Sep. 04, 2023	1 year
☐	Spectrum Analyzer (3 Hz~50 GHz)	Agilent	N9030A	MY53120541	Dec. 27, 2023	1 year
☐	Bluetooth Tester	R&S	CBT	100350	Mar. 20, 2023	2 years
☐	Power Supply	KEITHLEY	2303	4045290	Jan. 04, 2024	1 year

☒ means with testing used ;
☐ means without testing used
Note: N.C.R. = No Calibration Request.

For Radiated Emissions
Test Period: Feb. 06, 2024
Testing Engineer: Kerry Xu

Test Site		96603-BD				
Radiation test sites		Semi Anechoic Room				
Use	Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
☐	Spectrum Analyzer (10 Hz~44 GHz)	Keysight	N9010A	MY52221312	Jan. 04, 2024	1 year
☐	Spectrum Analyzer (3 Hz~50 GHz)	Agilent	N9030A	MY53120541	Dec. 27, 2023	1 year
☐	Spectrum Analyzer (2 Hz~50 GHz)	Keysight	N9030B	MY57143537	Apr. 18, 2023	1 year
☒	Spectrum Analyzer (10 Hz~44 GHz)	Keysight	N9020B	MY60112363	Jan. 10, 2024	1 year
☐	Amplifier (100 kHz~1.3 GHz)	Agilent	8447D	2944A11119	Jan. 10, 2024	1 year
☐	Amplifier (100 kHz~1.3 GHz)	Agilent	8447D	2944A10961	Jul. 10, 2023	1 year
☒	Broadband Amplifier (100 kHz~1 GHz)	Titan	T0910E00014330 A1F	001	Jul. 24, 2023	1 year
☐	Amplifier (1 GHz~26.5 GHz)	Agilent	8449B	3008A02237	Oct. 31, 2023	1 year
☒	Broadband Amplifier (1 GHz~26.5 GHz)	Titan	T0912E01263025 A1F	002	Jul. 24, 2023	1 year
☐	Preamplifier (26.5 GHz~40 GHz)	EMCI	EMC2654045	980028	Sep. 01, 2023	1 year
☒	Loop Antenna (9 kHz~30 MHz)	COM-POWER CORPORATION	AL-130	121014	Mar. 23, 2023	1 year
☐	Active Loop Antenna (9 kHz~30 MHz)	Schwarzbeck Mess-Elektronik	FMZB 1513-60	1513-60-031	Feb. 21, 2023	1 year
☒	Trilog Broadband Antenna (30 kHz~1 GHz)	Schwarzbeck Mess-Elektronik	VULB9168	01146	Jun. 26, 2023	1 year
☐	Trilog Broadband Antenna (30 kHz~1 GHz)	Schwarzbeck Mess-Elektronik	VULB9168	416	Jun. 13,2023	1 year
☒	Broadband Horn Antenna (1 GHz~18 GHz)	Schwarzbeck Mess-Elektronik	9120D	02207	Jul. 07, 2023	1 year
☐	Broadband Horn Antenna (1 GHz~18 GHz)	Schwarzbeck Mess-Elektronik	9120D	9120D-550	Jul. 21, 2023	1 year

☒ means with testing used ;
☐ means without testing used
Note: N.C.R. = No Calibration Request.

For Radiated Emissions
Test Period: Feb. 06, 2024
Testing Engineer: Kerry Xu

Test Site		96603-BD				
Radiation test sites		Semi Anechoic Room				
Use	Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
☒	Broadband Horn Antenna (18 GHz~40 GHz)	Schwarzbeck Mess-Elektronik	9170	9170-320	Jul. 21, 2023	1 year
☐	Horn Antenna (18 GHz~40 GHz)	ETS	3116	00086467	Dec. 08, 2023	1 year
☒	Coaxial Cable	Titan	T0710AT327A10A 100	J11005	Aug. 10, 2023	1 year
☒	Coaxial Cable	Titan	T0710AT327A10A 900	J11004	Aug. 10, 2023	1 year
☒	Coaxial Cable	Titan	CFD400NL-LW	001	Aug. 10, 2023	1 year
☐	Bluetooth Tester	R&S	CBT	100350	Mar. 20, 2023	2 years
☐	Wireless Connectivity Tester	R&S	CMW270	102208	Jun. 05, 2023	1 year
☐	Power Supply	KEITHLEY	2303	4045290	Jan. 04, 2024	1 year
☒	Software	EZ EMC	1.1.4.4	N/A	N.C.R.	---

☒ means with testing used ;
☐ means without testing used
Note: N.C.R. = No Calibration Request.

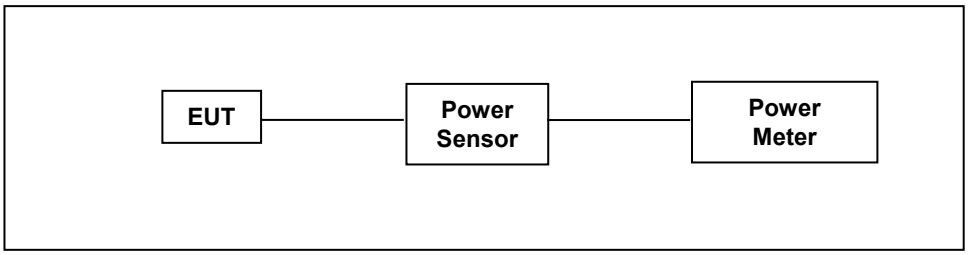
4 Measurement Procedure

4.1. Max. Transmitter Output Power and E.I.R.P. Measurement

■ Limit

FHSs operating in the band 2400-2483.5 MHz may have hopping channel carrier frequencies that are separated by 25 kHz or two thirds of the -20 dB bandwidth of the hopping channel, whichever is greater, provided that the systems operate with an output power no greater than 0.125 W and the e.i.r.p. shall not exceed 0.5 W

■ Test Setup



■ Test Procedure

The tests below are run with the EUT's transmitter set at high power in TX mode. The EUT is needed to force selection of output power level and channel number. While testing, EUT was set to transmit continuously. Remove the subjective device's antenna and connect the RF output port to power sensor.

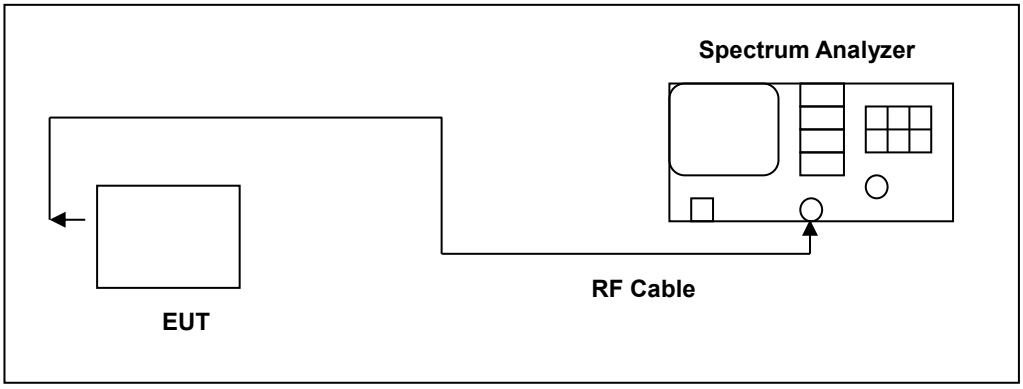
The total conducted output power shall be reduced by 1 dB below the specified limits for each 3 dB that the directional gain of the antenna/antenna array exceeds 6 dBi. The directional antenna gain shall be computed as the sum of 10 log(number of array elements or staves) plus the directional gain of the element or stave having the highest gain.

4.2. 20 dB Emission Bandwidth and 99 % Occupied Bandwidth Measurement

■ **Limit**

N/A

■ **Test Setup**



■ **Test Procedure**

20 dB Emission Bandwidth

The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10 dB passive attenuator. A fully charged battery was used for the supply voltage. The Bluetooth frequency hopping function of the EUT was enabled. The spectrum analyzer used the following settings:

1. Span = approx. 2 to 3 times the 20 dB bandwidth, centered on a hopping frequency
2. RBW ≥ 1 % of the 20 dB span
3. VBW ≥ RBW
4. Sweep = auto
5. Detector function = peak
6. Trace = max hold

The trace was allowed to stabilize. The EUT was transmitting at its maximum data rate. The marker-to-peak function was used to set the marker to the peak of the emission. The marker-delta function was used to measure 20 dB down one side of the emission. The marker-delta function and marker was moved to the other side of the emission until it was even with the reference marker. The marker-delta reading at this point was the 20 dB bandwidth of the emission.

99 % Occupied Bandwidth

The transmitter shall be operated at its maximum carrier power measured under normal test conditions.

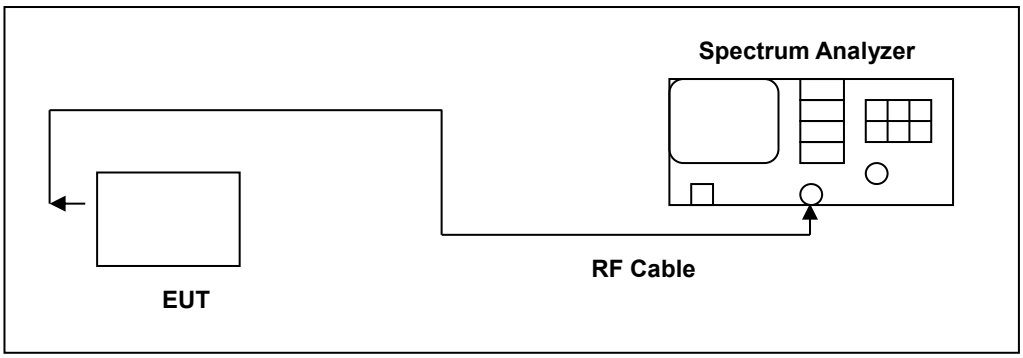
The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1 % of the selected span as is possible without being below 1 %. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold, may produce a wider bandwidth than actual. The trace data points are recovered and are directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded.

4.3. Hopping Channel Carrier Frequencies Separated Measurement

■ **Limit**

FHSs operating in the band 2400-2483.5 MHz may have hopping channel carrier frequencies that are separated by 25 kHz or two thirds of the -20 dB bandwidth of the hopping channel

■ **Test Setup**



■ **Test Procedure**

The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10 dB passive attenuator. A fully charged battery was used for the supply voltage. The Bluetooth transmitter of the V6 had its hopping function enabled. The following spectrum analyzer settings were used:

1. Span = wide enough to capture the peaks of two adjacent channels
2. Resolution (or IF) Bandwidth (RBW) = Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel.
3. Video (or Average) Bandwidth (VBW) ≥ RBW
4. Sweep = auto
5. Detector function = peak
6. Trace = max hold

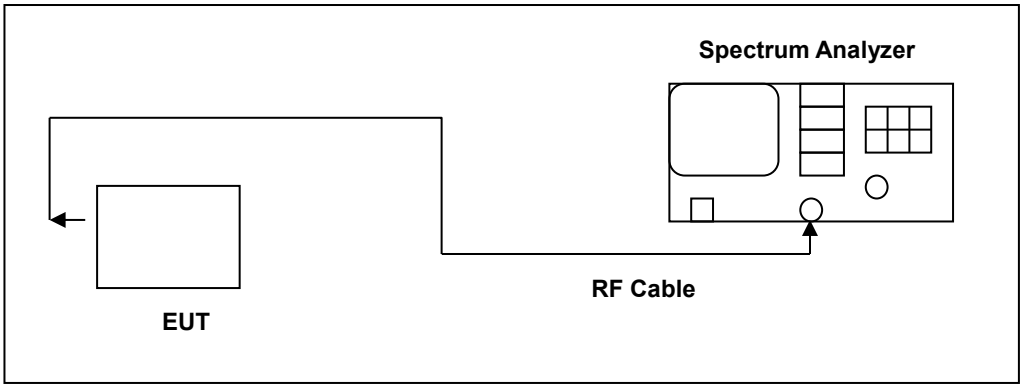
The trace was allowed to stabilize. The marker-delta function was used to determine the separation between the peaks of the adjacent channels.

4.4. Number of Hopping Channels Measurement

■ **Limit**

FHSs operating in the band 2400-2483.5 MHz shall use at least 15 hopping channels.

■ **Test Setup**



■ **Test Procedure**

The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10 dB passive attenuator. A fully charged battery was used for the supply voltage. The Bluetooth frequency hopping function of the EUT was enabled. The spectrum analyzer used the following settings:

1. Span = the frequency band of operation
2. RBW = To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dBbandwidth, whichever is smaller.
3. VBW ≥ RBW
4. Sweep = auto
5. Detector function = peak
6. Trace = max hold

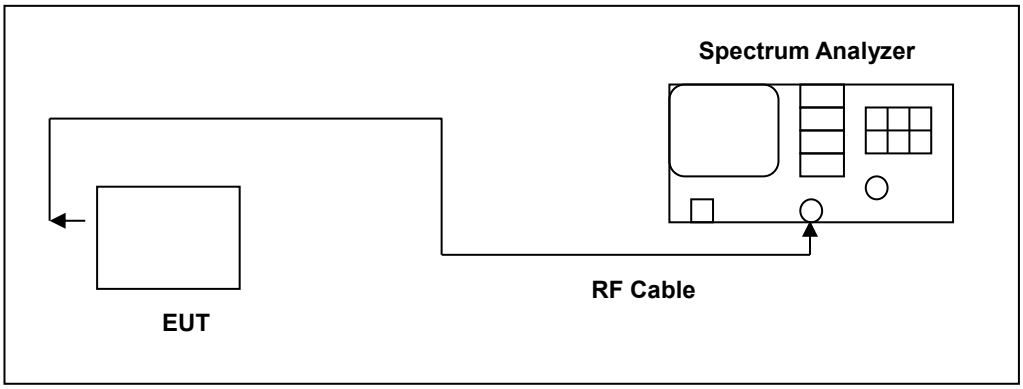
The trace was allowed to stabilize.

4.5. Average Time of Occupancy (Dwell Time) Measurement

■ Limit

FHSs operating in the band 2400-2483.5 MHz the average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds, multiplied by the number of hopping channels employed.

■ Test Setup



■ Test Procedure

The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10 dB passive attenuator. A fully charged battery was used for the supply voltage. The Bluetooth hopping function of the EUT was enabled. The following spectrum analyzer settings were used:

1. Span = zero span, centered on a hopping channel
2. RBW = 1 MHz
3. VBW $\geq$ RBW
4. Sweep = as necessary to capture the entire dwell time per hopping channel
5. Detector function = peak
6. Trace = max hold

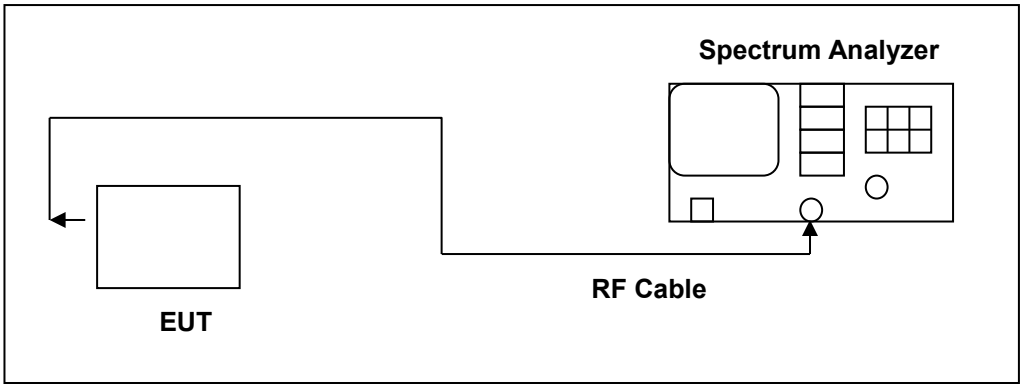
The marker-delta function was used to determine the dwell time.

