FCC Part 15.247

TEST REPORT

For

NOMVDIC Corporation

1209 Orange Street, Wilmington, New Castle Delaware 19801, USA

FCC ID: 2A4GSRP100

Report Type:	**Product Type:**
Original Report	Bluetooth/Voice Control Remote Control

Report Producer : Coco Lin

Report Number : RXZ211221006RF01

Report Date : 2022-04-28

Reviewed By: Andy Shih Andy. Shih

Prepared By: Bay Area Compliance Laboratories Corp.
(New Taipei Laboratory)
70, Lane 169, Sec. 2, Datong Road, Xizhi Dist.,
New Taipei City 22183, Taiwan, R.O.C.
Tel: +886 (2)2647 6898
Fax: +886 (2) 2647 6895
www.bacl.com.tw

Revision History

Revision	No.	Report Number	Issue Date	Description	Author/ Revised by
0.0	RXZ211221006	RXZ211221006RF01	2022-04-28	Original Report	Coco Lin

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1 General Information

1.1 Product Description for Equipment under Test (EUT)

<table>
<tr><td rowspan="2">Manufacturer</td><td>NOMVDIC Corporation</td></tr>
<tr><td>1209 Orange Street, Wilmington, New Castle Delaware 19801, USA</td></tr>
<tr><td>Brand(Trade) Name</td><td>NOMVDIC</td></tr>
<tr><td>Product (Equipment)</td><td>Bluetooth/Voice Control Remote Control</td></tr>
<tr><td>Main Model Name</td><td>RP100</td></tr>
<tr><td>Series Model Name</td><td>RP101, ND10003, ND10004</td></tr>
<tr><td>Model Discrepancy</td><td>The major electrical and mechanical constructions of series models are identical to the basic model, except different LED backlight. The model: RP100 is the testing sample and the final test data are shown on this test report.
<table>
<tr><th>With LED backlight</th><th>Without LED backlight</th></tr>
<tr><td>RP100</td><td>RP101</td></tr>
<tr><td>ND10003</td><td>ND10004</td></tr>
</table></td></tr>
<tr><td>Frequency Range</td><td>BLE Mode: 2402 ~ 2480 MHz</td></tr>
<tr><td>Transmit Power</td><td>BLE Mode: 2.74 dBm</td></tr>
<tr><td>Modulation Technique</td><td>BLE Mode: GFSK</td></tr>
<tr><td>Transmit Data Rate</td><td>BLE Mode: 1 Mbps</td></tr>
<tr><td rowspan="3">Power Operation
(Voltage Range)</td><td>☐ AC 120V/60Hz
☐ Adapter I/P:
☐ By AC Power Cord
☐PoE</td></tr>
<tr><td>☒DC
☒ Battery 1.5V*2
☐ DC Power Supply
☐ External from USB Cable
☐ External DC Adapter</td></tr>
<tr><td>☐ Host System</td></tr>
<tr><td>Received Date</td><td>Dec. 22, 2021</td></tr>
<tr><td>Date of Test</td><td>Dec. 30, 2021 ~ Apr. 26, 2022</td></tr>
</table>

*All measurement and test data in this report was gathered from production sample serial number: RXZ211221006-01 ,RXZ211221006-02(Assigned by BACL, New Taipei Laboratory).

1.2 Objective

This report is prepared on behalf of *NOMVDIC Corporation*in accordance with Part 2, Subpart J, Part 15, Subparts A and C of the Federal Communication Commission's rules.

1.3 Related Submittal(s)/Grant(s)

N/A.

1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.
KDB 558074 D01 15.247 Meas Guidance v05r02

1.5 Statement of Compliance

Decision Rule: No, (The test results do not include MU judgment)

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.
The determination of the test results does not require consideration of the uncertainty of the measurement, unless the assessment is required by customer agreement, regulation or standard document specification.
Bay Area Compliance Laboratories Corp. (New Taipei Laboratory) is not responsible for the authenticity of the information provided by the applicant that affects the test results.

1.6 Measurement Uncertainty

Parameter		Uncertainty
AC Mains		+/- 2.36 dB
RF output power, conducted		+/- 0.93 dB
Power Spectral Density, conducted		+/- 0.93 dB
Occupied Bandwidth		+/- 0.35 MHz
Unwanted Emissions, conducted		+/- 1.69 dB
Emissions, radiated	30 MHz~1GHz	+/- 5.22 dB
	1 GHz~18 GHz	+/- 6.12 dB
	18 GHz~40 GHz	+/- 4.99 dB
Temperature		+/- 1.27 °C
Humidity		+/- 3 %

1.7 Environmental Conditions

Test Site	Test Data	Temperature (℃)	Relative Humidity (%)	ATM Pressure (hPa)	Test Engineer
Radiation Spurious Emissions	2022/1/7~2022/4/26	19.2~21.1	63~67	1010	Howard Ho
Conducted Spurious Emissions	2021/12/30	24.8	47	1010	Howard Ho
6 dB Emission Bandwidth	2021/12/30	24.8	47	1010	Howard Ho
Maximum Output Power	2021/12/30	24.8	47	1010	Howard Ho
100 kHz Bandwidth of Frequency Band Edge	2021/12/30	24.8	47	1010	Howard Ho
Power Spectral Density	2021/12/30	24.8	47	1010	Howard Ho

1.8 Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (New Taipei Laboratory) to collect test data is located on

☒70, Lane 169, Sec. 2, Datong Road, Xizhi Dist., New Taipei City 22183, Taiwan, R.O.C.

Bay Area Compliance Laboratories Corp. (New Taipei Laboratory) is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 3732) and the FCC designation No.TW3732 under the Mutual Recognition Agreement (MRA) in FCC Test.

2 System Test Configuration

2.1 Description of Test Configuration

For BLE mode, there are totally 40 channels.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2442
1	2404	--	--
2	2406	--	--
3	2408	37	2476
--	--	38	2478
19	2440	39	2480

For BLE Modes were tested with channel 0, 19 and 39.

The system was configured for testing in engineering mode, which was provided by manufacturer.

2.2 Equipment Modifications

No modification was made to the EUT.

2.3 EUT Exercise Software

The test software was used “RTL8762C_RFTestTool”

Test Frequency		Low	Mid	High
Power Level Setting	BLE 1M	Default	Default	Default

2.4 Support Equipment List and Details

N/A

2.5 External Cable List and Details

N/A

2.6 Test Mode

Pre-scan

Radiated Spurious Emissions

Mode 1: RP100 (Sample serial number: RXZ211221006-01)

Mode 2: RP101 (Sample serial number: RXZ211221006-02)

Worst case is the Mode 1: RP100

Model 1: RP100 for all test item.

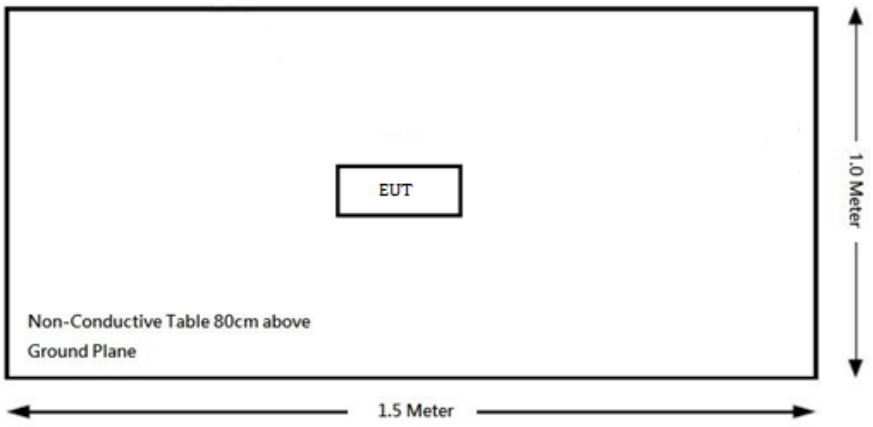
Model 2: RP101 test Below 1GHz Radiated Spurious Emissions.

2.7 Block Diagram of Test Setup

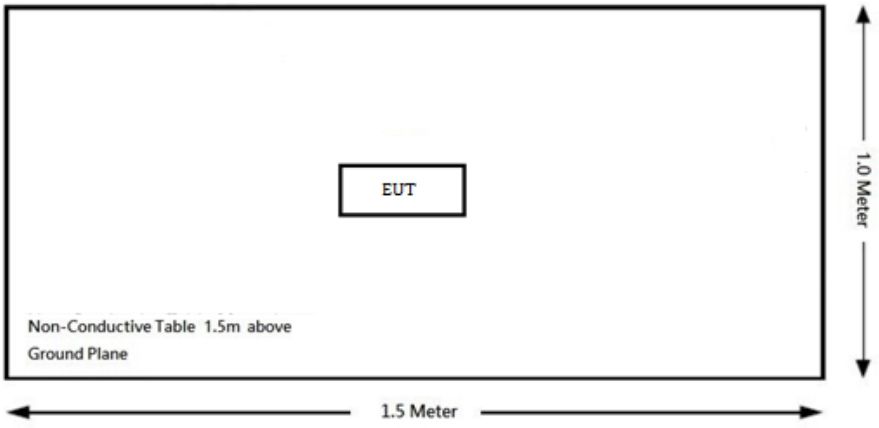
See test photographs attached in setup photos for the actual connections between EUT and support equipment.