4.6. Out of Band Conducted Emissions and Conducted Band Edge Measurement

■ Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits.

■ Test Setup



■ Test Procedure

In any 100 kHz bandwidth outside the EUT pass band, the RF power produced by the modulation products of the spreading sequence, the information sequence, and the carrier frequency shall be at least 20 dB below that of the maximum in-band 100 kHz emission, antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated for with the analyzer OFFSET function. All other types of emissions from the EUT shall meet the general limits for radiated frequencies outside the pass band. The test was performed at 3 channels (Channel 0, 39, 78)

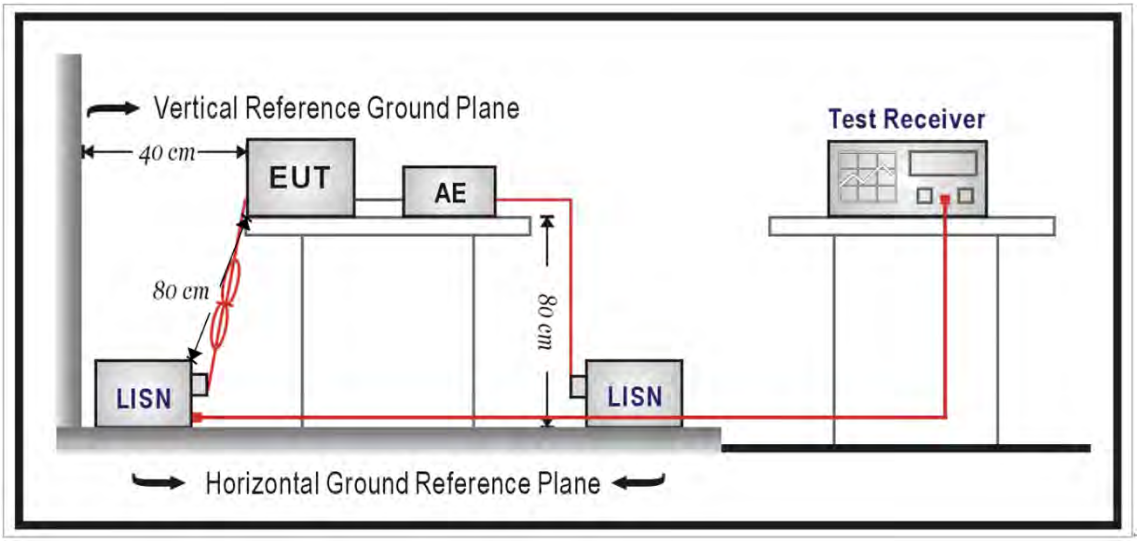
4.7. AC Power Line Conducted Emissions Measurement

■ **Limit**

Frequency (MHz)	Quasi-peak	Average
0.15 - 0.5	66 to 56 *	56 to 46*
0.50 - 5.0	56	46
5.0 - 30.0	60	50

* The level decreases linearly with the logarithm of the frequency.

■ **Test Setup**



■ **Test Procedure**

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 Ω// 50 uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50 Ω// 50 uH coupling impedance with 50 ohm termination.

Tabletop device shall be placed on a non-conducting platform, of nominal size 1 m by 1.5 m, raised 80 cm above the reference ground plane. The wall of screened room shall be located 40 cm to the rear of the EUT. Other surfaces of tabletop or floor standing EUT shall be at least 80 cm from any other ground conducting surface including one or more LISNs. For floor-standing device shall be placed under the EUT with a 12 mm insulating material.

Conducted emissions were investigated over the frequency range from 0.15 MHz to 30 MHz using a resolution bandwidth of 9 kHz. The equipment under test (EUT) shall be meet the limits in section 4.1, as applicable, including the average limit and the quasi-peak limit when using respectively, an average detector and quasi-peak detector measured in accordance with the methods described of related standard. When all of peak value were complied with quasi-peak and average limit from 150 kHz to 30 MHz then quasi-peak and average measurement was unnecessary.

The AMN shall be placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for AMNs mounted on top of the ground reference plane. This distance is between the closest points of the AMN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8 m from the AMN. If the mains power cable is longer than 1 m then the cable shall be folded back and forth at the centre of the lead to form a bundle no longer than 0.4 m. All of interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 cm to 40 cm long. All of EUT and AE shall be separate place more than 0.1 m. All 50 Ω ports of the LISN shall be resistively terminated into 50 Ω loads when not connected to the measuring instrument.

If the reading of the measuring receiver shows fluctuations close to the limit, the reading shall be observed for at least 15 s at each measurement frequency; the higher reading shall be recorded with the exception of any brief isolated high reading which shall be ignored

4.8. Transmitter Unwanted Emissions Measurement

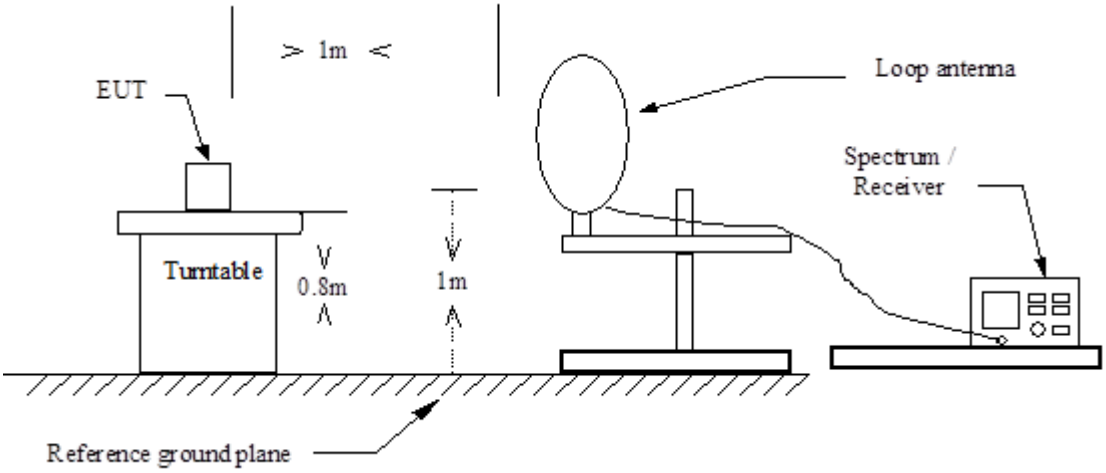
■ **Limit**

Frequency (MHz)	Field Strength (μV/m at meter)	Measurement Distance (meters)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30 - 88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

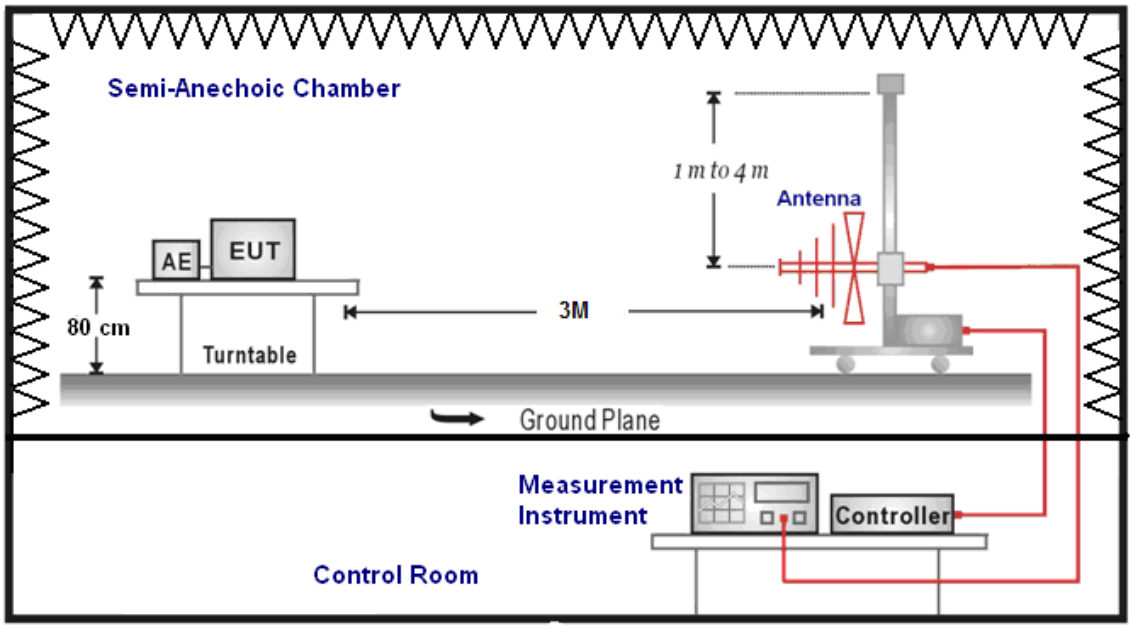
Note: The emission limits for the bands 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector. Transmitting devices are not permitted in restricted frequency bands unless stated otherwise in the relevant RSS.

■ **Setup**

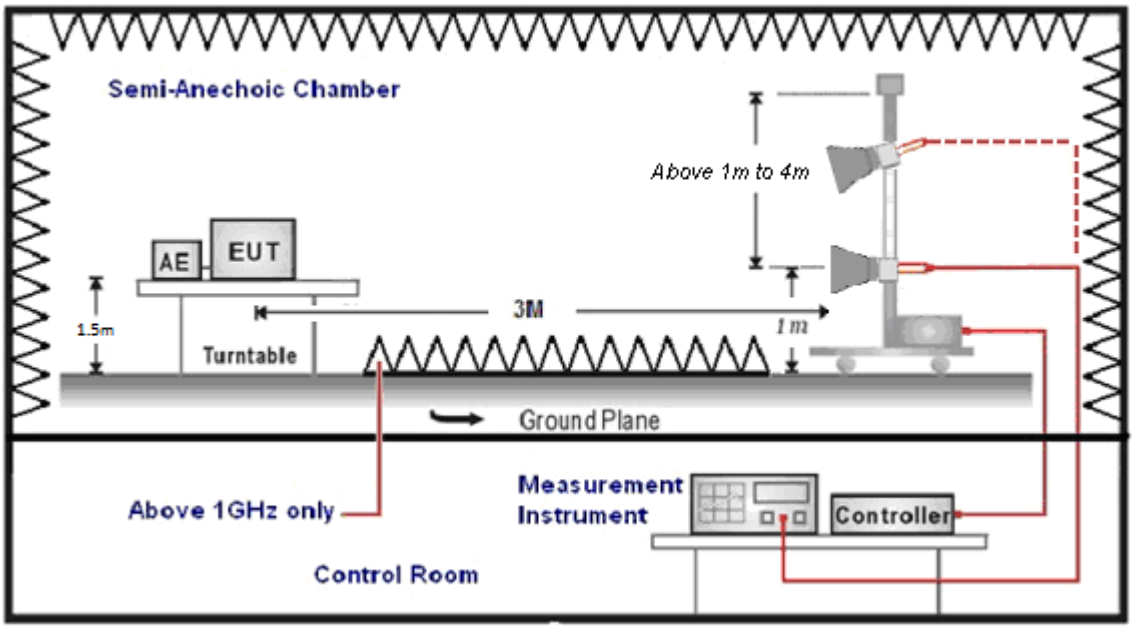
9 kHz ~ 30 MHz



Below 1 GHz



Above 1 GHz


Semi-Anechoic Chamber
Above 1m to 4m
AE
EUT
1.5m
Turntable
3M
1 m
Ground Plane
Above 1GHz only
Measurement
Instrument
Controller
Control Room

■ **Test Procedure**

Final radiation measurements were made on a three-meter, Semi Anechoic Chamber. The EUT system was placed on a nonconductive turntable which is 0.8 or 1.5 meters height(below 1 GHz use 0.8 m turntable / above 1 GHz use 1.5 m turntable), top surface 1.0 x 1.5 meter. The spectrum was examined from 250 MHz to 2.5 GHz in order to cover the whole spectrum below 10th harmonic which could generate from the EUT. During the test, EUT was set to transmit continuously & Measurements spectrum range from 9 kHz to 26.5 GHz is investigated.
For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, and then the video bandwidth is set to 3 MHz for peak measurements and 10 Hz for average measurements when Duty cycle >98 % / 1/T for average measurements when Duty cycle <98 %. A nonconductive material surrounded the EUT to supporting the EUT for standing on tree orthogonal planes. At each condition, the EUT was rotated 360 degrees, and the antenna was raised and lowered from one to four meters to find the maximum emission levels. Measurements were taken using both horizontal and vertical antenna polarization.
SCHWARZBECK MESS-ELEKTRONIK Biconilog Antenna at 3 Meter and the SCHWARZBECK Double Ridged Guide Antenna was used in frequencies 1 – 26.5 GHz at a distance of 1 meter. All test results were extrapolated to equivalent signal at 3 meters utilizing an inverse linear distance extrapolation Factor (20 dB/decade).
For testing above 1 GHz, the emission level of the EUT in peak mode was 20 dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
Appropriate preamplifiers were used for improving sensitivity and precautions were taken to avoid overloading or desensitizing the spectrum analyzer. No post – detector video filters were used in the test.
The spectrum analyzer's 6 dB bandwidth was set to 1 MHz, and the analyzer was operated in the peak detection mode, for frequencies both below and up 1 GHz. The average levels were obtained by subtracting the duty cycle correction factor from the peak readings.
The following procedures were used to convert the emission levels measured in decibels referenced to 1 microvolt (dBuV) into field intensity in micro volts pre meter (uV/m).
The actual field intensity in decibels referenced to 1 microvolt in to field intensity in micro colts per meter (dBuV/m).

The actual field is intensity in referenced to 1 microvolt per meter (dBuV/m) is determined by algebraically adding the measured reading in dBuV, the antenna factor (dB), and cable loss (dB) and Subtracting the gain of preamplifier (dB) is auto calculate in spectrum analyzer.

(1) Amplitude (dBuV/m) = FI (dBuV) +AF (dBuV) +CL (dBuV)-Gain (dB)
FI= Reading of the field intensity.
AF= Antenna factor.
CL= Cable loss.
P.S Amplitude is auto calculate in spectrum analyzer.
(2) Actual Amplitude (dBuV/m) = Amplitude (dBuV)-Dis(dB)
The IC specified emission limits were calculated according the EUT operating frequency and by following linear interpolation equations:
(a) For fundamental frequency : Transmitter Output < +30 dBm
(b) For spurious frequency : Spurious emission limits = fundamental emission limit /10

Data of measurement within this frequency range without mark in the table above means the reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.

4.9. Antenna Requirement

■ **Limit**

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 (and in the notice to be included in the user manual, provided below).

When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.

The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.

For licence-exempt equipment with detachable antennas, the user manual shall also contain the following notice in a conspicuous location:

This radio transmitter [enter the device's ISED certification number] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.
Immediately following the above notice, the manufacturer shall provide a list of all antenna types which can be used with the transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna type.