Radiation:

Below 1GHz:



Above 1GHz:



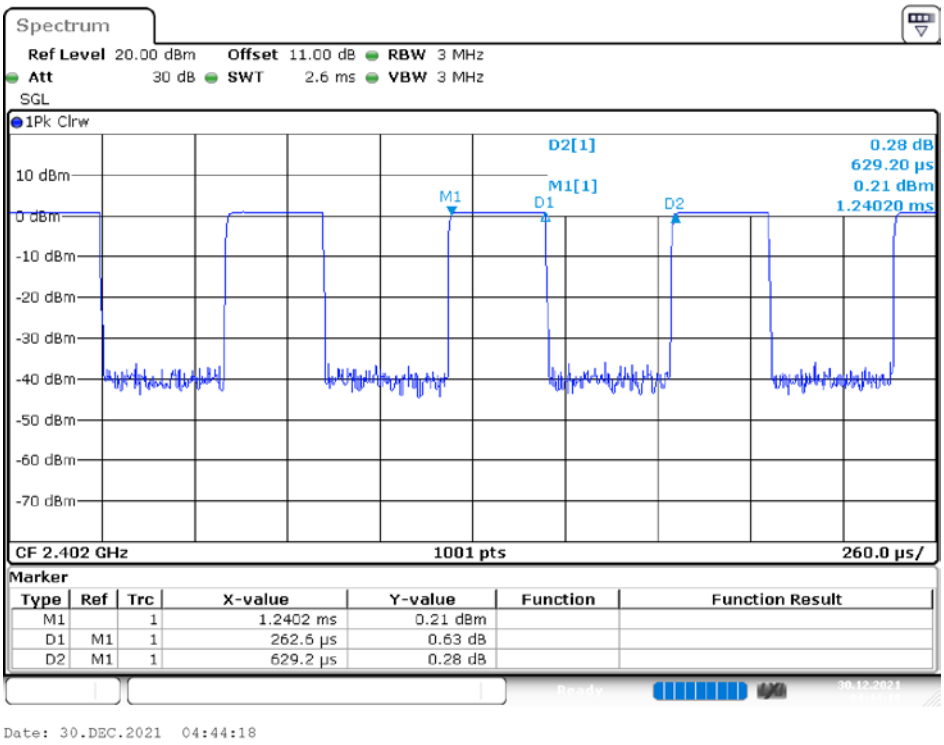
2.8 Duty Cycle

The duty cycle as below:

Radio Mode	On Time (ms)	Off Time (ms)	Duty Cycle (%)
BLE	0.263	0.366	42

Please refer to the following plots.

BLE Mode



3 Summary of Test Results

FCC Rules	Description of Test	Results
§15.247(i), §1.1310, §2.1093	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207(a)	AC Line Conducted Emissions	Not applicable
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247(a)(2)	6 dB Emission Bandwidth	Compliance
§15.247(b)(3)	Maximum Peak Output Power	Compliance
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliance
§15.247(e)	Power Spectral Density	Compliance

Not applicable: The device is battery operated equipment.

.

4 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Room (966-A)					
Bilog Antenna with 6 dB Attenuator	SUNOL SCIENCES & MINI-CIRCUITS	JB6/UNAT-6+	A050115/15542_01	2021/1/19	2022/1/18
				2022/2/14	2023/2/13
Horn Antenna	EMCO	SAS-571	1983	2021/5/6	2022/5/5
Horn Antenna	ETS-Lindgren	3116	62638	2021/8/11	2022/8/10
Preamplifier	Sonoma	310N	130602	2021/6/8	2022/6/7
Preamplifier	A.H. system Inc.	PAM-0118P	466	2021/11/4	2022/11/3
Microware Preamplifier	EM Electronics Corporation	EM18G40G	60656	2021/12/22	2022/12/21
Spectrum Analyzer	Rohde & Schwarz	FSV40	101939	2021/12/24	2022/12/23
EMI Test Receiver	Rohde & Schwarz	ESR7	101419	2021/11/9	2022/11/8
Micro flex Cable	UTIFLEX	UFB197C-1-2362-70U-70U	225757-001	2021/2/1	2022/1/31
				2022/1/24	2023/1/23
Coaxial Cable	COMMATE	PEWC	8Dr	2021/12/24	2022/12/23
Coaxial Cable	UTIFLEX	UFB311A-Q-1440-300300	220490-006	2021/2/1	2022/1/31
				2022/1/24	2023/1/23
Coaxial Cable	JUNFLON	J12J102248-00-B-5	AUG-07-15-044	2021/12/24	2022/12/23
Cable	EMC	EMC105-SM-SM-10000	201003	2021/2/3	2022/2/2
				2022/1/24	2023/1/23
Coaxial Cable	ROSNOL	K1K50-UP0264-K1K50-450CM	160309-1	2021/2/1	2022/1/31
				2022/1/24	2023/1/23
Coaxial Cable	ROSNOL	K1K50-UP0264-K1K50-50CM	15120-1	2021/1/28	2022/1/27
				2022/1/18	2023/1/17
Software	Farad	EZ_EMC	BACL-03A1	N.C.R	N.C.R
Conducted Room					
Spectrum Analyzer	Rohde & Schwarz	FSV40	101140	2021/1/7	2022/1/6
Cable	UTIFLEX	UFA210A	9435	2021/10/5	2022/10/4
Power Sensor	KEYSIGHT	U2021XA	MY54080018	2021/1/28	2022/1/27
Attenuator	MINI-CIRCUITS	BW-S10W5+	1419	2021/1/28	2022/1/27

***Statement of Traceability:** BACL Corp. attests that all of the calibrations on the equipment items listed above were traceable to the SI System of Units via the R.O.C. Center for Measurement Standards of the Electronics Testing Center, Taiwan (ETC) or to another internationally recognized National Metrology Institute (NMI), and were compliant with the current Taiwan Accreditation Foundation (TAF) requirements.

5 FCC §15.247(i), §1.1310, § 2.1093–RF Exposure

5.1 Applicable Standard

According to §2.1093 and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D01 General RF Exposure Guidance v06

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

1. f(GHz) is the RF channel transmit frequency in GHz.
2. Power and distance are rounded to the nearest mW and mm before calculation.
3. The result is rounded to one decimal place for comparison.
4. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion.

5.2 RF Exposure Evaluation Result

RF Exposure evaluation:

Mode	Frequency Range (MHz)	Tune-up Power		Evaluation Distance (mm)	Calculated Value	Threshold	SAR Test Exclusion
		(dBm)	(mW)			10-g extremity SAR	
BLE	2402-2480	3	1.995	5	0.64	7.5	Yes

Result: SAR test is exempted.

6 FCC §15.203 – Antenna Requirements

6.1 Applicable Standard

According to § 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 user of a standard antenna jack or electrical connector is prohibited.

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna does not exceed 6dBi.

6.2 Antenna Information

Model	Type	Antenna Gain
N/A	PCB Antenna	1.5 dBi

Result: Compliance

7 FCC §15.209, §15.205 , §15.247(d) – Spurious Emissions

5.1 Applicable Standard

As per FCC §15.35(d): Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1MHz.

As Per FCC §15.205(a) except as show in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 – 0.110	16.42 – 16.423	608 – 614	4. 5 – 5. 15
0.495 – 0.505	16.69475 – 16.69525	960 – 1240	5. 35 – 5. 46
2.1735 – 2.1905	16.80425 – 16.80475	1300 – 1427	7.25 – 7.75
4.125 – 4.128	25.5 – 25.67	1435 – 1626.5	8.025 – 8.5
4.17725 – 4.17775	37.5 – 38.25	1645.5 – 1646.5	9.0 – 9.2
4.20725 – 4.20775	73 – 74.6	1660 – 1710	9.3 – 9.5
6.215 – 6.218	74.8 – 75.2	1718.8 – 1722.2	10.6 – 12.7
6.26775 – 6.26825	108 – 121.94	2200 – 2300	13.25 – 13.4
6.31175 – 6.31225	123 – 138	2310 – 2390	14.47 – 14.5
8.291 – 8.294	149.9 – 150.05	2483.5 – 2500	15.35 – 16.2
8.362 – 8.366	156.52475 – 156.52525	2690 – 2900	17.7 – 21.4
8.37625 – 8.38675	156.7 – 156.9	3260 – 3267	22.01 – 23.12
8.41425 – 8.41475	162.0125 –167.17	3.332 – 3.339	23.6 – 24.0
12.29 – 12.293	167.72 – 173.2	3 3458 – 3 358	31.2 – 31.8
12.51975 – 12.52025	240 – 285	3.600 – 4.400	36.43 – 36.5
12.57675 – 12.57725	322 – 335.4		Above 38.6
13.36 – 13.41	399.9 – 410		