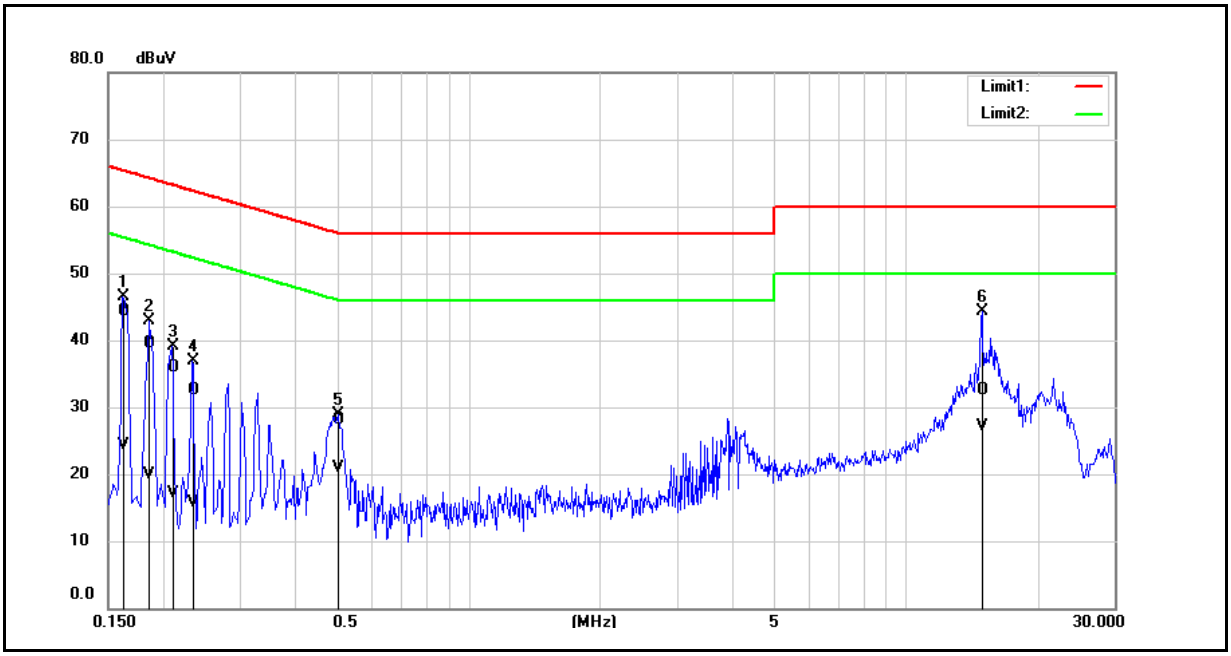
■ **Antenna Connector Construction**

See section 2 – antenna information.

5 Test Results

5.1. Conducted Emission

Standard:	RSS-Gen	Line:	L1
Test item:	Conducted Emission	Power:	AC 120 V/60 Hz
Mode:	Transmit Mode		
Description:			

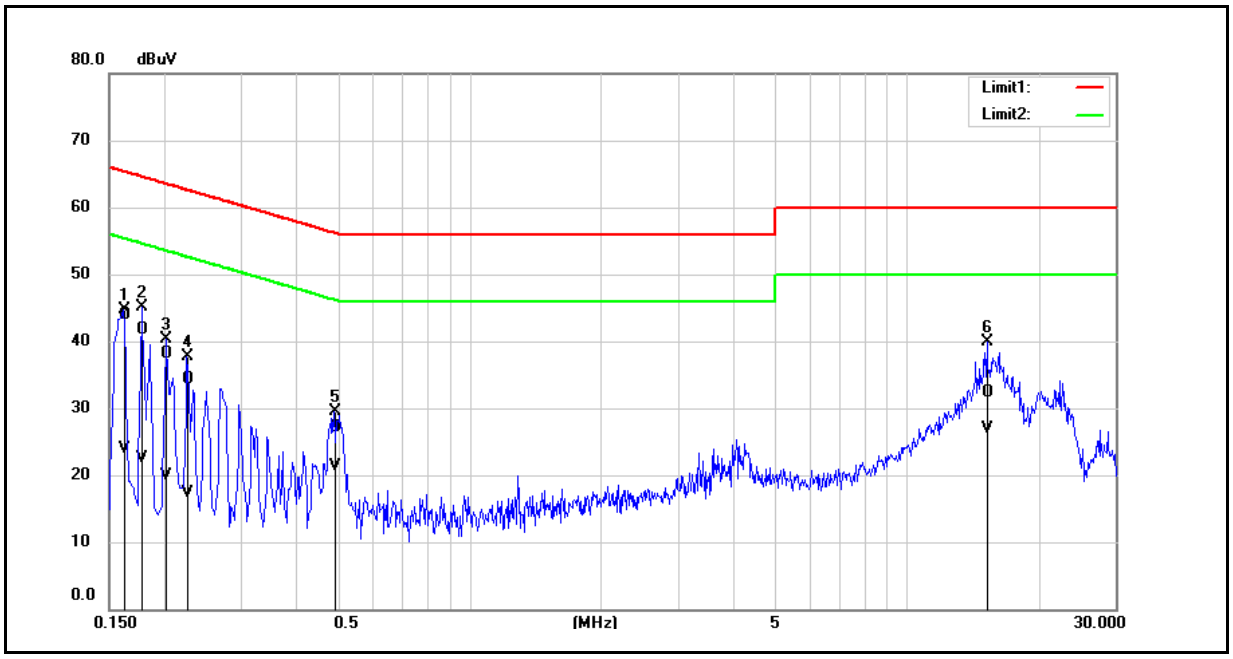


No.	Frequency (MHz)	QP reading (dBuV)	AVG reading (dBuV)	Correction factor (dB)	QP result (dBuV)	AVG result (dBuV)	QP limit (dBuV)	AVG limit (dBuV)	QP margin (dB)	AVG margin (dB)	Remark
1	0.1620	34.62	14.63	9.61	44.23	24.24	65.36	55.36	-21.13	-31.12	Pass
2	0.1860	29.82	10.35	9.61	39.43	19.96	64.21	54.21	-24.78	-34.25	Pass
3	0.2100	26.30	7.53	9.61	35.91	17.14	63.21	53.21	-27.30	-36.07	Pass
4	0.2340	22.83	6.19	9.61	32.44	15.80	62.31	52.31	-29.87	-36.51	Pass
5	0.5020	18.54	11.32	9.63	28.17	20.95	56.00	46.00	-27.83	-25.05	Pass
6	14.9300	22.52	17.08	9.95	32.47	27.03	60.00	50.00	-27.53	-22.97	Pass

Note: 1. Result (dBuV) = Correction factor (dB) + Reading(dBuV).

2. Correction factor (dB) = Cable loss (dB) + L.I.S.N. factor (dB).

Standard:	RSS-Gen	Line:	N
Test item:	Conducted Emission	Power:	AC 120 V/60 Hz
Mode:	Transmit Mode		
Description:			



No.	Frequency (MHz)	QP reading (dBuV)	AVG reading (dBuV)	Correction factor (dB)	QP result (dBuV)	AVG result (dBuV)	QP limit (dBuV)	AVG limit (dBuV)	QP margin (dB)	AVG margin (dB)	Remark
1	0.1620	34.35	14.30	9.60	43.95	23.90	65.36	55.36	-21.41	-31.46	Pass
2	0.1780	32.09	12.96	9.61	41.70	22.57	64.58	54.58	-22.88	-32.01	Pass
3	0.2020	28.40	10.29	9.61	38.01	19.90	63.53	53.53	-25.52	-33.63	Pass
4	0.2260	24.62	7.60	9.61	34.23	17.21	62.60	52.60	-28.37	-35.39	Pass
5	0.4900	17.57	11.59	9.62	27.19	21.21	56.17	46.17	-28.98	-24.96	Pass
6	15.2780	22.29	16.79	10.06	32.35	26.85	60.00	50.00	-27.65	-23.15	Pass

Note: 1. Result (dBuV) = Correction factor (dB) + Reading(dBuV).

2. Correction factor (dB) = Cable loss (dB) + L.I.S.N. factor (dB).

5.2. Conducted Test Results

Max. Transmitter Output Power and E.I.R.P. Measurement
Reference Appendix A

20 dB Emission Bandwidth and 99 % Occupied Bandwidth Measurement
Reference Appendix A / Appendix B

Hopping Channel Carrier Frequencies Separated Measurement
Reference Appendix A / Appendix B

Number of Hopping Channels Measurement
Reference Appendix A / Appendix B

Average Time of Occupancy (Dwell Time) Measurement
Reference Appendix A / Appendix B

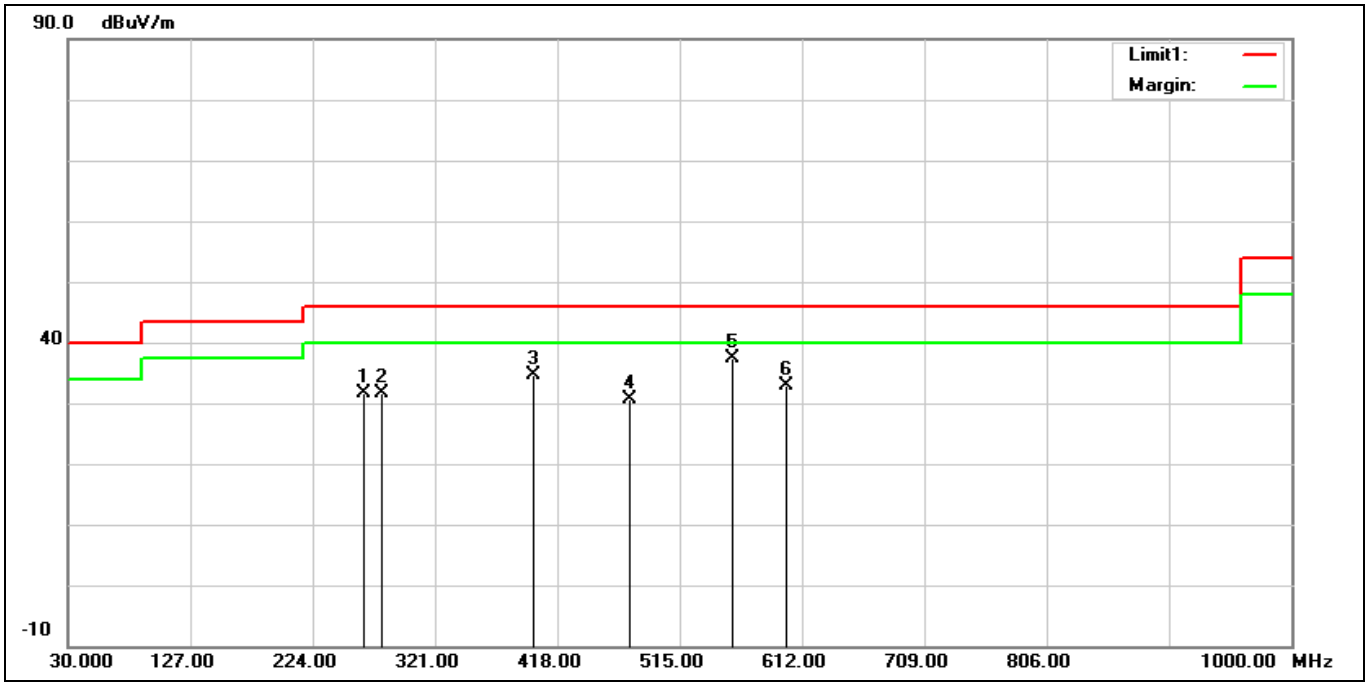
Out of Band Conducted Emissions and Conducted Band Edge Measurement
Out of Band Conducted Spurious Emission
Reference Appendix B

Conducted Band Edge
Reference Appendix B

5.3. Radiated Emission Measurement

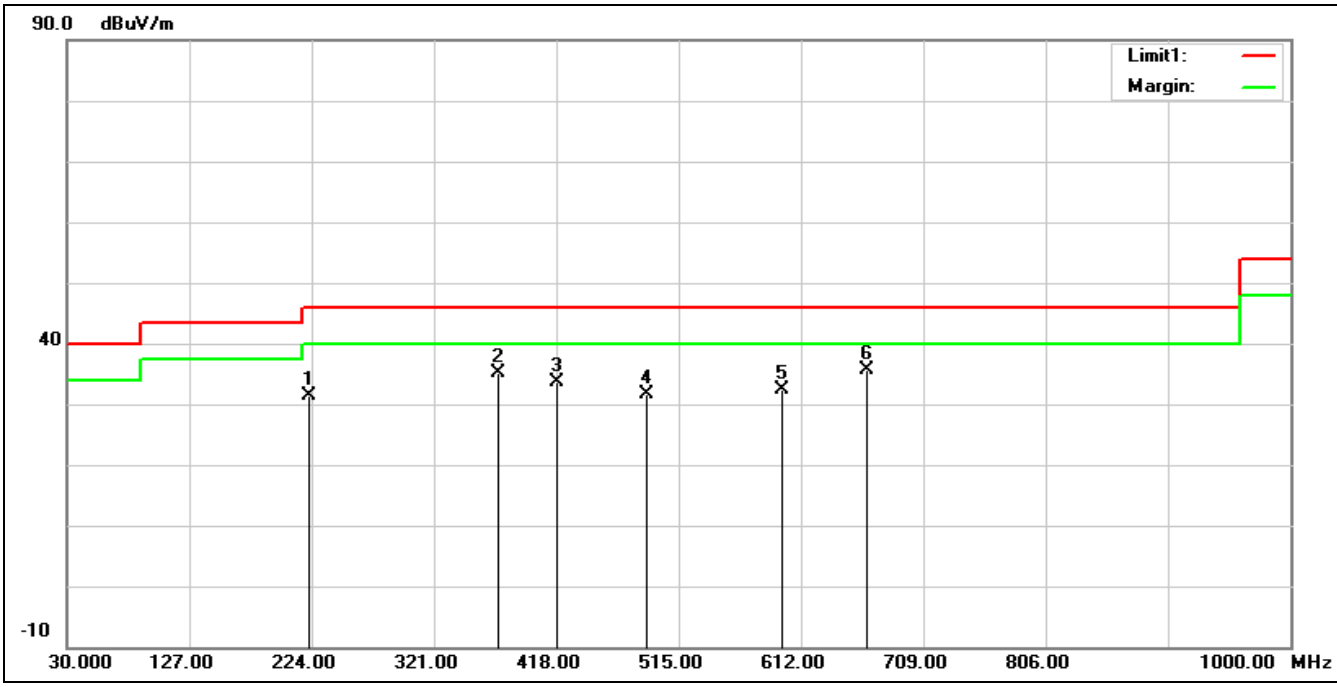
Below 1 GHz

Standard:	RSS-247	Test Site:	966 Chamber
Polarization:	Horizontal		
Test Mode:	SRD 1M 2480 MHz		
Remark:			



No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	264.7400	38.21	-6.64	31.57	46.00	-14.43	QP
2	279.2900	37.65	-6.02	31.63	46.00	-14.37	QP
3	399.5700	37.82	-3.18	34.64	46.00	-11.36	QP
4	475.2300	32.50	-1.92	30.58	46.00	-15.42	QP
5*	556.7100	38.01	-0.57	37.44	46.00	-8.56	QP
6	599.3900	32.23	0.62	32.85	46.00	-13.15	QP

Standard:	RSS-247	Test Site:	966 Chamber
Polarization:	Vertical		
Test Mode:	SRD 1M 2480 MHz		
Remark:			