As per FCC §15.209(a): Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

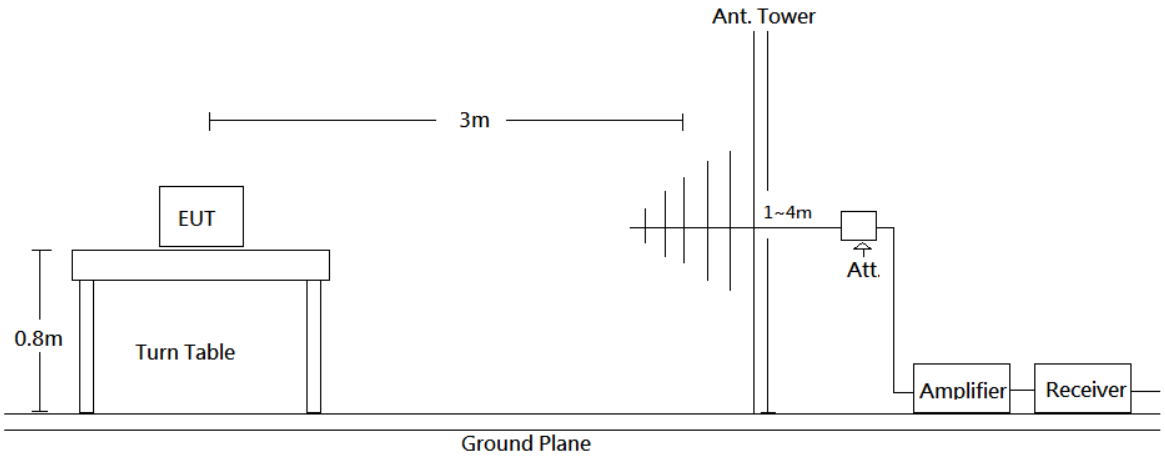
Frequency (MHz)	Field Strength (micro volts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100**	3
88 - 216	150**	3
216 - 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

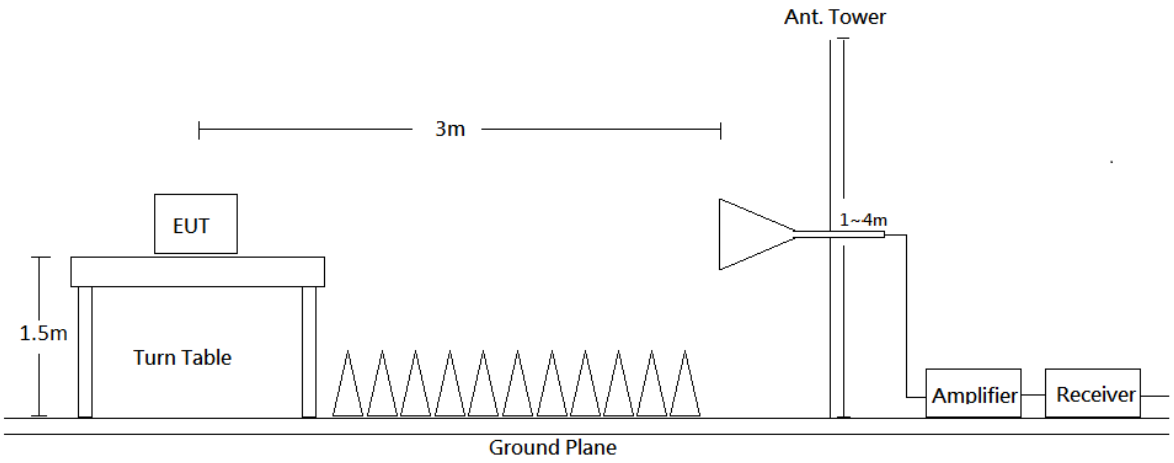
As per FCC §15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c).

5.2 EUT Setup

Below 1 GHz:



Above 1 GHz:



Radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC Part 15.209 and FCC 15.247 Limits.

5.3 EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 26.5 GHz. During the radiated emission test, the EMI test receiver was set with the following configurations measurement method 6.3 in ANSI C63.10.

Frequency Range	RBW	VBW	Duty cycle	Measurement method
30-1000 MHz	120 kHz	/	/	QP
Above 1 GHz	1 MHz	3 MHz	/	PK
	1 MHz	3 MHz	>98%	Ave
	1 MHz	1/T	<98%	Ave

Note: T is minimum transmission duration

5.4 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the Quasi-peak detector mode from 30 MHz to 1 GHz and PK and average detector modes for frequencies above 1 GHz.

5.5 Corrected Factor & Margin Calculation

The Correct Factor is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

Margin = Result –Limit

5.6 Test Results

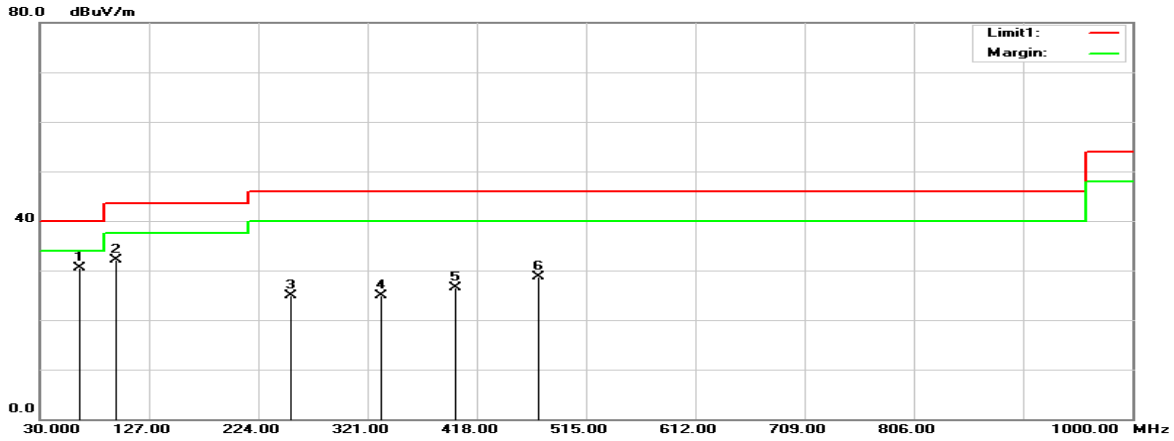
Test Mode: Transmitting

BLE Mode (Pre-scan with three orthogonal axis, and worse case as Z axis.)

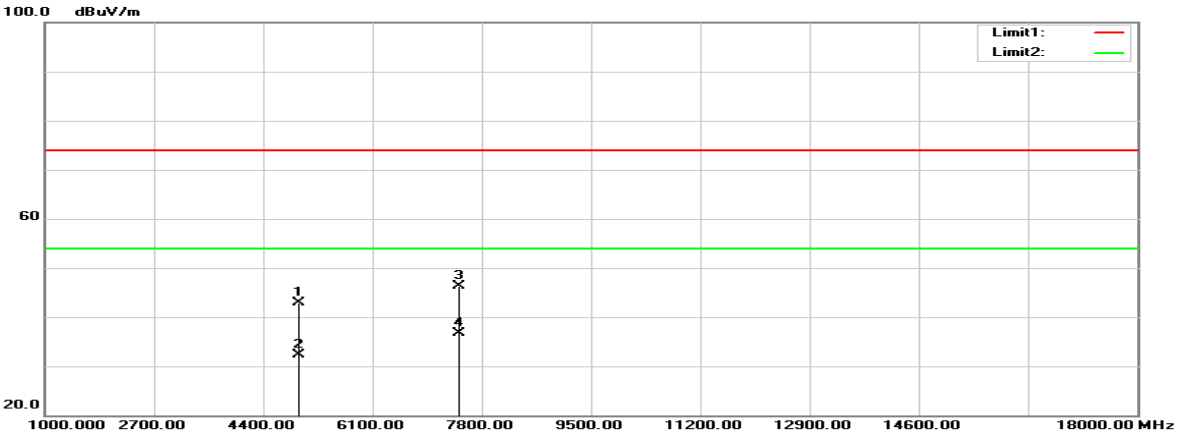
Model:RP100

Horizontal (worst case is high channel)

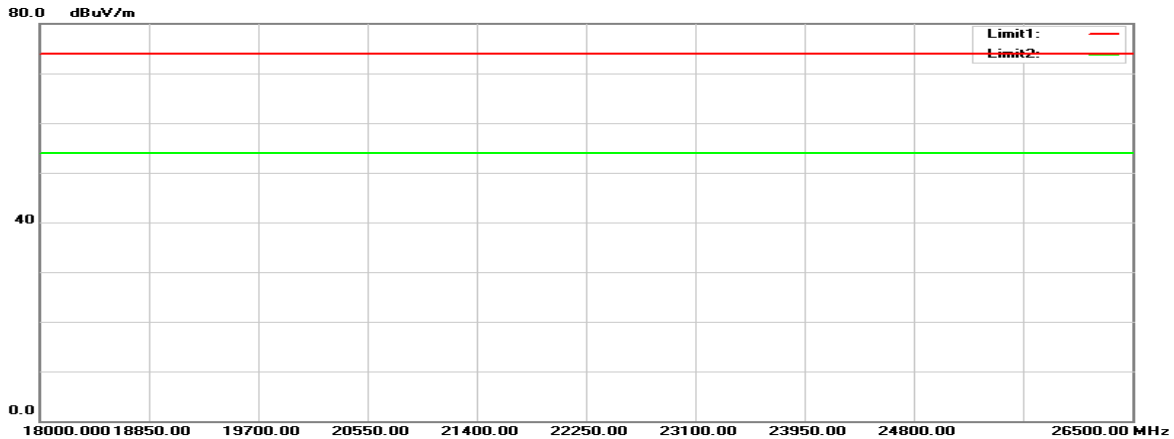
30MHz-1GHz:



1GHz-18GHz:

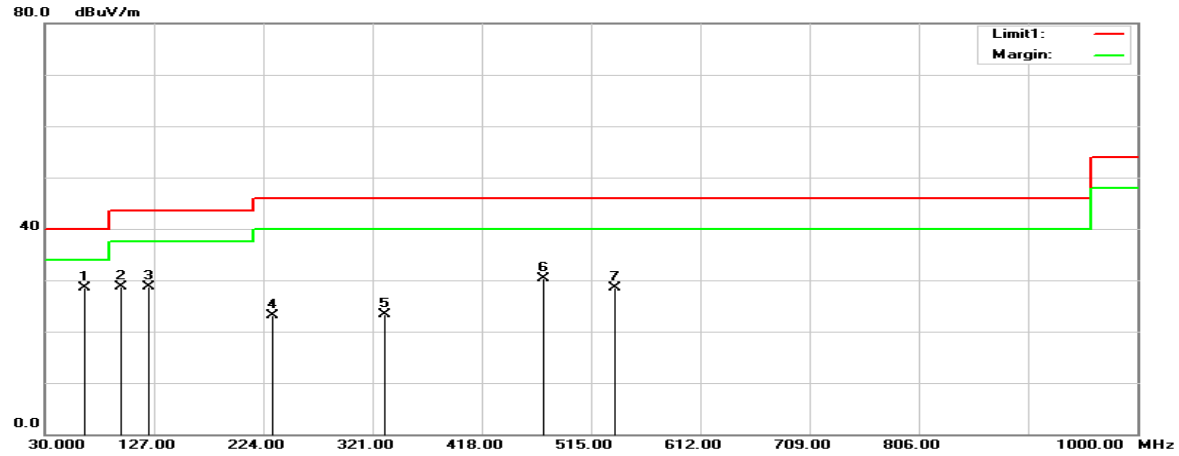


18GHz-26.5GHz:

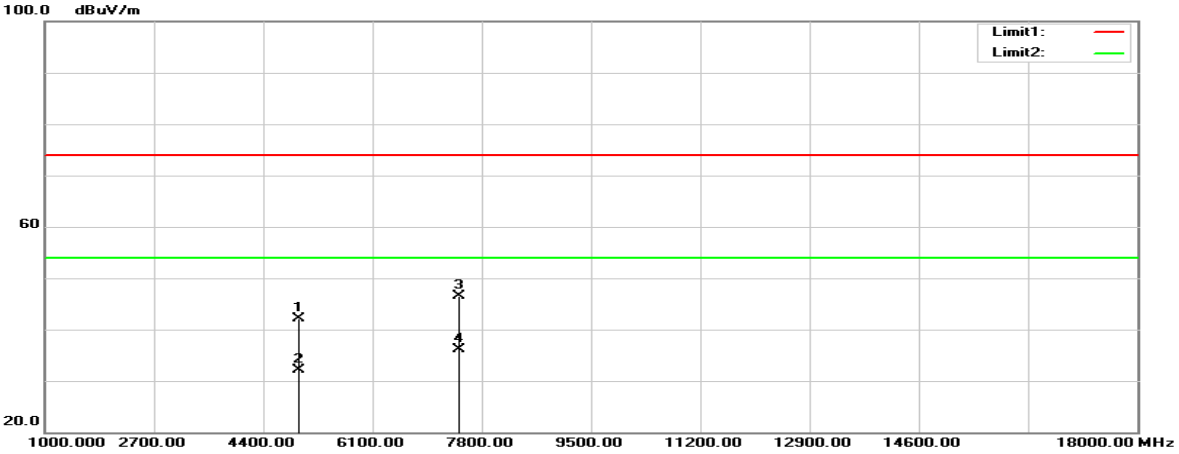


Vertical (worst case is low channel)

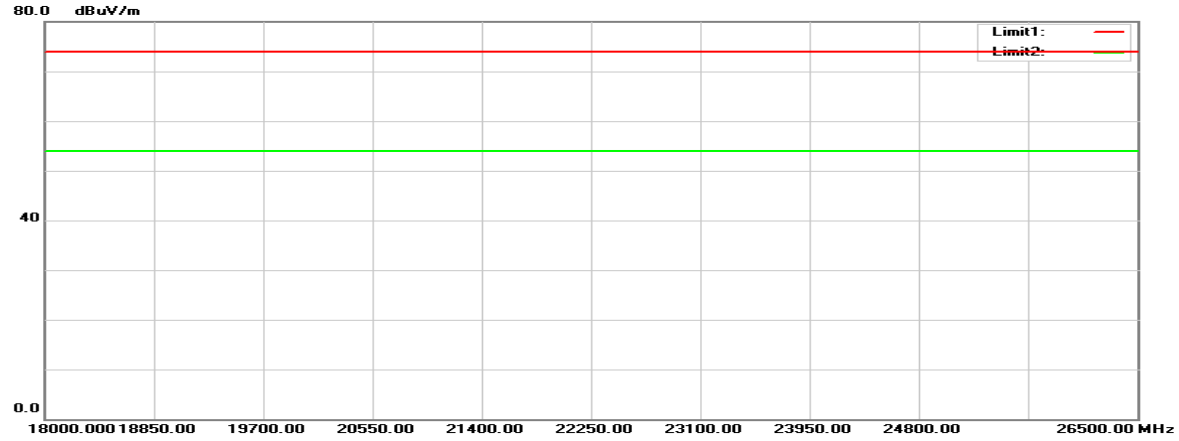
30MHz-1GHz:



1GHz-18GHz:



18GHz-26.5GHz:



Below 1GHz

Horizontal

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
65.8900	45.48	-15.04	30.44	40.00	-9.56	100	35	peak
97.9000	44.92	-12.75	32.17	43.50	-11.33	100	188	peak
253.1000	34.72	-9.84	24.88	46.00	-21.12	100	30	peak
332.6400	31.71	-6.76	24.95	46.00	-21.05	100	270	peak
398.6000	31.37	-4.91	26.46	46.00	-19.54	100	328	peak
472.3200	31.46	-2.76	28.70	46.00	-17.30	100	331	peak

Vertical

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
65.8900	43.46	-15.04	28.42	40.00	-11.58	100	158	peak
97.9000	41.49	-12.75	28.74	43.50	-14.76	100	24	peak
122.1500	36.92	-8.21	28.71	43.50	-14.79	100	333	peak
232.7300	33.23	-10.16	23.07	46.00	-22.93	100	218	peak
331.6700	30.05	-6.78	23.27	46.00	-22.73	100	133	peak
472.3200	32.97	-2.76	30.21	46.00	-15.79	100	45	peak
536.3400	30.43	-2.01	28.42	46.00	-17.58	100	26	peak

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

Above 1GHz

Horizontal

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
Low channel								
2366.900	56.59	-9.64	46.95	74.00	-27.05	149	154	peak
2366.900	43.29	-9.64	33.65	54.00	-20.35	149	154	AVG
4804.000	42.86	-2.17	40.69	74.00	-33.31	155	251	peak
4804.000	32.55	-2.17	30.38	54.00	-23.62	155	251	AVG
7206.000	42.09	4.18	46.27	74.00	-27.73	146	322	peak
7206.000	32.43	4.18	36.61	54.00	-17.39	146	322	AVG
Middle channel								
4880.000	43.48	-1.88	41.60	74.00	-32.40	145	249	peak
4880.000	33.26	-1.88	31.38	54.00	-22.62	145	249	AVG
7320.000	41.08	5.10	46.18	74.00	-27.82	133	256	peak
7320.000	31.28	5.10	36.38	54.00	-17.62	133	256	AVG
High channel								
2488.030	58.68	-8.38	50.30	74.00	-23.70	125	158	peak
2488.030	44.81	-8.38	36.43	54.00	-17.57	125	158	AVG
4960.000	44.30	-1.49	42.81	74.00	-31.19	146	258	peak
4960.000	33.89	-1.49	32.40	54.00	-21.60	146	258	AVG
7440.000	41.11	5.23	46.34	74.00	-27.66	155	177	peak
7440.000	31.42	5.23	36.65	54.00	-17.35	155	177	AVG