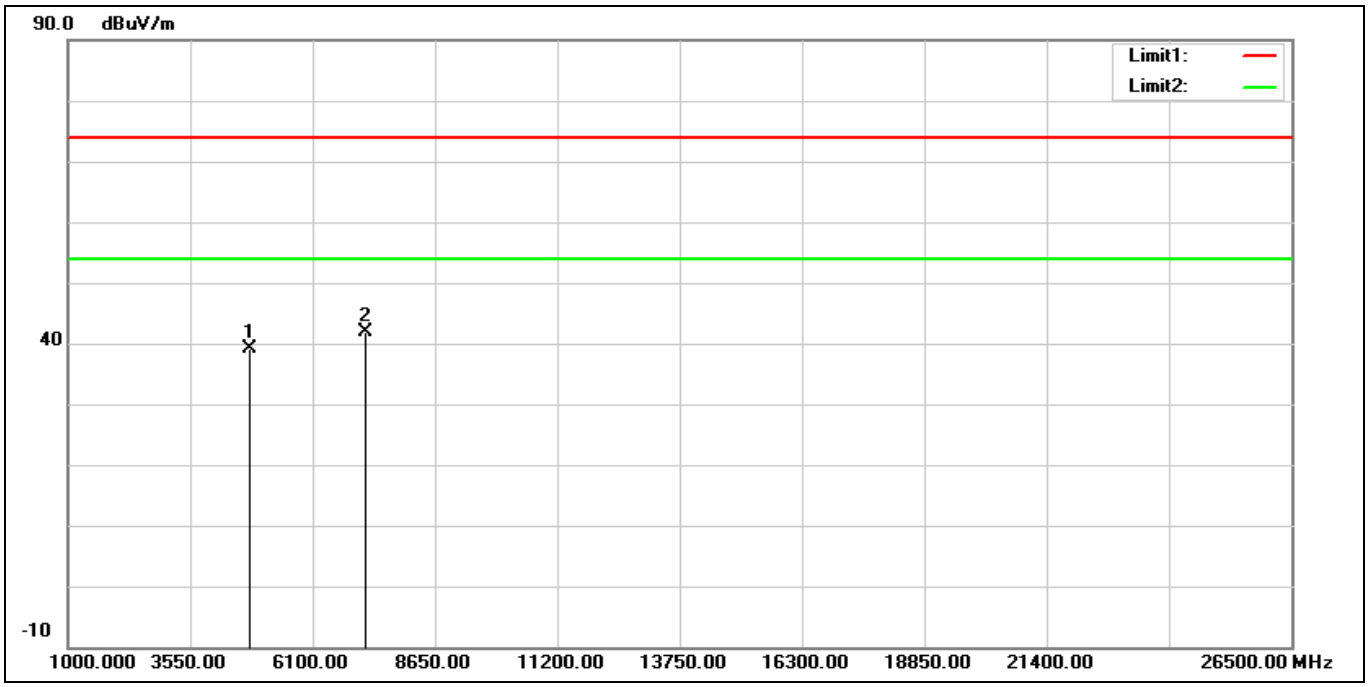


No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	222.0600	39.98	-8.51	31.47	46.00	-14.53	QP
2	371.4400	39.03	-3.95	35.08	46.00	-10.92	QP
3	418.0000	36.49	-2.74	33.75	46.00	-12.25	QP
4	489.7800	33.57	-1.90	31.67	46.00	-14.33	QP
5	597.4500	31.93	0.55	32.48	46.00	-13.52	QP
6*	664.3800	34.02	1.71	35.73	46.00	-10.27	QP

Harmonic

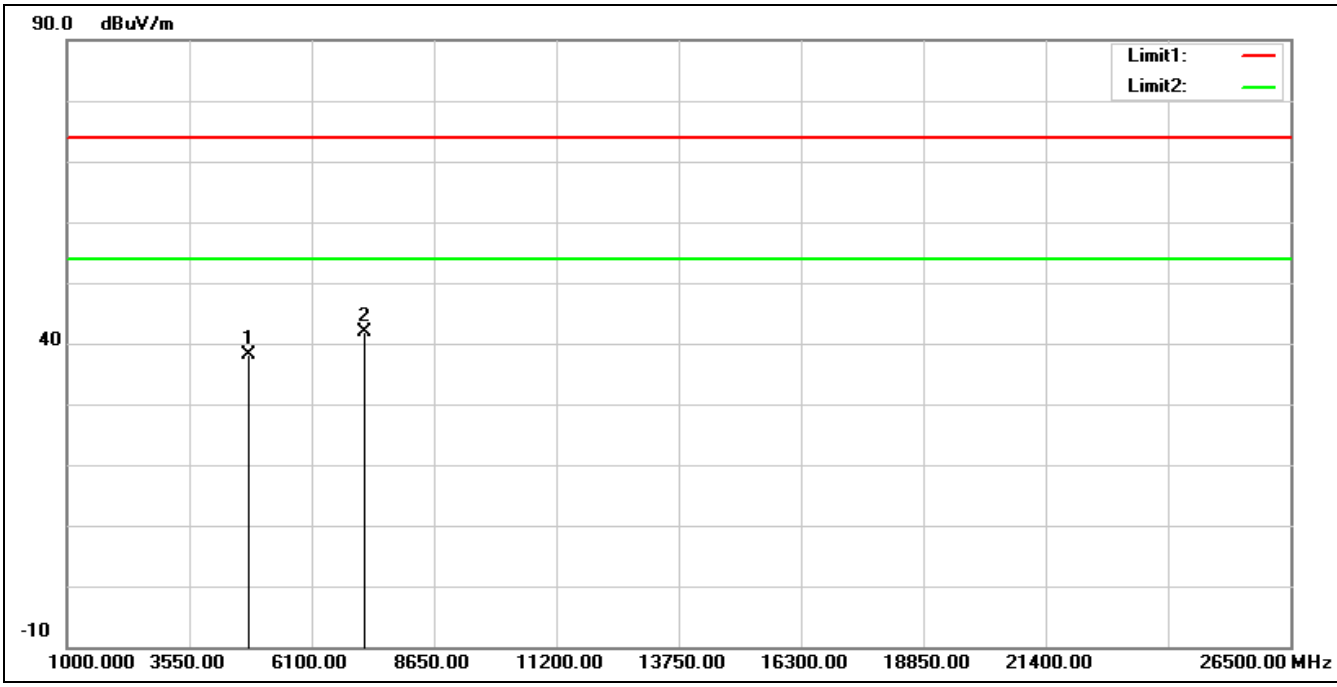
Above 1 GHz

Standard:	RSS-247	Test Site:	966 Chamber
Polarization:	Horizontal		
Test Mode:	SRD 1M 2402 MHz		
Remark:			



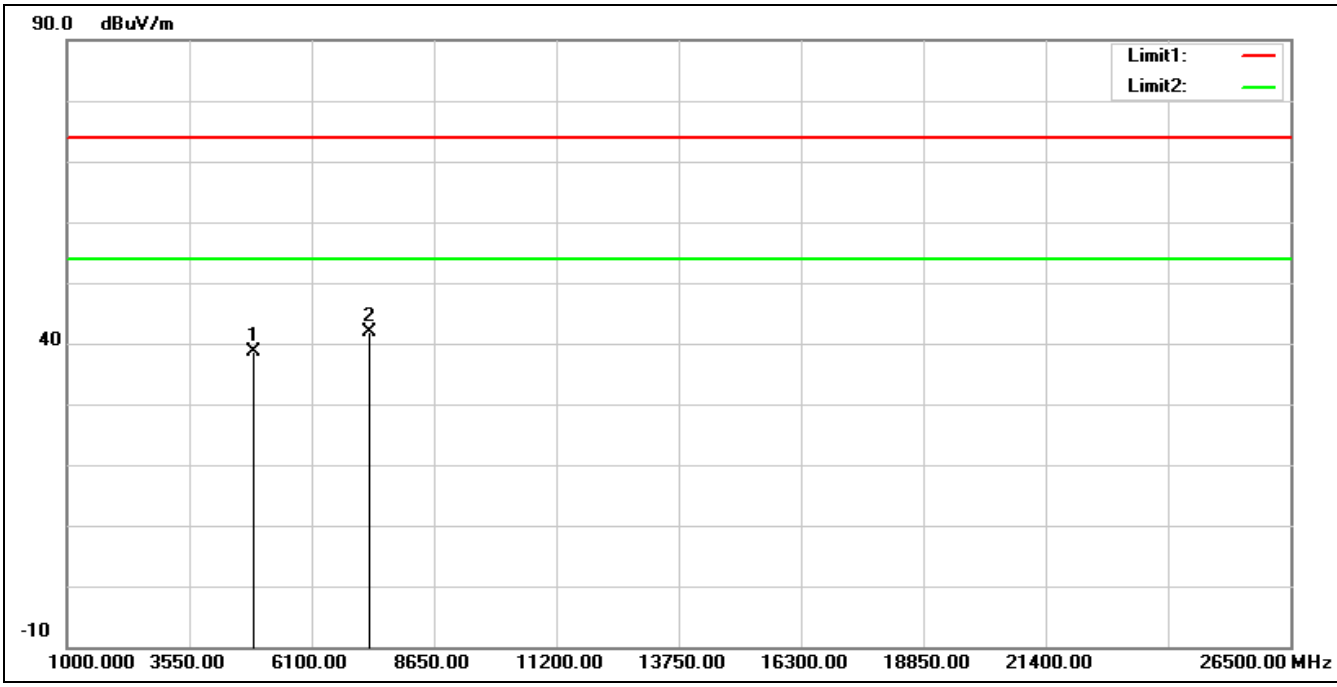
No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804.000	39.39	-0.31	39.08	74.00	-34.92	peak
2*	7206.000	35.28	6.52	41.80	74.00	-32.20	peak

Standard:	RSS-247	Test Site:	966 Chamber
Polarization:	Vertical		
Test Mode:	SRD 1M 2402 MHz		
Remark:			



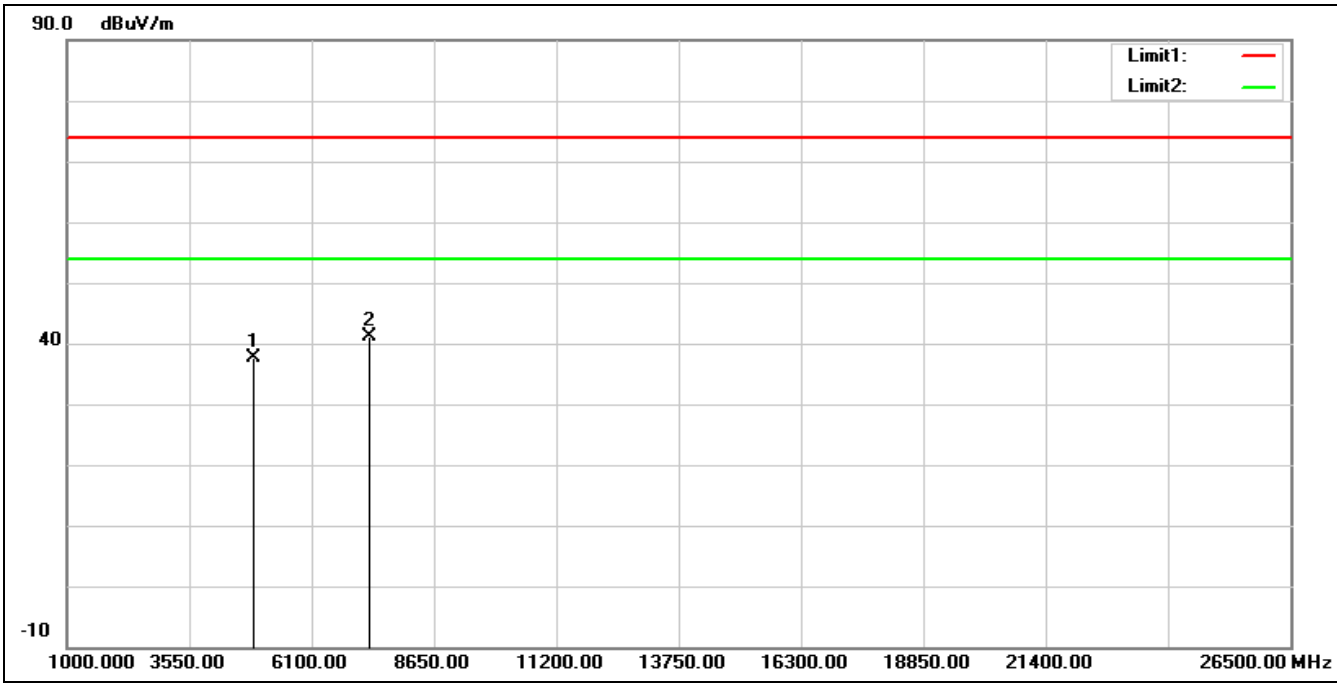
No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804.000	38.36	-0.31	38.05	74.00	-35.95	peak
2*	7206.000	35.24	6.52	41.76	74.00	-32.24	peak

Standard:	RSS-247	Test Site:	966 Chamber
Polarization:	Horizontal		
Test Mode:	SRD 1M 2440 MHz		
Remark:			



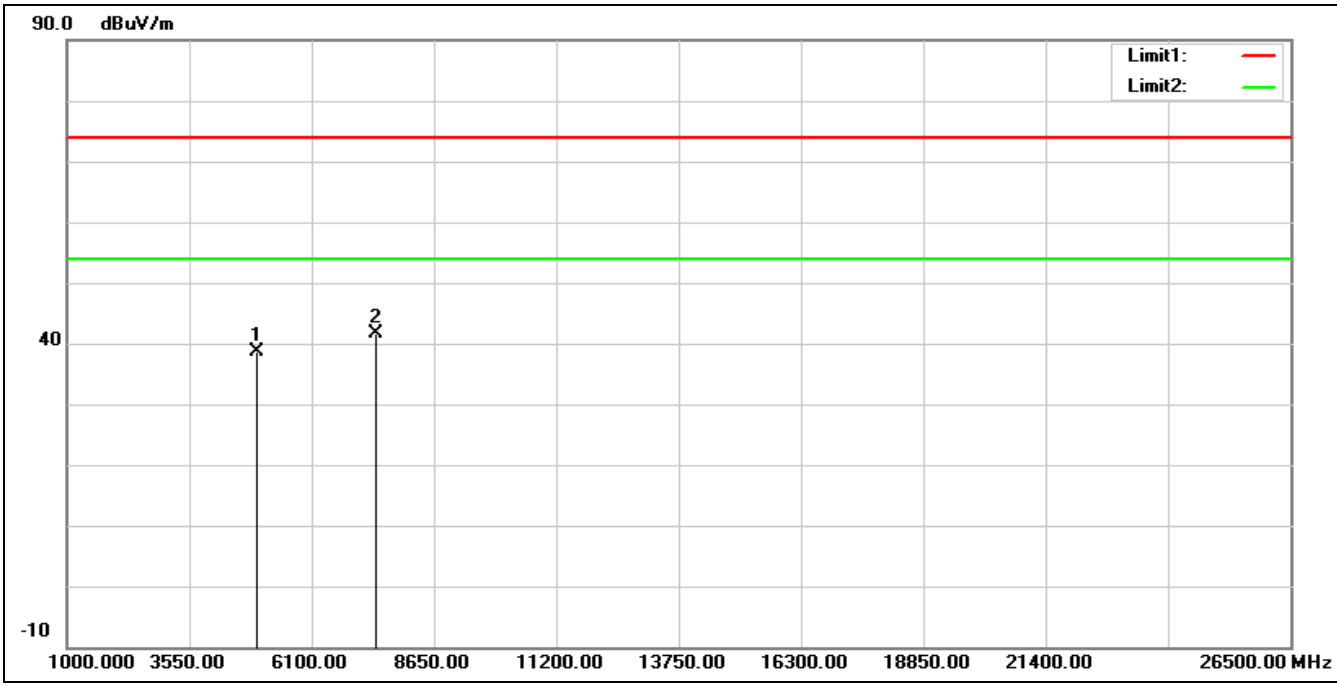
No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4880.000	38.72	-0.13	38.59	74.00	-35.41	peak
2*	7320.000	35.55	6.22	41.77	74.00	-32.23	peak

Standard:	RSS-247	Test Site:	966 Chamber
Polarization:	Vertical		
Test Mode:	SRD 1M 2440 MHz		
Remark:			