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

Vertical

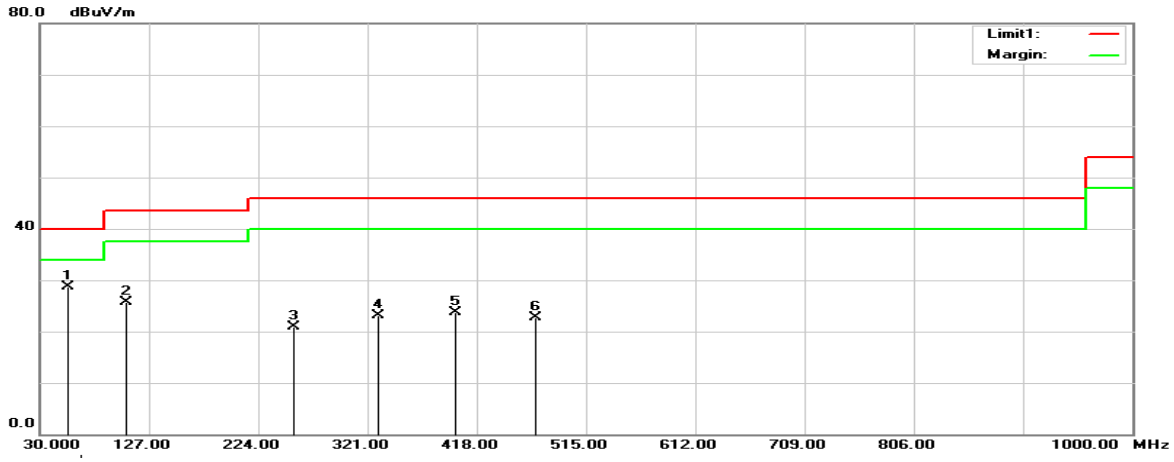
Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
Low channel								
2363.900	56.51	-9.67	46.84	74.00	-27.16	215	293	peak
2363.900	42.76	-9.67	33.09	54.00	-20.91	215	293	AVG
4804.000	43.67	-2.17	41.50	74.00	-32.50	156	325	peak
4804.000	32.89	-2.17	30.72	54.00	-23.28	156	325	AVG
7206.000	40.67	4.18	44.85	74.00	-29.15	142	288	peak
7206.000	30.64	4.18	34.82	54.00	-19.18	142	288	AVG
Middle channel								
4880.000	42.60	-1.88	40.72	74.00	-33.28	156	138	peak
4880.000	32.48	-1.88	30.60	54.00	-23.40	156	138	AVG
7320.000	40.94	5.10	46.04	74.00	-27.96	173	245	peak
7320.000	30.69	5.10	35.79	54.00	-18.21	173	245	AVG
High channel								
2488.120	58.18	-8.38	49.80	74.00	-24.20	201	290	peak
2488.120	45.22	-8.38	36.84	54.00	-17.16	201	290	AVG
4960.000	43.55	-1.49	42.06	74.00	-31.94	124	158	peak
4960.000	33.67	-1.49	32.18	54.00	-21.82	124	158	AVG
7440.000	41.25	5.23	46.48	74.00	-27.52	146	233	peak
7440.000	30.89	5.23	36.12	54.00	-17.88	146	233	AVG

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

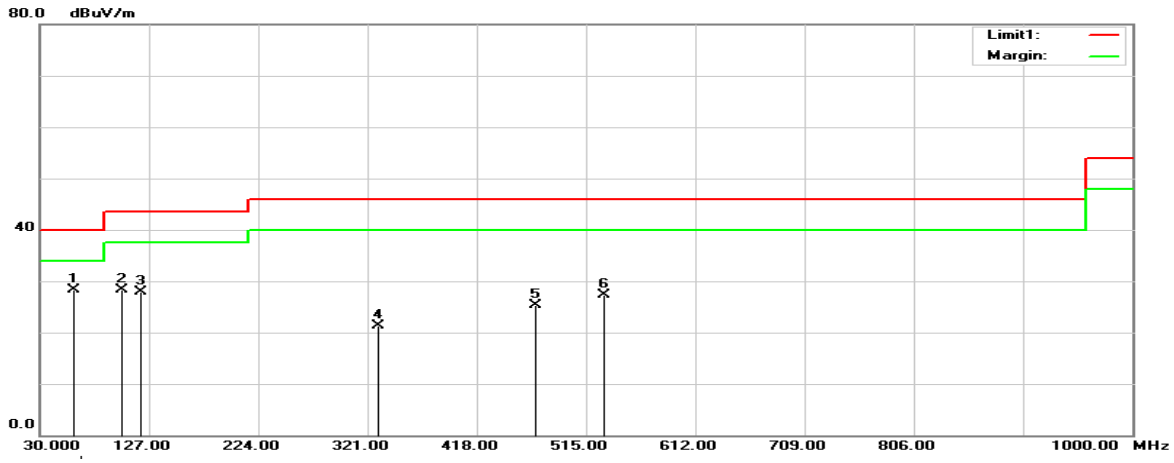
Model:RP101

30MHz-1GHz: (worst case is high channel)

Horizontal



Vertical



Below 1GHz

Horizontal

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
55.7600	44.29	-15.60	28.69	40.00	-11.31	100	118	peak
106.3800	36.23	-10.58	25.65	43.50	-17.85	100	110	peak
255.4000	30.60	-9.78	20.82	46.00	-25.18	100	236	peak
330.5200	29.95	-6.81	23.14	46.00	-22.86	100	200	peak
399.4200	28.54	-4.87	23.67	46.00	-22.33	100	265	peak
470.3200	25.55	-2.83	22.72	46.00	-23.28	100	48	peak

Vertical

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
60.8000	43.64	-15.40	28.24	40.00	-11.76	100	175	peak
102.6400	39.80	-11.48	28.32	43.50	-15.18	100	77	peak
119.3200	36.33	-8.51	27.82	43.50	-15.68	100	241	peak
330.1500	28.20	-6.82	21.38	46.00	-24.62	100	139	peak
470.2200	28.20	-2.84	25.36	46.00	-20.64	100	207	peak
531.6700	29.27	-2.02	27.25	46.00	-18.75	100	108	peak

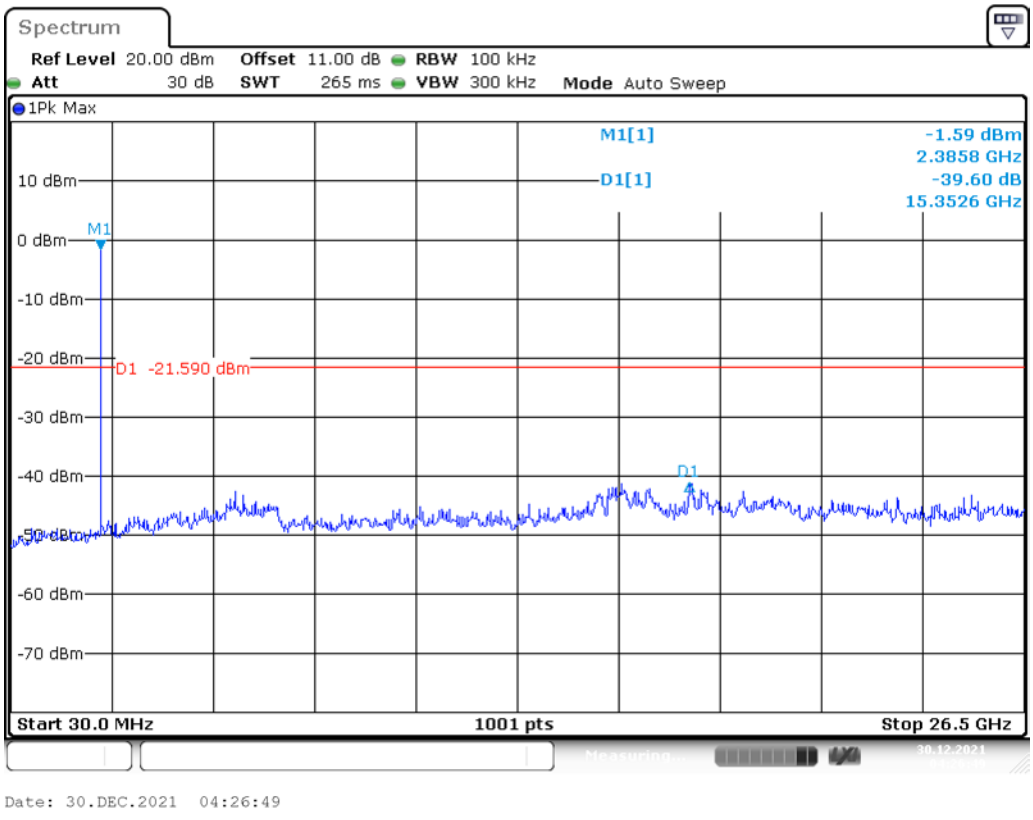
Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

Conducted Spurious Emissions:

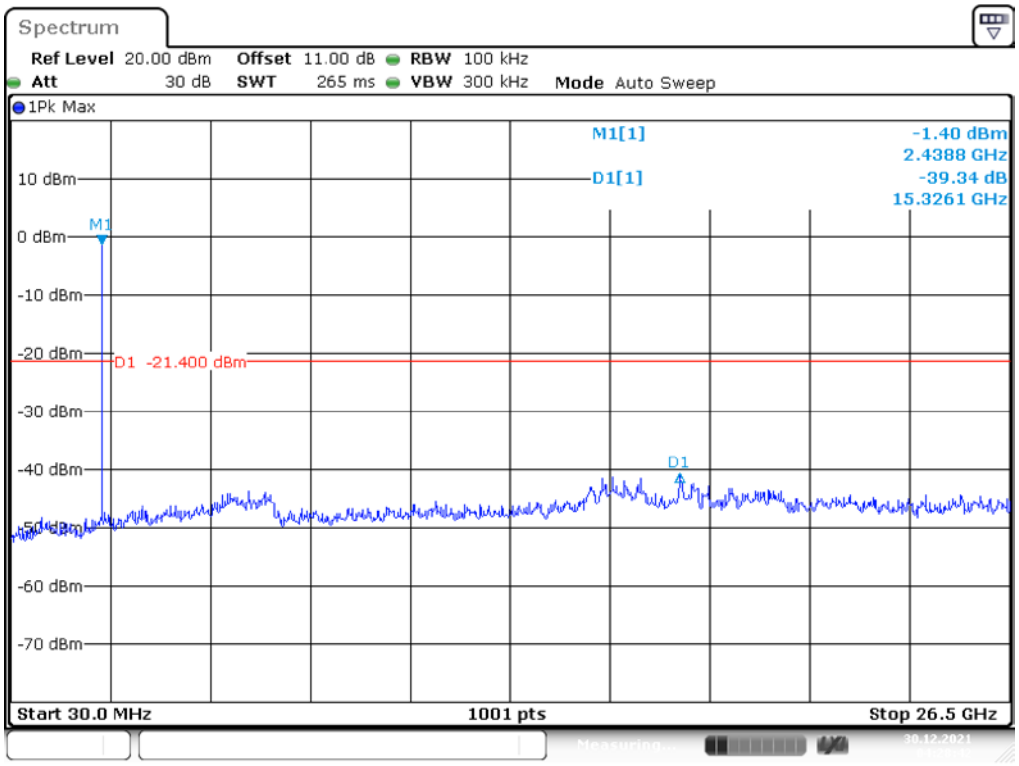
Channel	Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)	Result
Low	2402	39.60	≥ 20	PASS
Middle	2440	39.34	≥ 20	PASS
High	2480	41.68	≥ 20	PASS

BLE Mode

Low Channel



Middle Channel



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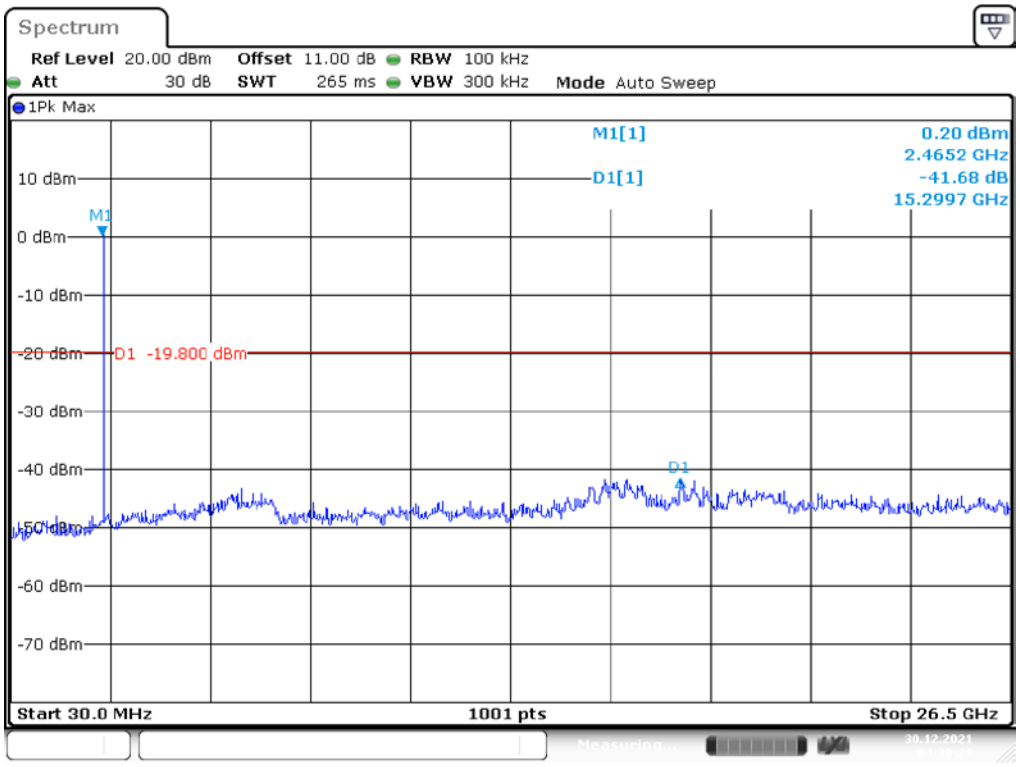
High Channel



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6 FCC §15.247(a)(2) – 6 dB Emission Bandwidth

6.1 Applicable Standard

According to FCC §15.247(a)(2).

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

6.2 Test Procedure

The steps for the first option are as follows:

a) Set RBW = 100 kHz.

b) Set the VBW ≥ [3 × RBW].

c) Detector = peak.

d) Trace mode = max hold.

e) Sweep = auto couple.

f) Allow the trace to stabilize.

g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

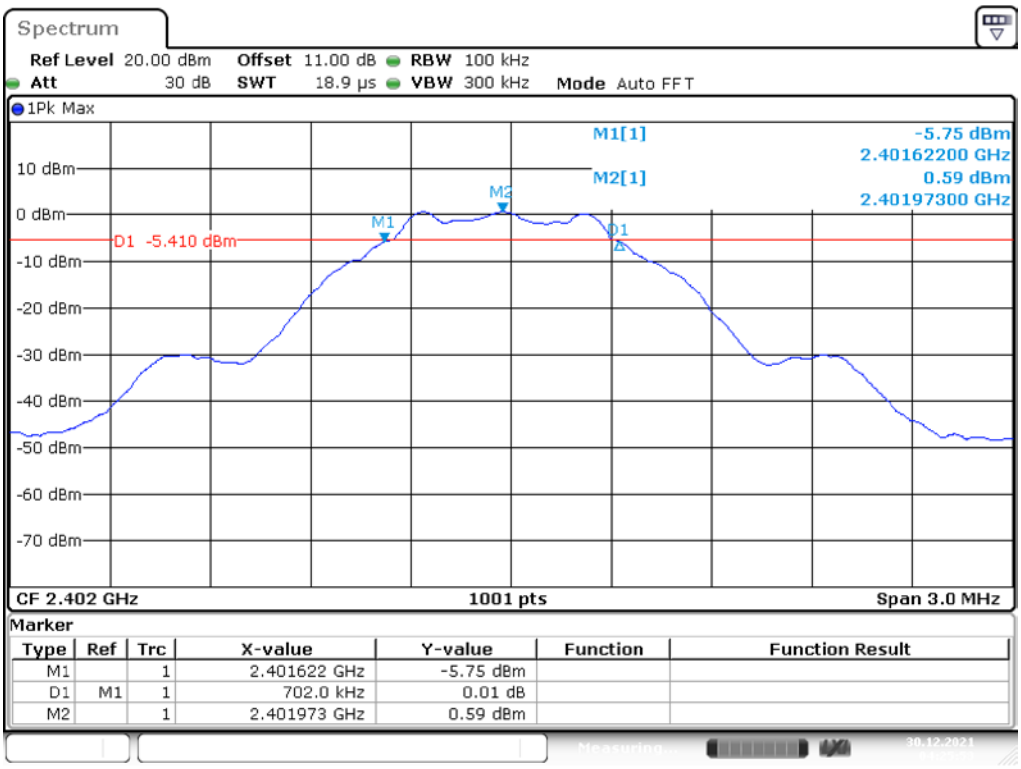
6.3 Test Results

Channel	Frequency (MHz)	6 dB Emission Bandwidth (kHz)	Limit (kHz)	Result
Low	2402	702	> 500	Compliance
Middle	2440	681	> 500	Compliance
High	2480	690	> 500	Compliance

Please refer to the following plots

BLE Mode

Low Channel



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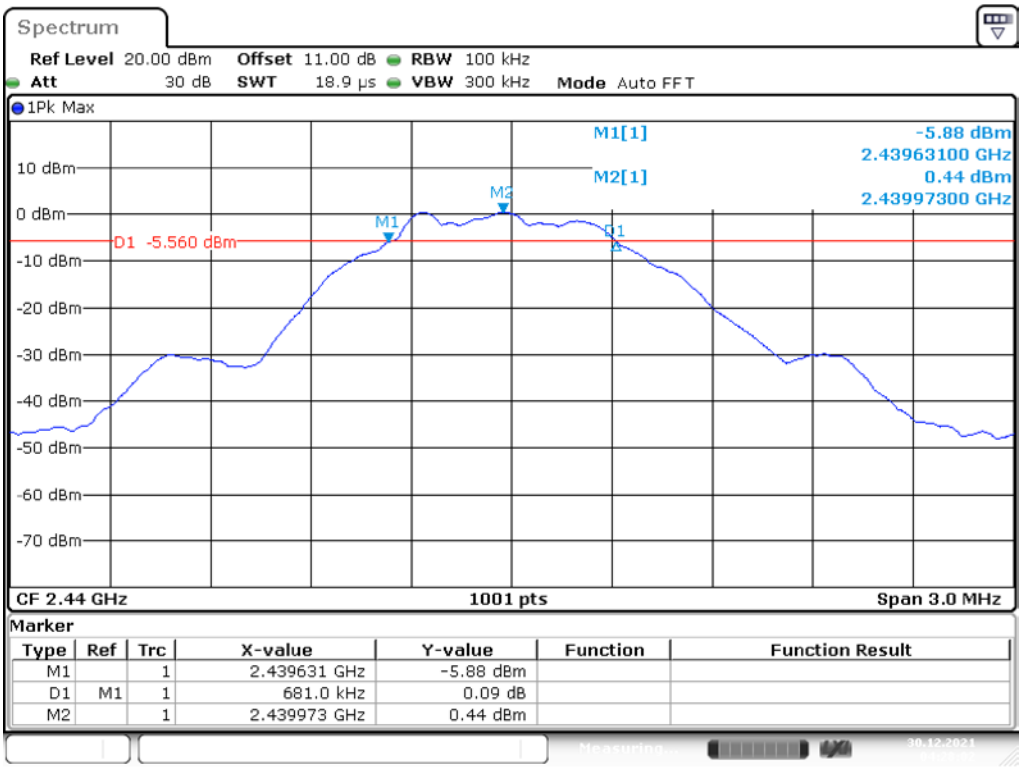
Middle Channel