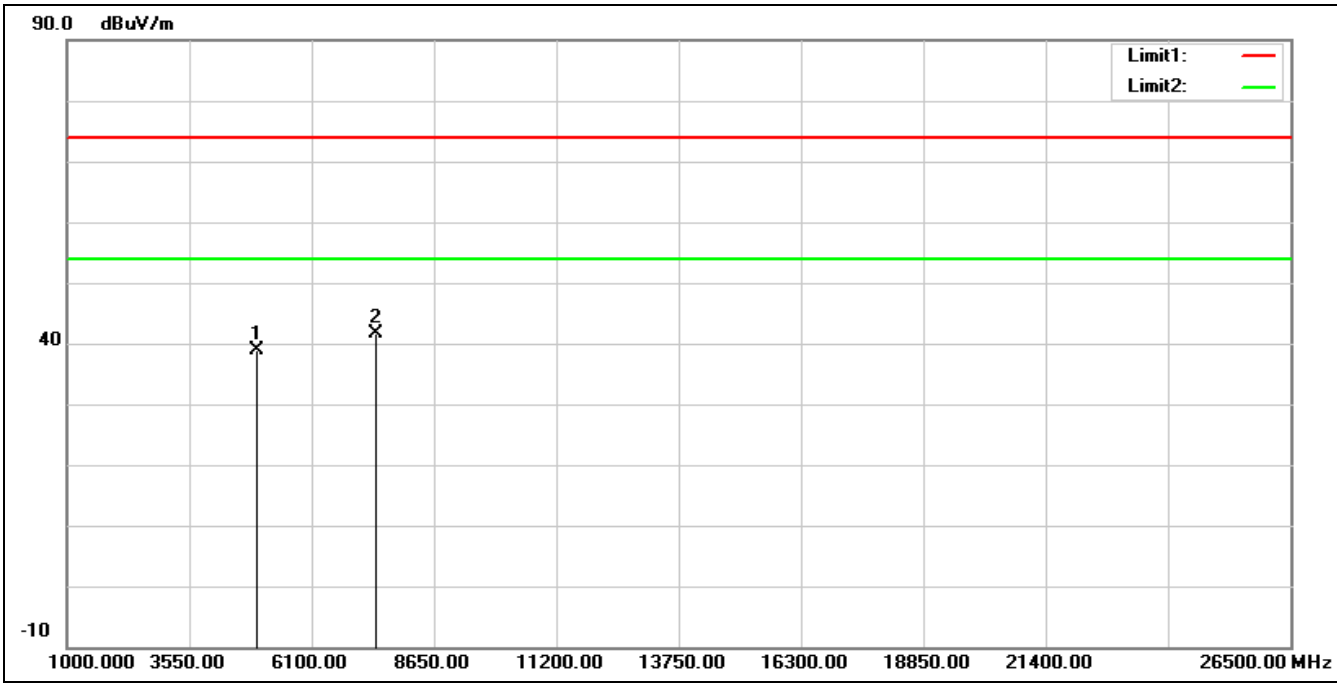
No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4880.000	37.74	-0.13	37.61	74.00	-36.39	peak
2*	7320.000	34.95	6.22	41.17	74.00	-32.83	peak

Standard:	RSS-247	Test Site:	966 Chamber
Polarization:	Horizontal		
Test Mode:	SRD 1M 2480 MHz		
Remark:			



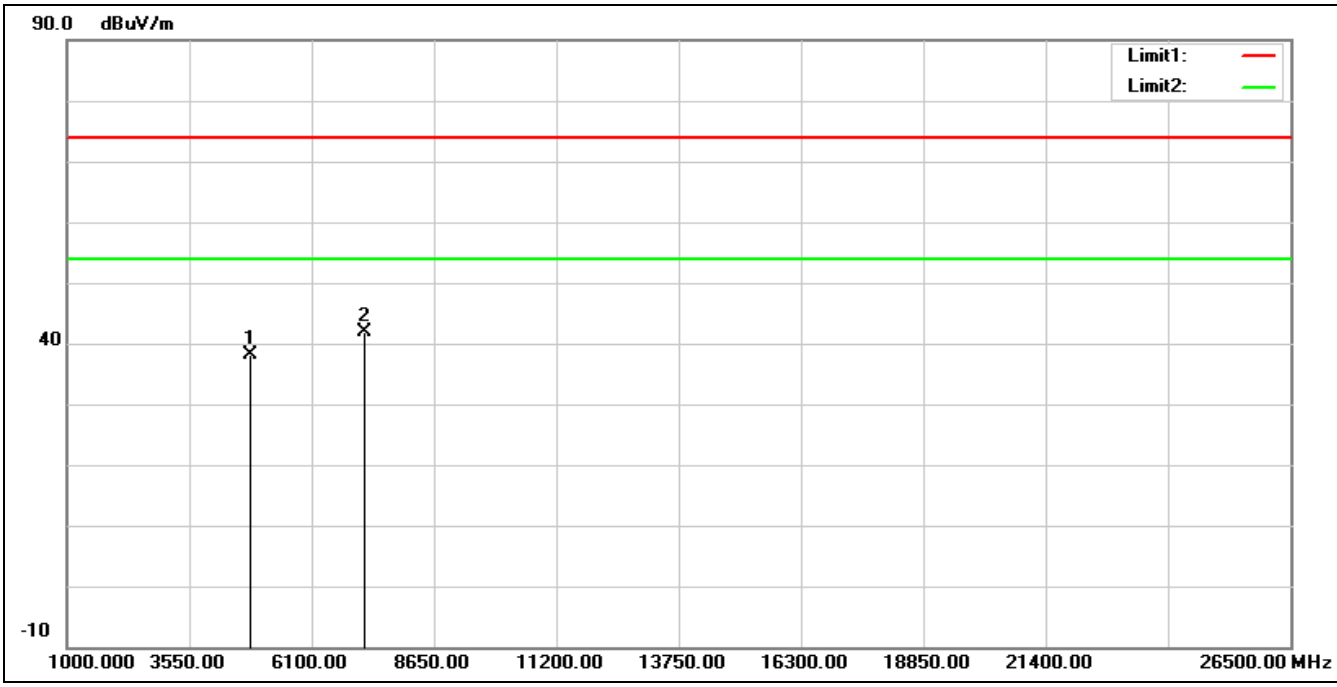
No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960.000	38.29	0.22	38.51	74.00	-35.49	peak
2*	7440.000	35.17	6.40	41.57	74.00	-32.43	peak

Standard:	RSS-247	Test Site:	966 Chamber
Polarization:	Vertical		
Test Mode:	SRD 1M 2480 MHz		
Remark:			



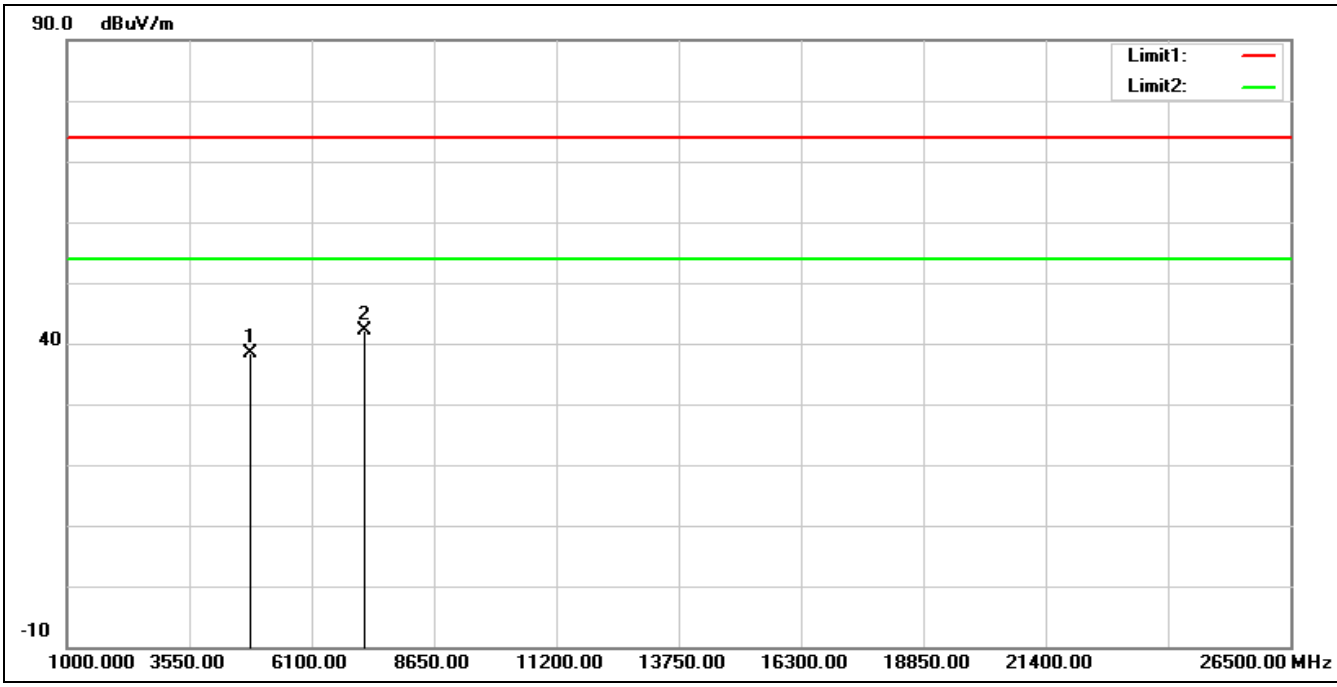
No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960.000	38.65	0.22	38.87	74.00	-35.13	peak
2*	7440.000	35.32	6.40	41.72	74.00	-32.28	peak

Standard:	RSS-247	Test Site:	966 Chamber
Polarization:	Horizontal		
Test Mode:	SRD 2M 2404 MHz		
Remark:			



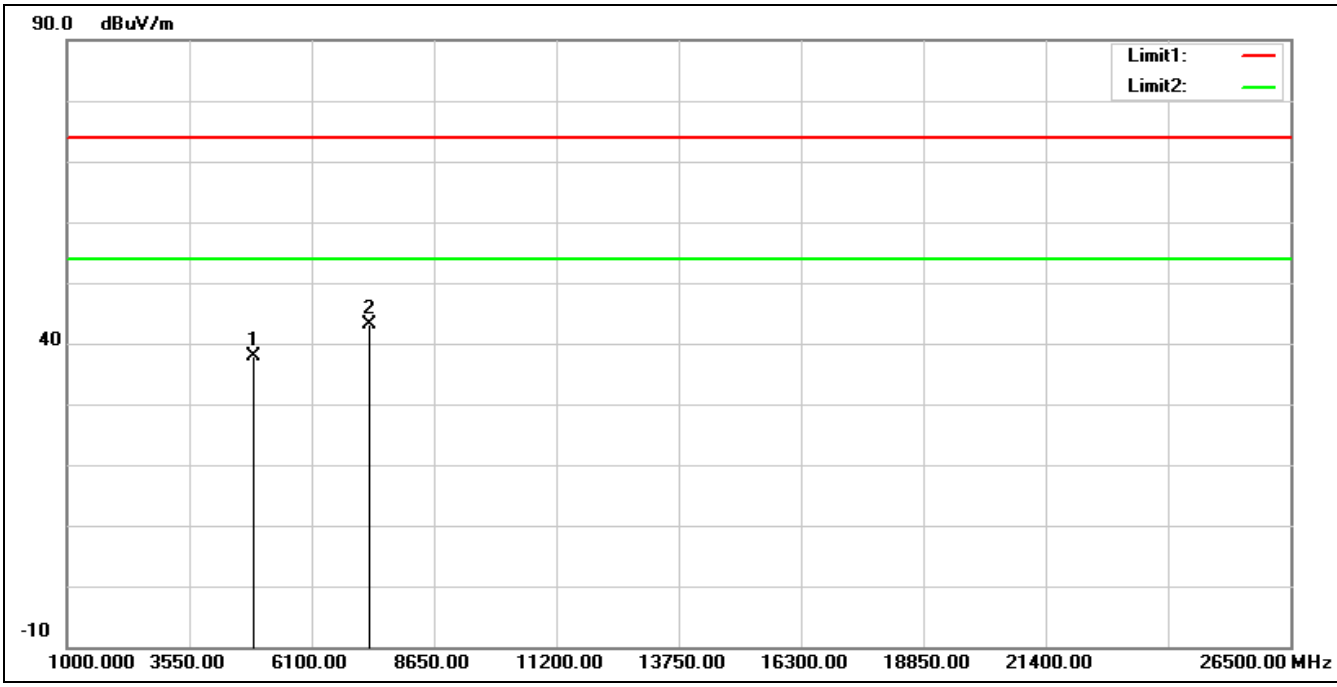
No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4808.000	38.38	-0.29	38.09	74.00	-35.91	peak
2*	7212.000	35.40	6.51	41.91	74.00	-32.09	peak

Standard:	RSS-247	Test Site:	966 Chamber
Polarization:	Vertical		
Test Mode:	SRD 2M 2404 MHz		
Remark:			



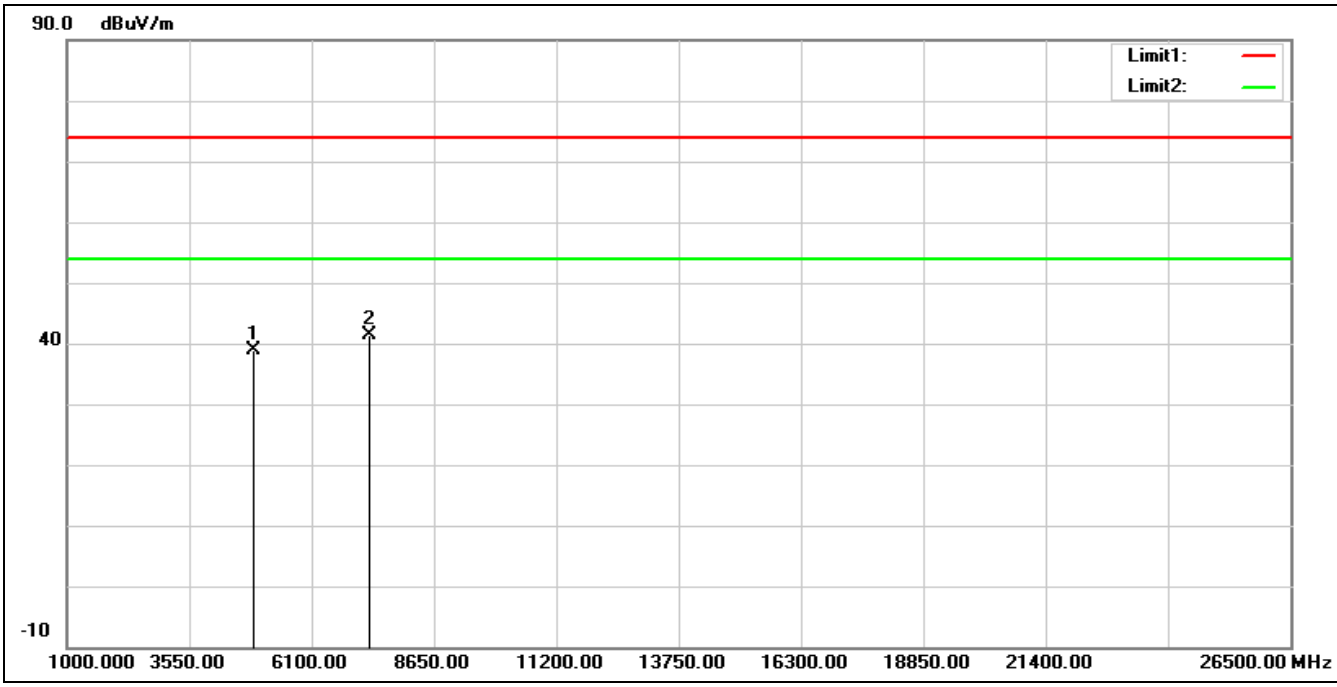
No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4808.000	38.58	-0.29	38.29	74.00	-35.71	peak
2*	7212.000	35.67	6.51	42.18	74.00	-31.82	peak

Standard:	RSS-247	Test Site:	966 Chamber
Polarization:	Horizontal		
Test Mode:	SRD 2M 2440 MHz		
Remark:			



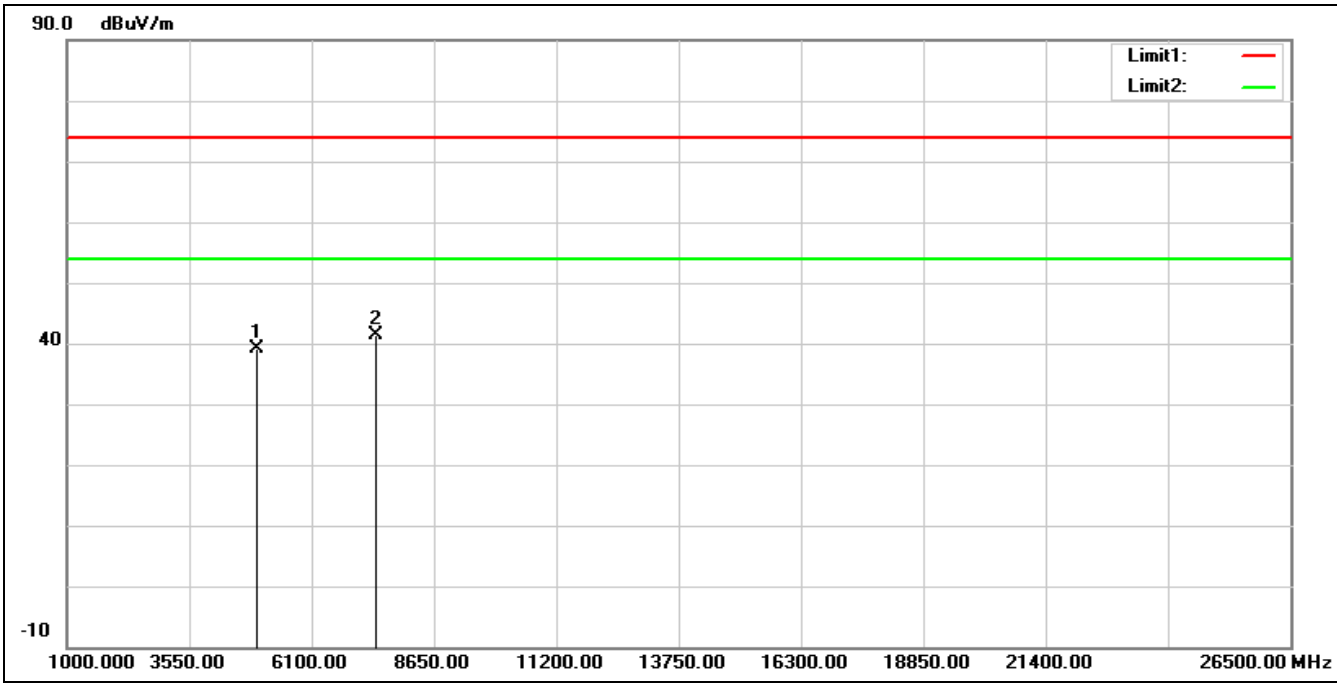
No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4880.000	37.94	-0.13	37.81	74.00	-36.19	peak
2*	7320.000	37.02	6.22	43.24	74.00	-30.76	peak

Standard:	RSS-247	Test Site:	966 Chamber
Polarization:	Vertical		
Test Mode:	SRD 2M 2440 MHz		
Remark:			



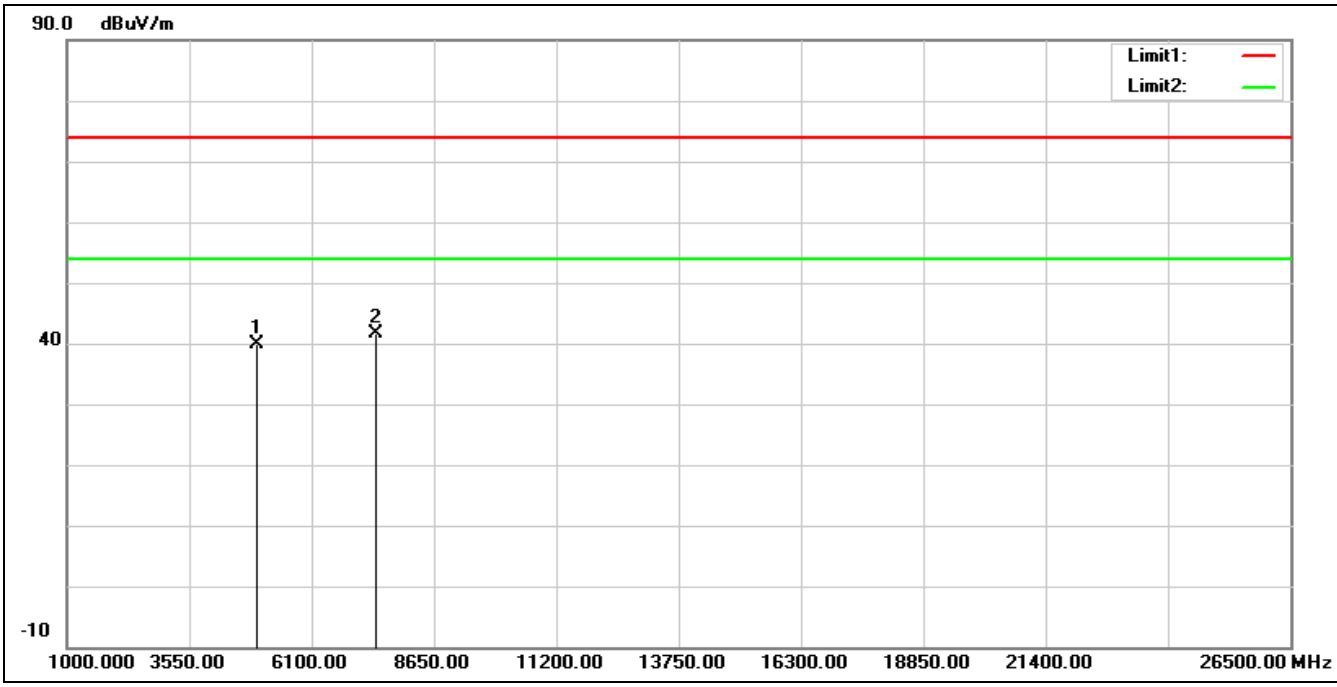
No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4880.000	39.02	-0.13	38.89	74.00	-35.11	peak
2*	7320.000	35.11	6.22	41.33	74.00	-32.67	peak

Standard:	RSS-247	Test Site:	966 Chamber
Polarization:	Horizontal		
Test Mode:	SRD 2M 2478 MHz		
Remark:			



No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4956.000	38.96	0.19	39.15	74.00	-34.85	peak
2*	7434.000	34.92	6.40	41.32	74.00	-32.68	peak

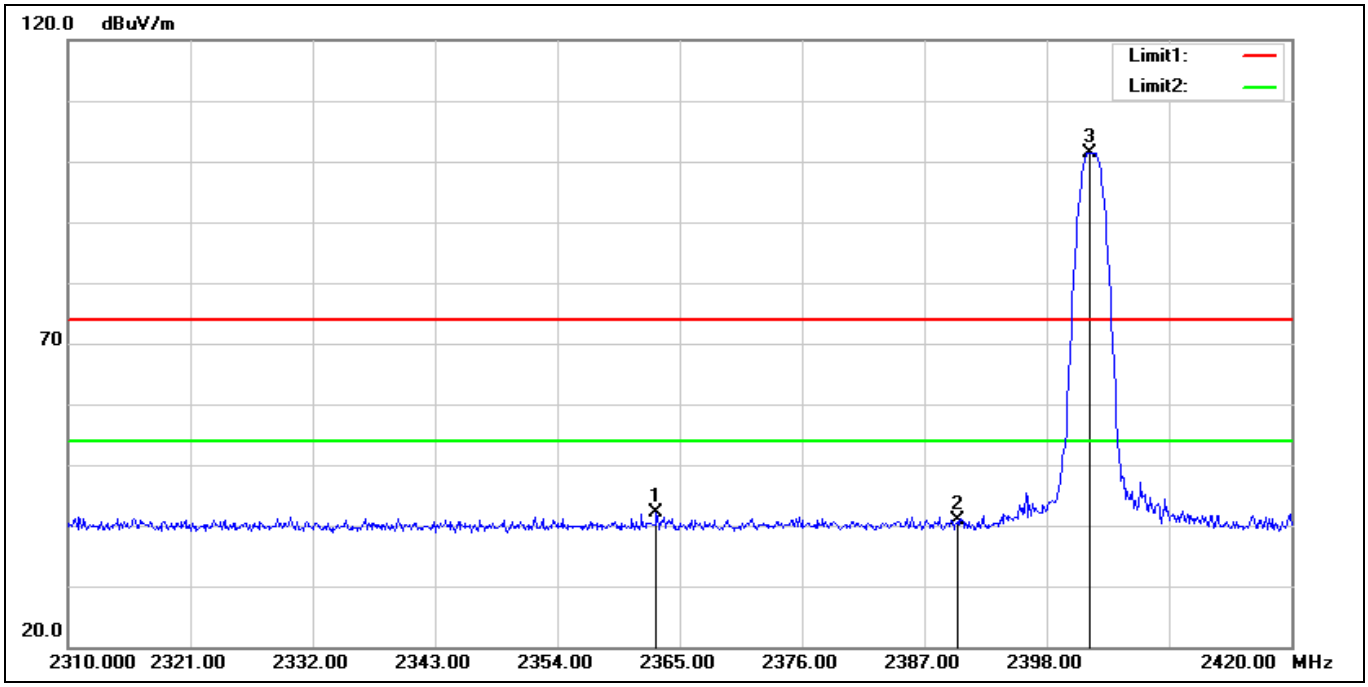
Standard:	RSS-247	Test Site:	966 Chamber
Polarization:	Vertical		
Test Mode:	SRD 2M 2478 MHz		
Remark:			



No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4956.000	39.62	0.19	39.81	74.00	-34.19	peak
2*	7434.000	35.18	6.40	41.58	74.00	-32.42	peak

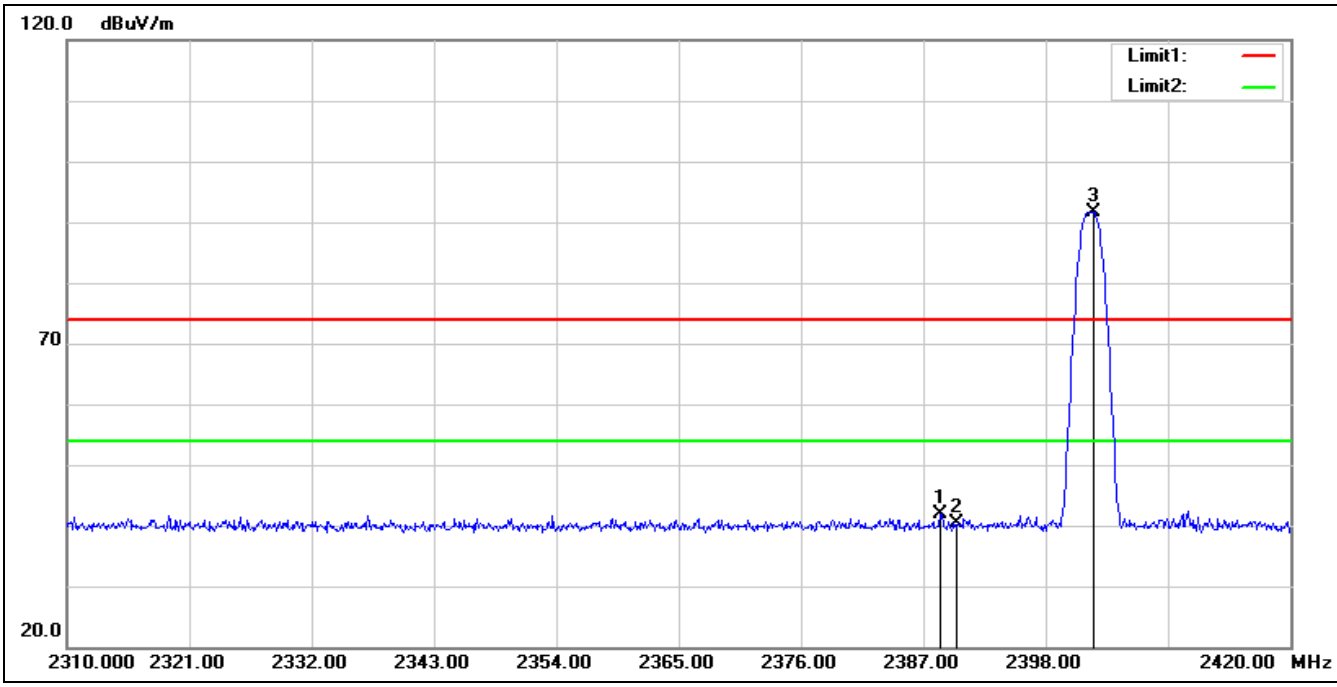
Band Edge

Standard:	RSS-247	Test Site:	966 Chamber
Polarization:	Horizontal		
Test Mode:	SRD 1M 2402 MHz		
Remark:			



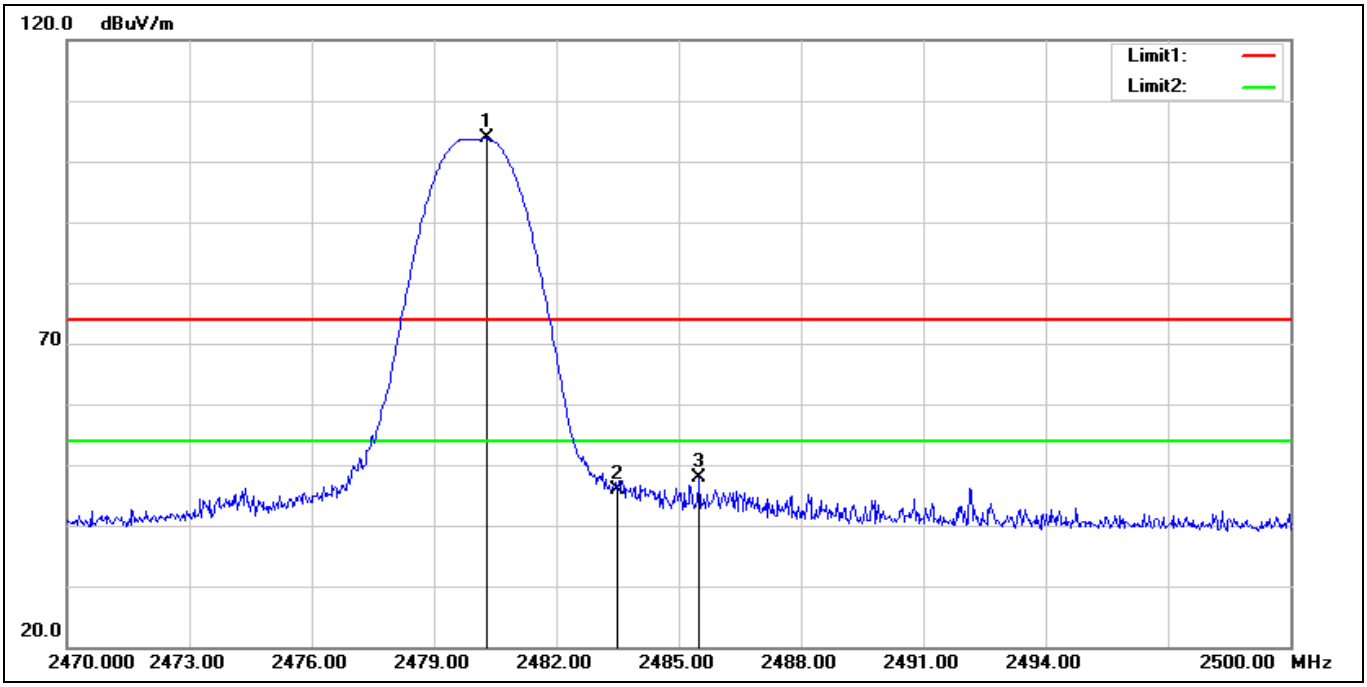
No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2362.910	48.50	-6.48	42.02	74.00	-31.98	peak
2	2390.000	47.46	-6.50	40.96	74.00	-33.04	peak
3*	2401.850	108.01	-6.51	101.50	74.00	27.50	peak

Standard:	RSS-247	Test Site:	966 Chamber
Polarization:	Vertical		
Test Mode:	SRD 1M 2402 MHz		
Remark:			