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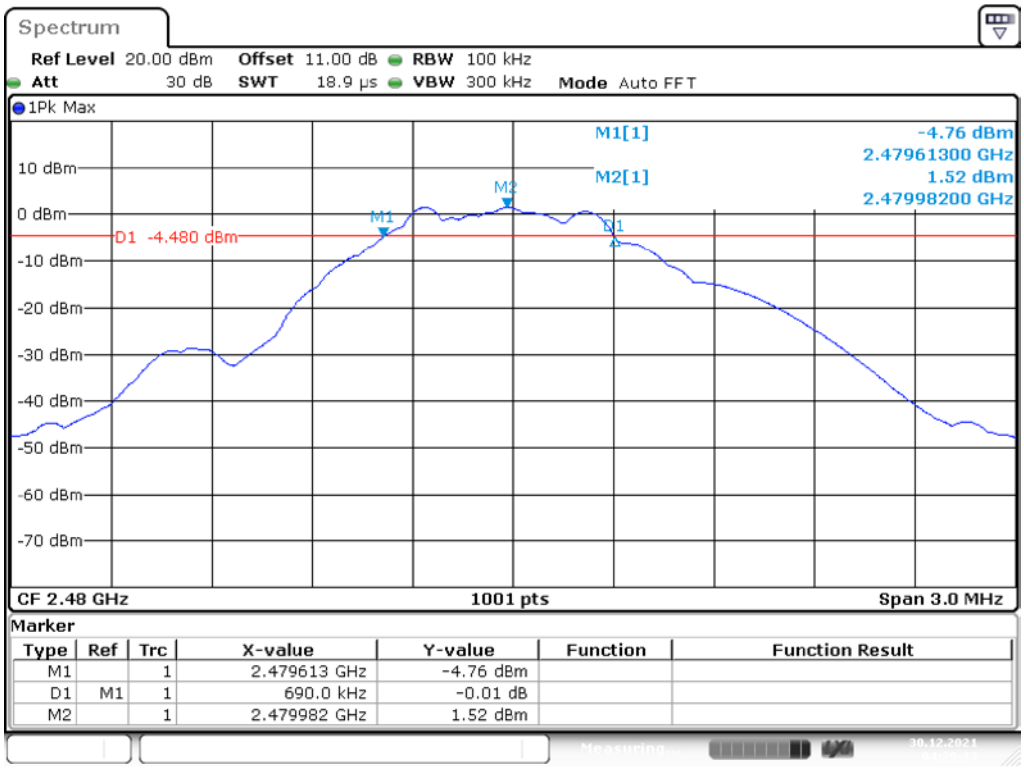
High Channel



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7 FCC §15.247(b)(3) – Maximum Output Power

7.1 Applicable Standard

According to FCC §15.247(b) (3).

Systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

7.2 Test Procedure

1. Place the EUT on a bench and set it in transmitting mode.

2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to measuring equipment.

7.3 Test Results

Conducted Peak Output Power

Channel	Frequency (MHz)	Power (dBm)	Power (W)	Limit (W)	Result
BLE Mode					
Low	2402	2.01	0.0016	1	PASS
Middle	2440	1.87	0.0015	1	PASS
High	2480	2.74	0.0019	1	PASS

8 FCC§15.247(d) – 100 kHz Bandwidth of Frequency Band Edge

8.1 Applicable Standard

According to FCC §15.247(d).

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator 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 the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

8.2 Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.

3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.

4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.

5. Repeat above procedures until all measured frequencies were complete.

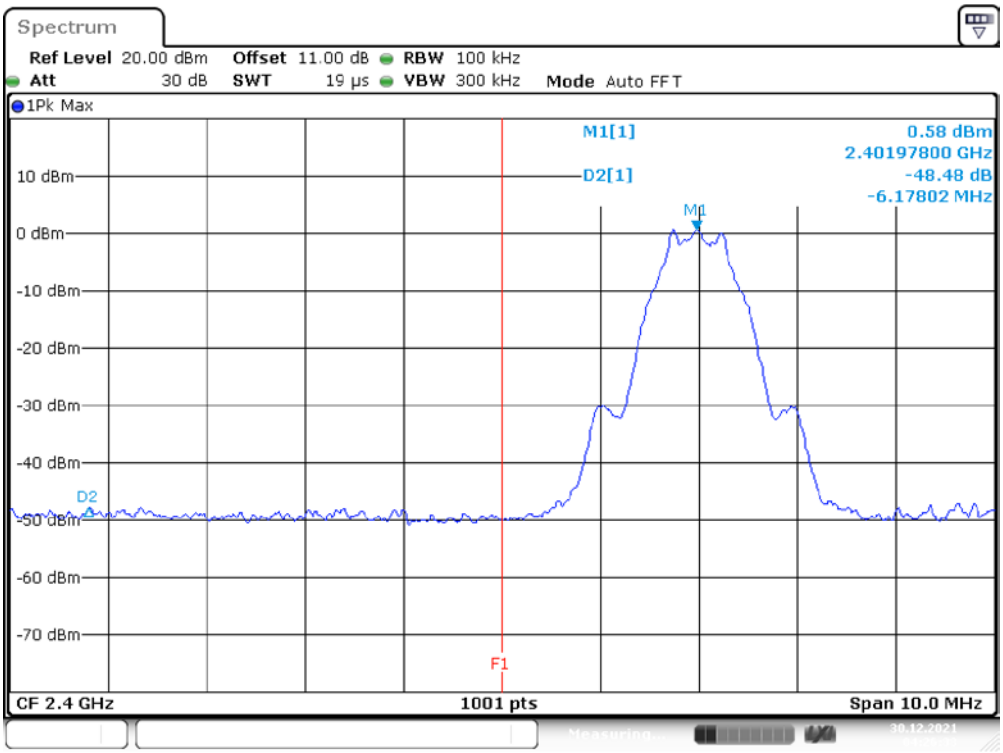
8.3 Test Results

Channel	Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)	Result
Low	2402	48.48	≥ 20	PASS
High	2480	49.56	≥ 20	PASS

Please refer to the following plots

BLE Mode

Band Edge, Left Side



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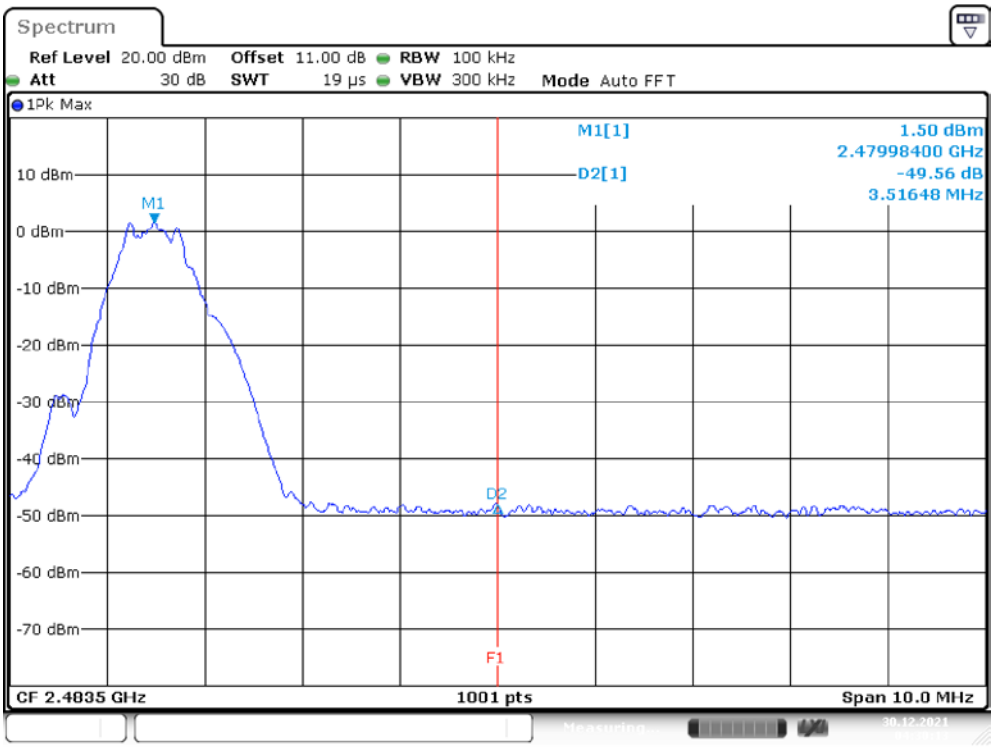
Band Edge, Right Side



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9 FCC §15.247(e) – Power Spectral Density

9.1 Applicable Standard

According to FCC §15.247(e).