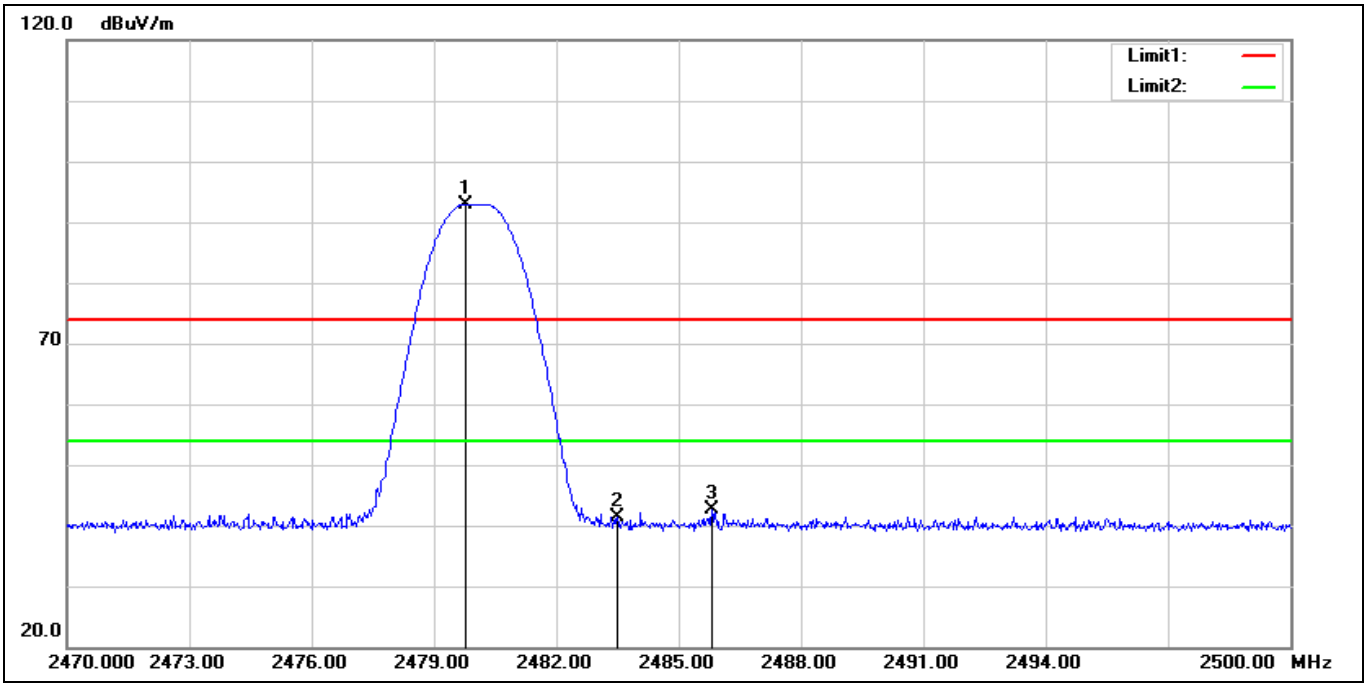
No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2388.540	48.48	-6.50	41.98	74.00	-32.02	peak
2	2390.000	46.88	-6.50	40.38	74.00	-33.62	peak
3*	2402.290	98.16	-6.51	91.65	74.00	17.65	peak

Standard:	RSS-247	Test Site:	966 Chamber
Polarization:	Horizontal		
Test Mode:	SRD 1M 2480 MHz		
Remark:			



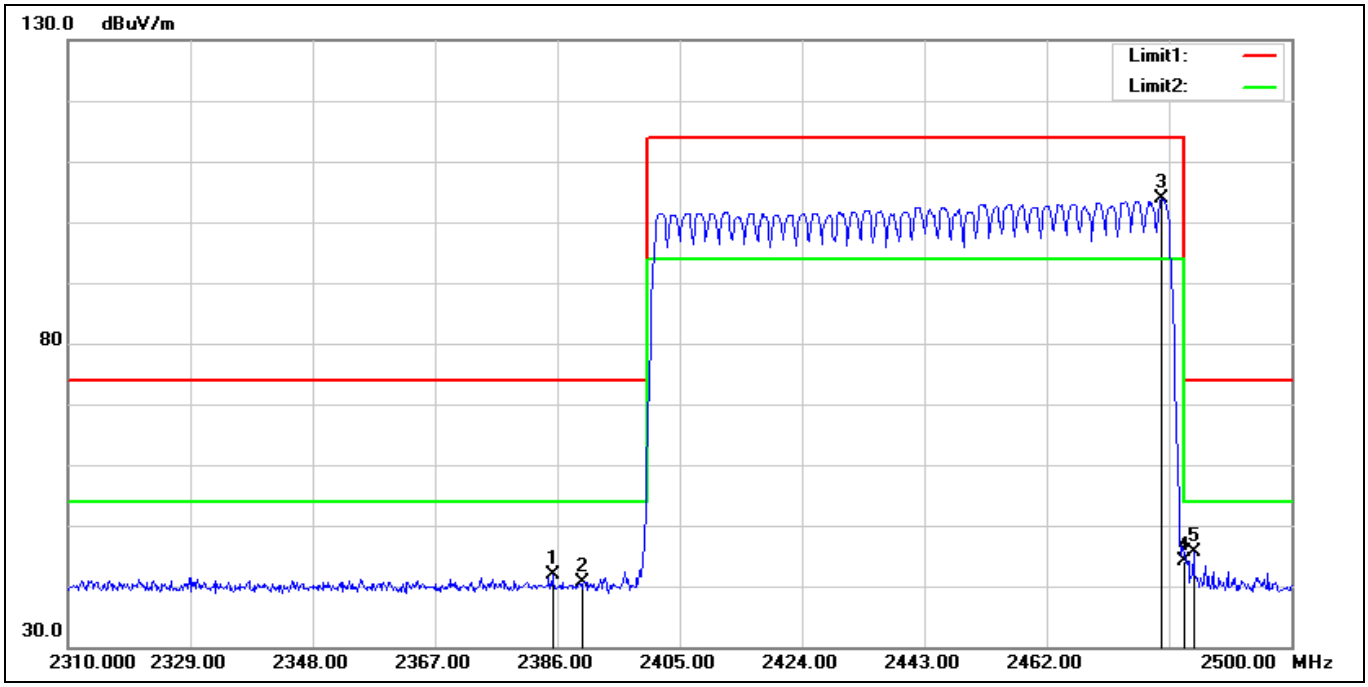
No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1*	2480.290	110.36	-6.58	103.78	74.00	29.78	peak
2	2483.500	52.35	-6.57	45.78	74.00	-28.22	peak
3	2485.510	54.41	-6.57	47.84	74.00	-26.16	peak

Standard:	RSS-247	Test Site:	966 Chamber
Polarization:	Vertical		
Test Mode:	SRD 1M 2480 MHz		
Remark:			



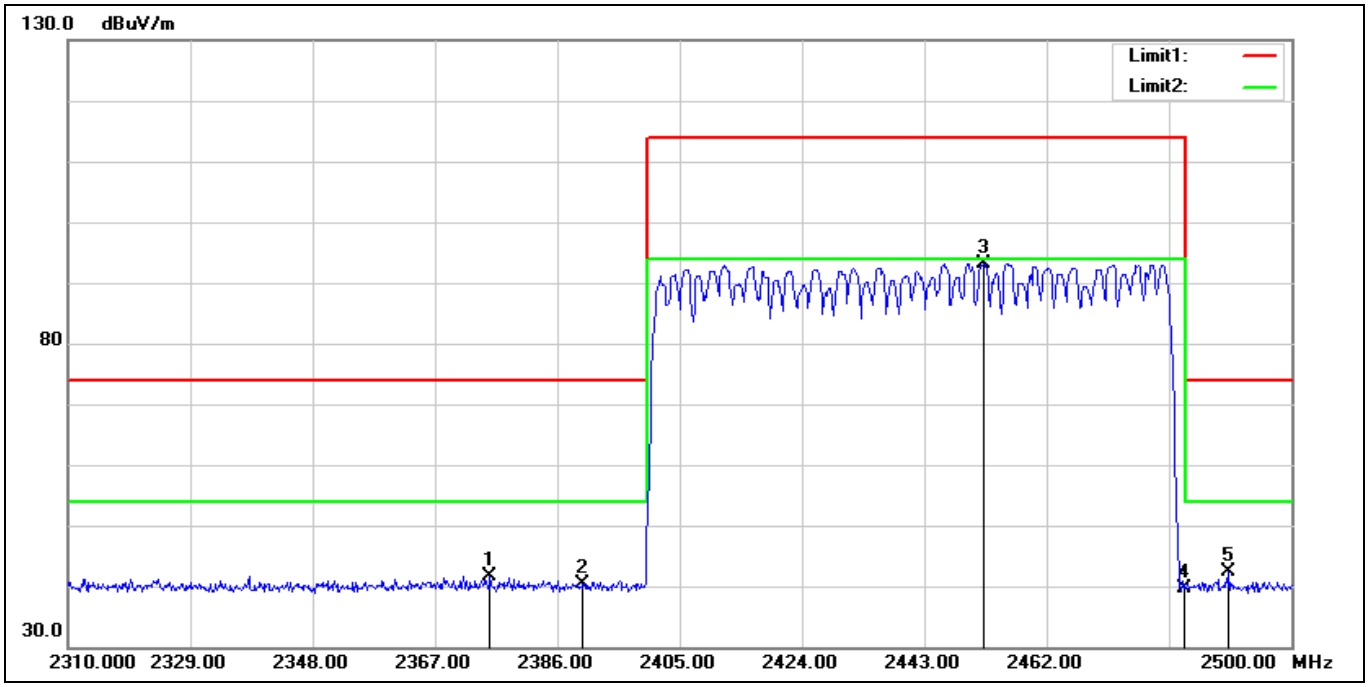
No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1*	2479.780	99.51	-6.58	92.93	74.00	18.93	peak
2	2483.500	47.91	-6.57	41.34	74.00	-32.66	peak
3	2485.810	49.10	-6.57	42.53	74.00	-31.47	peak

Standard:	RSS-247	Test Site:	966 Chamber
Polarization:	Horizontal		
Test Mode:	Hopping 1M		
Remark:			



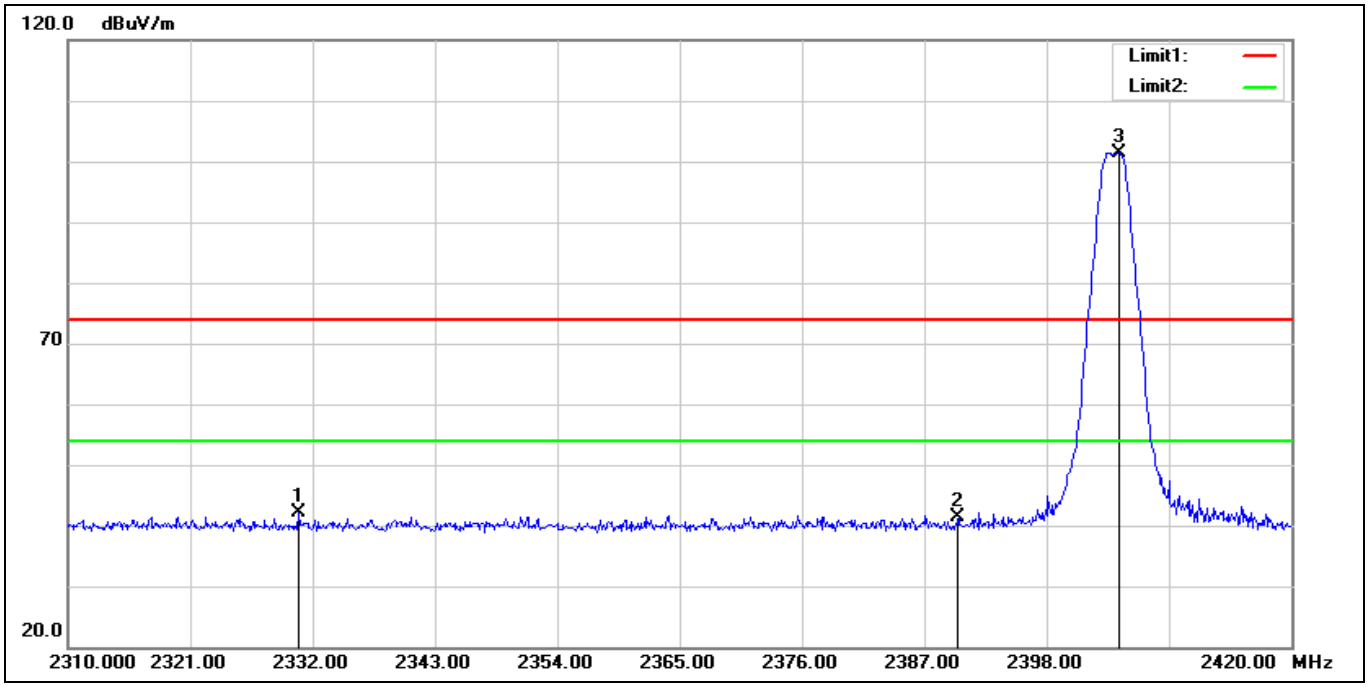
No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2385.240	48.29	-6.49	41.80	74.00	-32.20	peak
2	2390.000	47.02	-6.50	40.52	74.00	-33.48	peak
3*	2479.860	110.35	-6.58	103.77	114.00	-10.23	peak
4	2483.500	50.66	-6.57	44.09	74.00	-29.91	peak
5	2484.800	52.22	-6.57	45.65	74.00	-28.35	peak

Standard:	RSS-247	Test Site:	966 Chamber
Polarization:	Vertical		
Test Mode:	Hopping 1M		
Remark:			



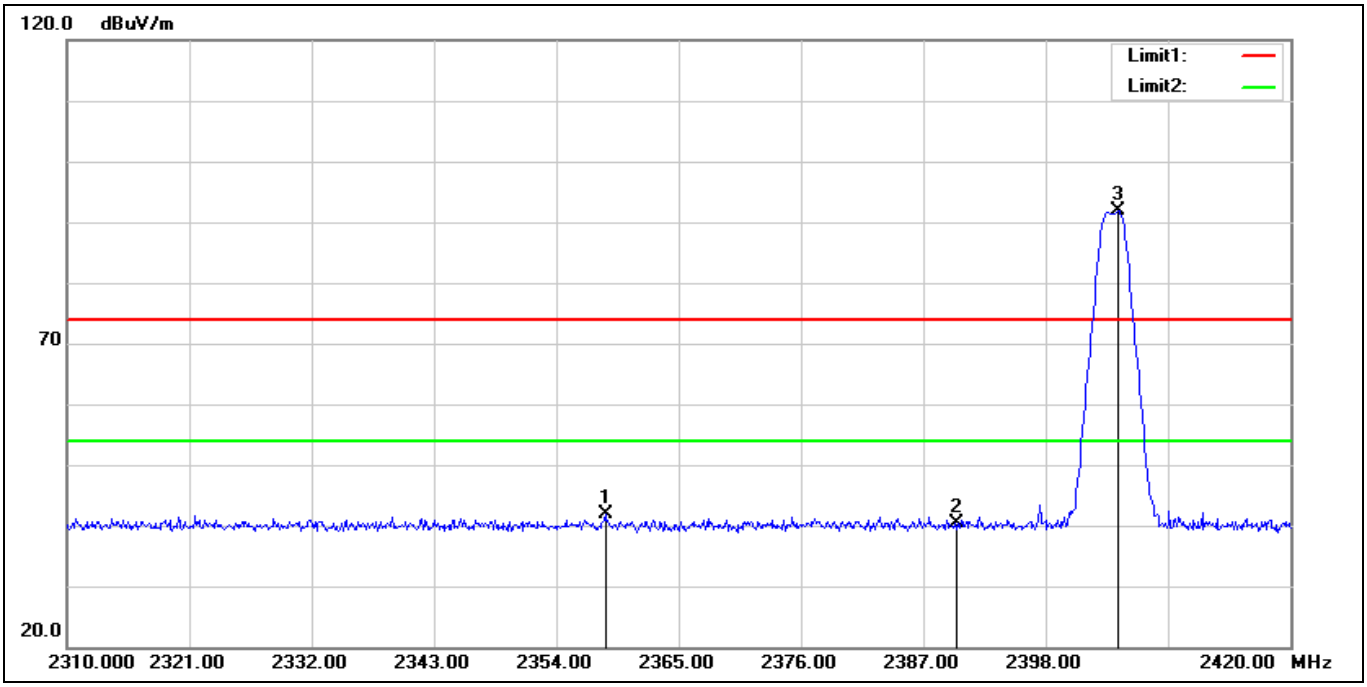
No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2375.550	48.22	-6.48	41.74	74.00	-32.26	peak
2	2390.000	46.92	-6.50	40.42	74.00	-33.58	peak
3*	2452.310	99.76	-6.54	93.22	114.00	-20.78	peak
4	2483.500	46.27	-6.57	39.70	74.00	-34.30	peak
5	2490.310	48.93	-6.58	42.35	74.00	-31.65	peak

Standard:	RSS-247	Test Site:	966 Chamber
Polarization:	Horizontal		
Test Mode:	SRD 2M 2404 MHz		
Remark:			



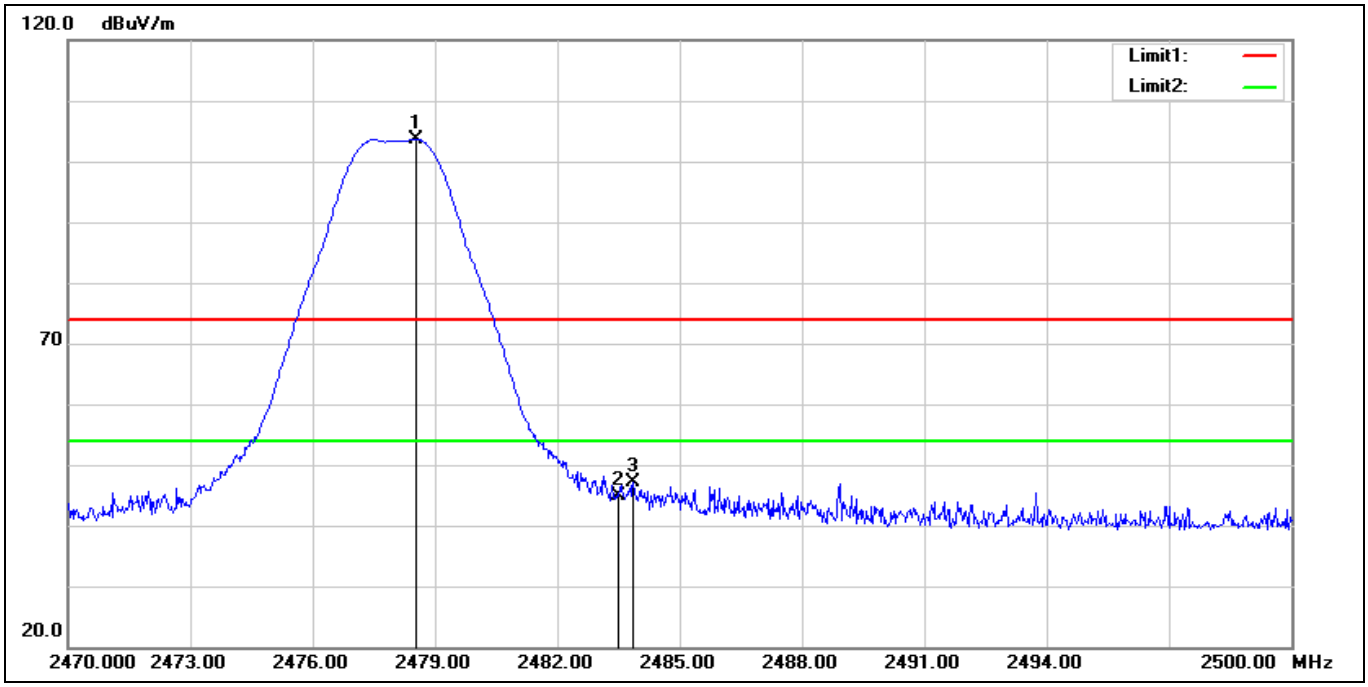
No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2330.790	48.63	-6.40	42.23	74.00	-31.77	peak
2	2390.000	47.81	-6.50	41.31	74.00	-32.69	peak
3*	2404.490	107.97	-6.50	101.47	74.00	27.47	peak

Standard:	RSS-247	Test Site:	966 Chamber
Polarization:	Vertical		
Test Mode:	SRD 2M 2404 MHz		
Remark:			



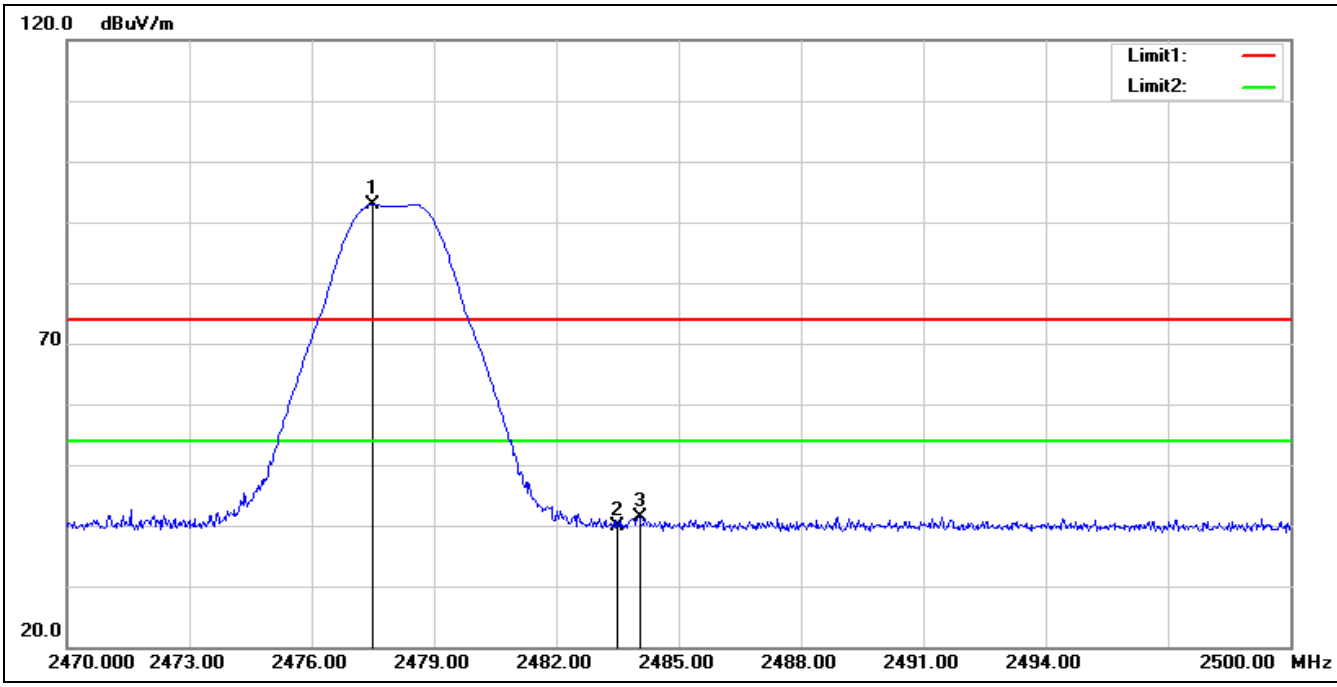
No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2358.400	48.46	-6.47	41.99	74.00	-32.01	peak
2	2390.000	46.95	-6.50	40.45	74.00	-33.55	peak
3*	2404.490	98.26	-6.50	91.76	74.00	17.76	peak

Standard:	RSS-247	Test Site:	966 Chamber
Polarization:	Horizontal		
Test Mode:	SRD 2M 2478 MHz		
Remark:			



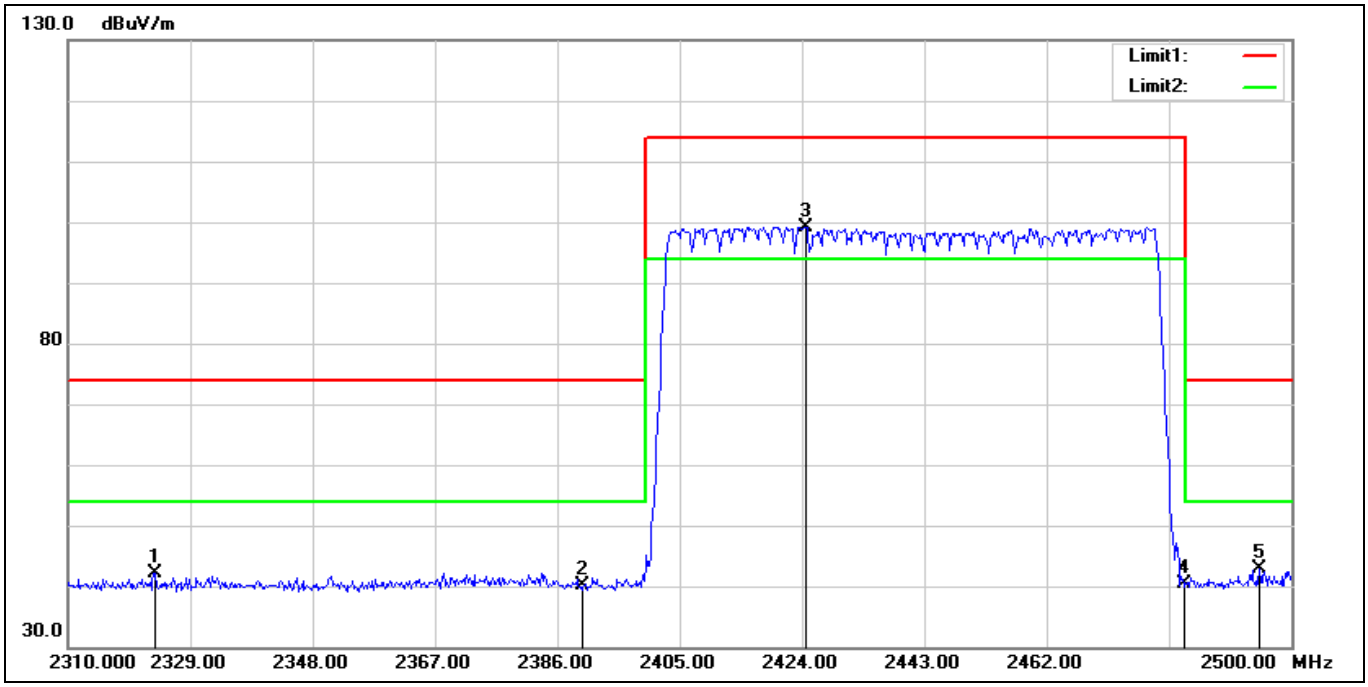
No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1*	2478.520	110.28	-6.58	103.70	74.00	29.70	peak
2	2483.500	51.43	-6.57	44.86	74.00	-29.14	peak
3	2483.860	53.73	-6.57	47.16	74.00	-26.84	peak

Standard:	RSS-247	Test Site:	966 Chamber
Polarization:	Vertical		
Test Mode:	SRD 2M 2478 MHz		
Remark:			



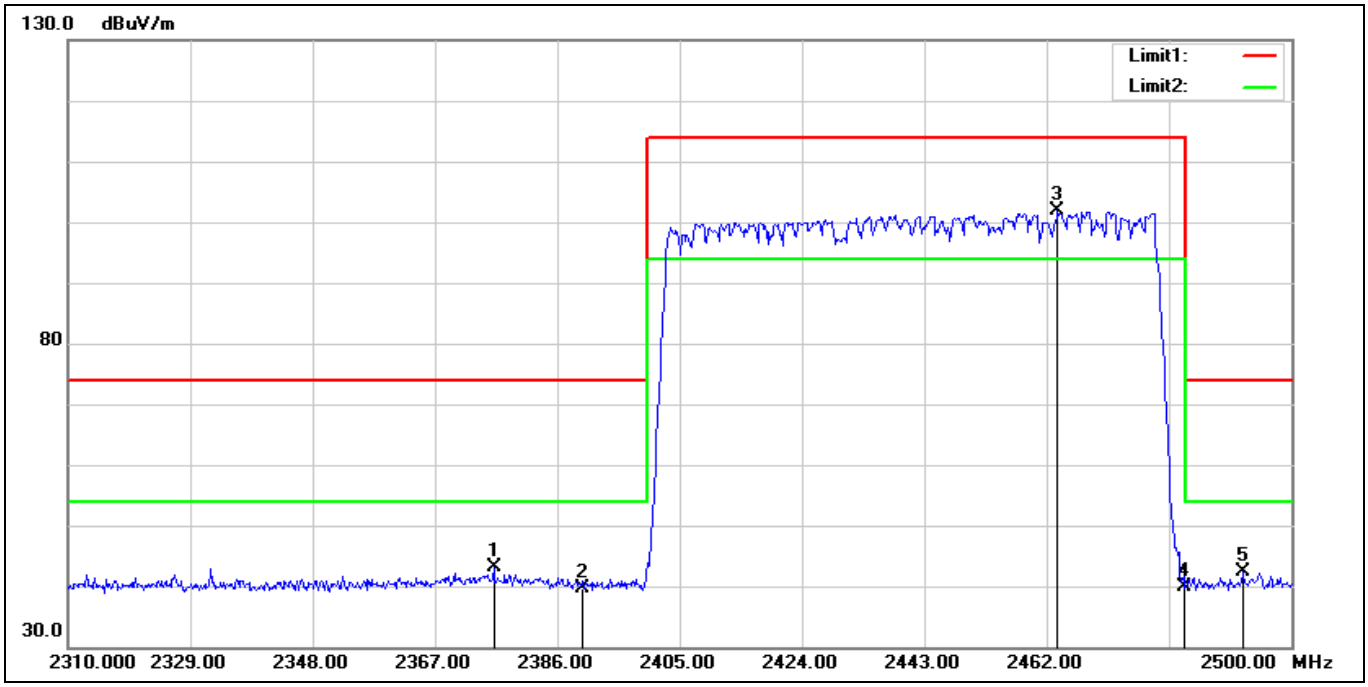
No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1*	2477.500	99.50	-6.58	92.92	74.00	18.92	peak
2	2483.500	46.48	-6.57	39.91	74.00	-34.09	peak
3	2484.040	48.05	-6.57	41.48	74.00	-32.52	peak

Standard:	RSS-247	Test Site:	966 Chamber
Polarization:	Horizontal		
Test Mode:	Hopping 2M		
Remark:			



No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2323.490	48.60	-6.39	42.21	74.00	-31.79	peak
2	2390.000	46.53	-6.50	40.03	74.00	-33.97	peak
3*	2424.570	105.76	-6.53	99.23	114.00	-14.77	peak
4	2483.500	46.86	-6.57	40.29	74.00	-33.71	peak
5	2495.060	49.36	-6.58	42.78	74.00	-31.22	peak

Standard:	RSS-247	Test Site:	966 Chamber
Polarization:	Vertical		
Test Mode:	Hopping 2M		
Remark:			



No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2376.120	49.52	-6.48	43.04	74.00	-30.96	peak
2	2390.000	46.16	-6.50	39.66	74.00	-34.34	peak
3*	2463.710	108.32	-6.56	101.76	114.00	-12.24	peak
4	2483.500	46.52	-6.57	39.95	74.00	-34.05	peak
5	2492.400	49.05	-6.58	42.47	74.00	-31.53	peak

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