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

9.2 Test Procedure

a) Set analyzer center frequency to DTS channel center frequency.

b) Set the span to 1.5 times the DTS bandwidth.

c) Set the RBW to 3 kHz ≤ RBW ≤ 100 kHz.

d) Set the VBW ≥ [3 × RBW].

e) Detector = peak.

f) Sweep time = auto couple.

g) Trace mode = max hold.

h) Allow trace to fully stabilize.

i) Use the peak marker function to determine the maximum amplitude level within the RBW.

j) If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat

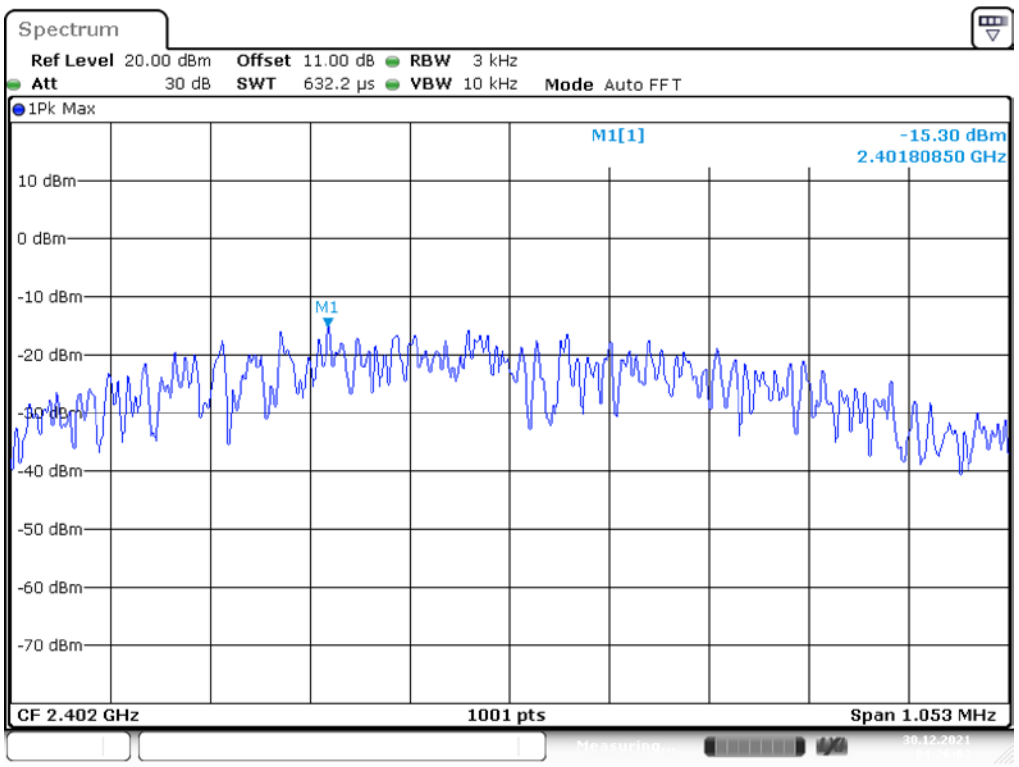
9.3 Test Results

Channel	Frequency (MHz)	Power Spectral Density (dBm/3 kHz)	Limit (dBm/3 kHz)	Result
Low	2402	-15.30	8	Compliance
Middle	2440	-13.48	8	Compliance
High	2480	-14.60	8	Compliance

Please refer to the following plots

BLE Mode

Low Channel



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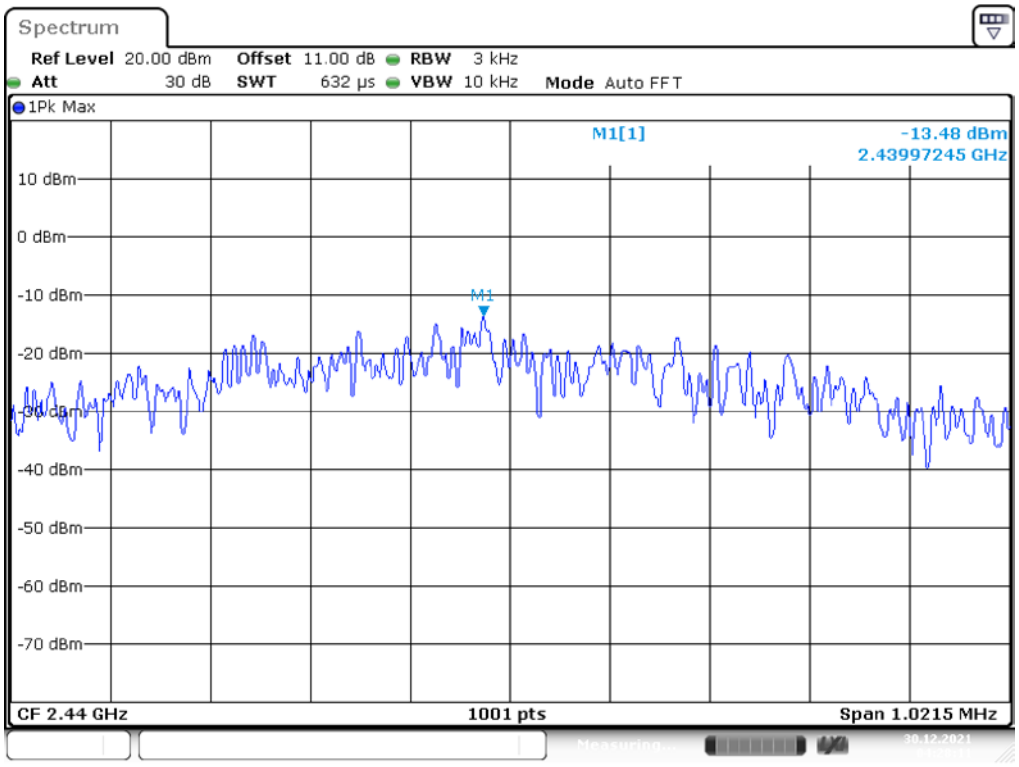
Middle Channel



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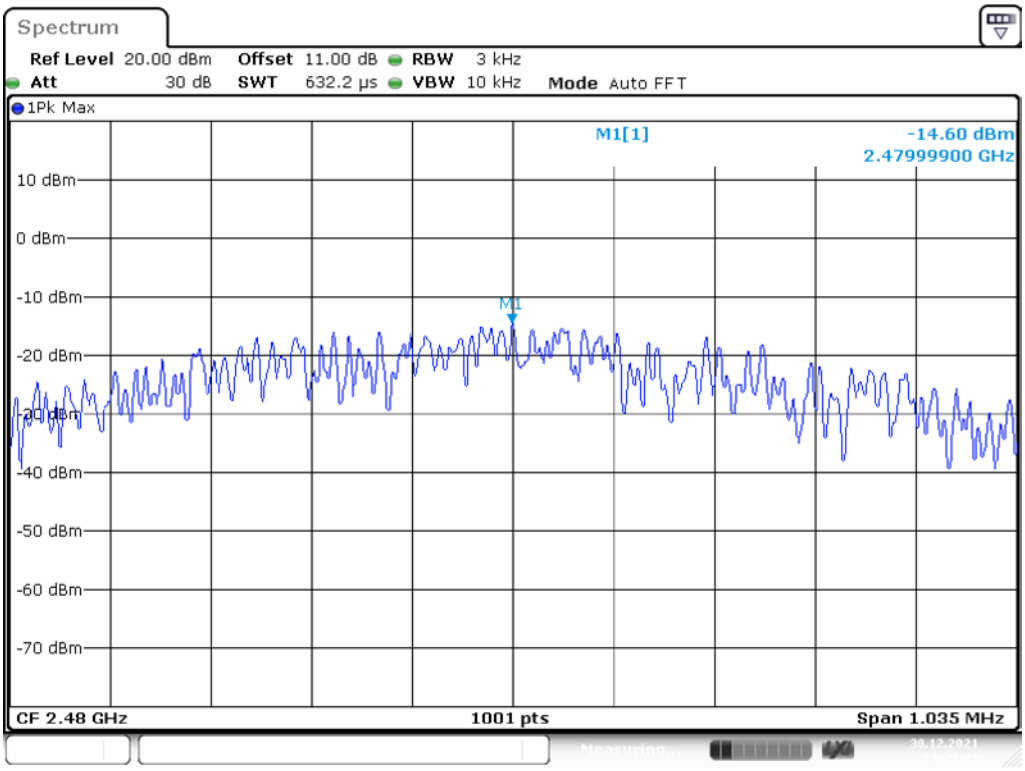
High Channel



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******* END OF REPORT *******